THE COLLABORATIVE EVALUATION AND CO-DESIGN (CEC) APPROACH: PROSPECTS FOR EFFECTIVE SOLUTIONS-INNOVATIONS, EPISTEMOLOGICAL FOUNDATIONS AND IMPLEMENTATION PROCESS

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Abstract. One typical challenge of designing solutions is that they seem feasible in theory but are difficult to implement at scale and to make sustainable. To address this challenge, there is a growing call for the inclusion of every actor in the innovation process. Our study's hypothesis points to the collaborative evaluation and co-design (CEC) approach as the ideal way to the adoption of workable solutions. This methodological design paper aims to introduce the reader to the foundations and the use of this approach. Multiple tests of its effectiveness were conducted in different Moroccan school environments. Then a comparative analysis of the tests' results allowed a revision each time and led to the first finding; the development of the CEC approach based on the theoretical perspective of "*meaning making*" by actors. The second finding is the different steps of its use, namely the exploratory phase and the organization and conduct of workshops. The research identified key opportunities and recommendations for the successful implementation of the findings. Finally, this evolution of design research from a user-centered approach to co-design opens new areas of collective creativity as well as potentially more sustainable innovations in different fields.

Keywords: *corrective actions, meaning-making by the actors, methodological design, stakeholders, workshops.*

Rezumat. O provocare tipică a proiectării soluțiilor este că acestea par fezabile în teorie, dar sunt dificil de implementat la scară largă și de a le face durabile. Pentru a aborda această provocare, există un apel tot mai mare pentru includerea fiecărui actor în procesul de inovare. Ipoteza studiului indică abordarea de evaluare colaborativă și co-proiectare (CEC) ca modalitate ideală de adoptare a soluțiilor viabile. Această lucrare de proiectare metodologică își propune să introducă cititorul în bazele și utilizarea acestei abordări. Au fost efectuate mai multe teste ale eficacității în diferite medii școlare marocane. Apoi o analiză comparativă a rezultatelor testelor a permis o revizuirea și a condus la prima constatare: dezvoltarea abordării CEC bazată pe perspectiva teoretică a „*crearea sensului*" de către actori. A doua constatare implică diferite etape ale utilizării conceptului, și anume faza de explorare și desfășurarea atelierelor. Cercetarea a identificat oportunități și recomandări cheie pentru

implementarea cu succes a rezultatelor. În cele din urmă, această evoluție a cercetării designului de la o abordare centrată pe utilizator la co-design deschide noi domenii de creativitate colectivă, precum și inovații potențial mai sustenabile în diferite domenii.

Cuvinte cheie: *acțiuni corective, crearea de sens de către actori, proiectare metodologică, părți interesate, ateliere.*

1. Introduction

In the late 1990s, a shift started progressively in the process by which organizations, institutions, and companies created value [1]. With growing competition, for example, businesses were being forced to design products "with" their customers, not only "for" them, resulting in the participation of a selected number of customers (if not all) in the creation process [2]. That shift in the balance of influence between individuals and institutions was not unique to businesses. In government, open governance was beginning to be adopted. Education systems, for example, have seen the institutionalization of the participation and collaboration of parents and the wider school community in the management of education systems in most countries around the world [3]. The core idea was to bring together the expertise of system designers and researchers with that of people whose work would be affected by the service, product, or change [4].

The collaborative approach has been proven to improve the creative process, the service or result of a project, the management of projects as well as the longer-term effects, whether on a market or a community [5]. However, while this significant progress is being made, implementing a collaborative decision-making approach with the effective participation of all stakeholders remains challenging. Therefore, this paper aims to discuss a methodological approach to successfully implement collaborative evaluation and co-design of corrective actions. The methodological design described in this work is based on the author's experience and practices by means of workshops over the years. It has been developed, improved, and tested in the school environment, but could be used in other fields such as health, community, cooperatives, etc. We first present the theoretical framework before outlining the methodological approach. The methodological framework of this work involved empirical tests of the approach through its use in several contexts and on various issues namely related to education in Morocco. Along with the inclusion of all actors from numerous schools' educational communities, we were able to continuously make comparisons of the results of the tests and reveal patterns of the approach's implementation to improve its use and develop its implementation process. This process draws on the principles of open government and collaboration to conduct performance evaluations, assessments, as well as ideation and corrective action planning sessions by involving the various stakeholders in the concerned communities.

2. Theoretical Framework: an Epistemology of "Meaning Making" by the Actors

The foundation of a collaborative approach is that it occurs in groups of people with diverse backgrounds but with a common interest in resolving an issue. They interact using language, signs, and tools to express their ideas and reach or not a consensus. Each actor makes sense of what a certain aspect means to him depending on his previous knowledge and experience. And that's what we call "Meaning making" which "designates the process by which people interpret situations, events, objects, or discourses, in the light of their previous knowledge and experience" [6]. In this paper, we use five theories as shown in the figure

below, to approach and analyze the process of "Meaning making" by the actors on which the CEC approach developed in this work is based: Interactionist theory, Actor-network theory, activity theory; co-design theory and systemic theory.
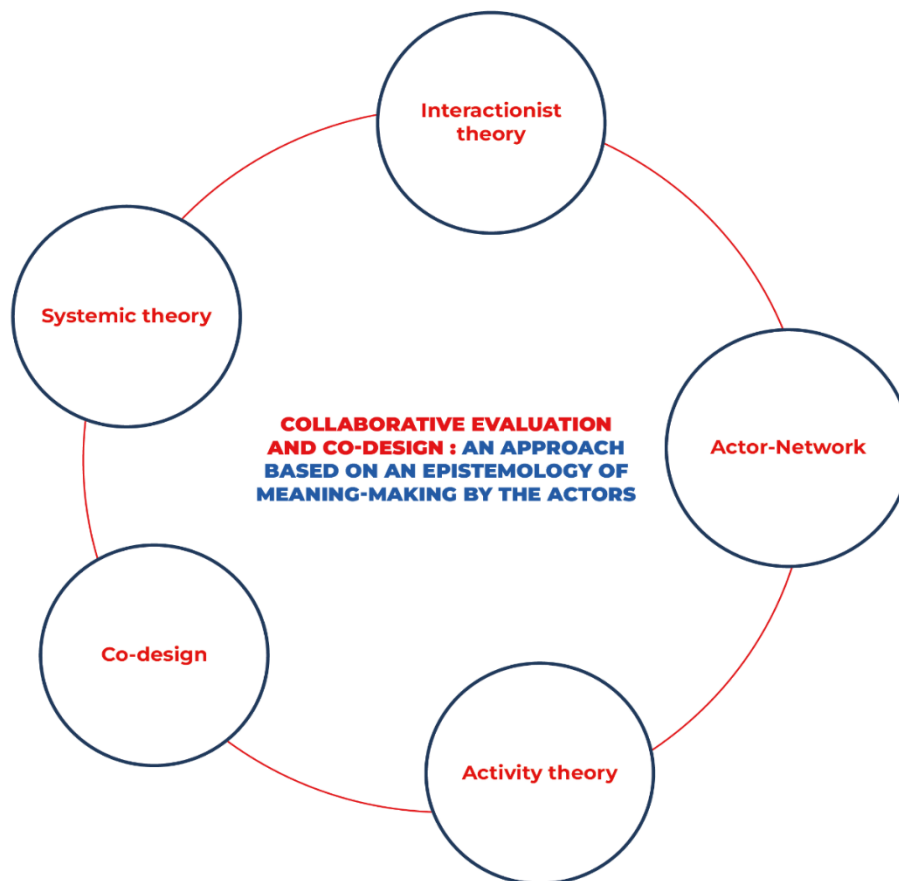

Figure 1. Overview of the theoretical framework of the epistemology of "meaning making" by the actors. the co-design process (right) [7-8].

2.1. Interactionist theory

Interactionist theory is predicated on the idea that human beings, through interaction with others, create meanings for themselves and others, and use those meanings to act in the world [9]. From this point on, symbolic interactionism focuses on describing this exchange of meaning through language and symbols.

Goffman, a leading figure in symbolic interactionism, went through several models before establishing his conception. He first used a dramaturgical model, then a game-theoretic model, an ethological model, and finally a conversational model [7]. He states that interactionism refers to the rigorous framework of micro-sociological analysis that advocates the empirical use of movement between actors and systems in the analysis of social facts [7,10]. This perspective is enhanced by the use of systems theory.

2.2. Systems theory

Systems Theory brings together the set of theoretical principles that explain the systemics[11]. The systemic theory is based on the logic of the system. Thanks to a holistic vision, it allows going beyond the limits of classical Cartesianism to approach complex subjects that were refractory to the latter. The system is defined according to each scientific field. However, it refers to an assembling of elements functioning in a unitary way and permanent interaction. Bertalanffy evokes the general theory of systems, during his research

where he explored various fields of application of the theory including psychology, and sociology with levels of organization [11,12]. To this end, he discusses general systems theory based on three levels of analysis including systems science, systems technology, and systems philosophy.

Groups of people interacting together to come up with a solution is a system. In fact, systems theory provides a way to explain the interactions between small group systems and the systems in which they are nested, such as the plenary sessions that constitute another system. This theory is especially valuable since our basic assumption for the value of collaborative work is that "the whole is greater than the sum of its parts" [13]; which is exactly the basic principle of systems theory.

2.3. Activity theory

Activity theory is a concept that stems from the work of Soviet theorists in the early 20th century [10]. These theories are coming back to the forefront with issues related to cognition, learning, and teaching [14]. The premise of this theory is that every activity is implemented by people with an intention in a community governed by rules, to achieve a goal, the purpose of the activity [15]. The added value of Activity theory is that it considers tools, signs, or other artefacts as well as rules of the community mediating the activity as actors without which the activity will not either exist at all or be significantly deviated from its objective, creating thereby another activity. The figure below is a representation of the structure of this interaction between all these actors to reach an action. Activity theory offers a conceptual framework from which one can understand "the inter-relationship between activities, actions, operations and artefacts, subjects' motives and goals, and aspects of the social, organizational and societal contexts within which these activities are framed".
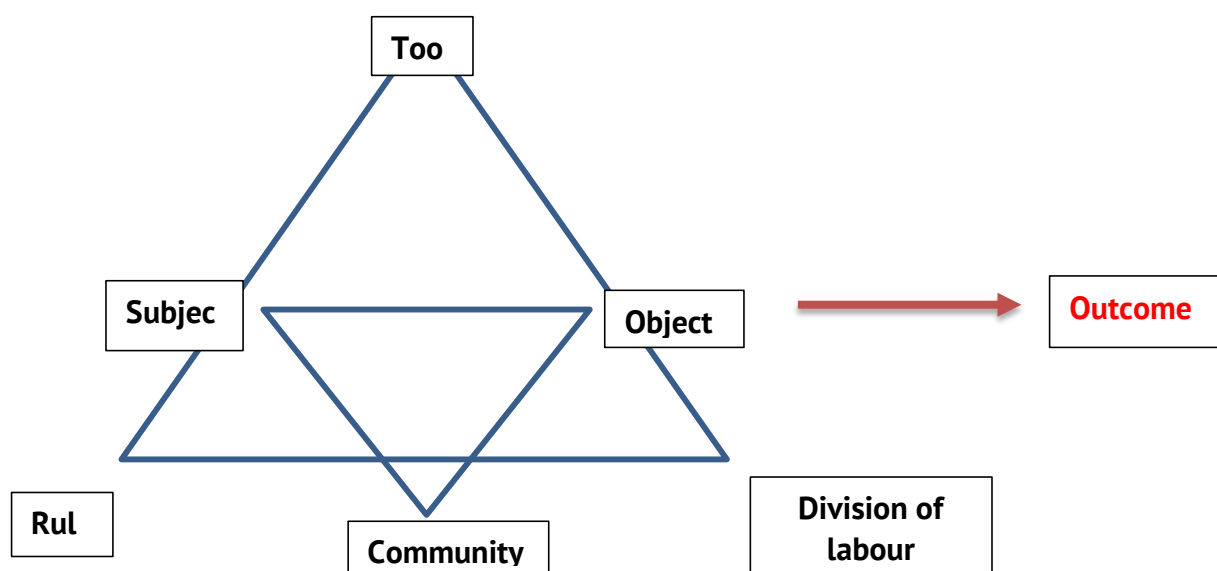

Figure 2. The structure of human activity [15].

2.4. Actor theory, actor-network theory

Actor theory was developed by Michel Crozier and Erhard Friedberg in the 1970s [16]. It is a central theory in the sociology of organizations, developed within a strategic analysis. The Actor-Network theory was developed during the 1980s by a group of sociologists [17], dealing with interactions not only between human beings but also with non-human "agents".

Latour suggests that every agent in a network, whether human or not has the same importance, and constitutes itself a network; every element of a network has its agency [18]. The group of sociologists at the origin of this theory [17] asserts that the success or failure of a network lies in its capacity to link heterogeneous "actors", by engaging them in structuring conflicts or controversies that are a good way to achieve social acceptability of innovation.

2.5. Co-design

Collaborative design is a new pedagogical approach. It is opposed to the old one which is critical and stressful. It is a more collaborative approach, less competitive, encouraging learners to help each other. In education, for example, it allows learners to learn to think aloud, without blocking or fear of rejection [19]. Researchers are calling for the integration of education and research actors in this innovation process for easy adoption of solutions [20,21]. Co-design has evolved into co-creation, which could lead to more sustainable solutions. Collaborative research focuses on contributing to both improved practice and theory building [22]. The figure below shows a shift from user-centered input design to co-design and how the merging of actors improves their role in the design process. This approach leads to a shared understanding of the user experience between users, researchers, and designers [2,23].
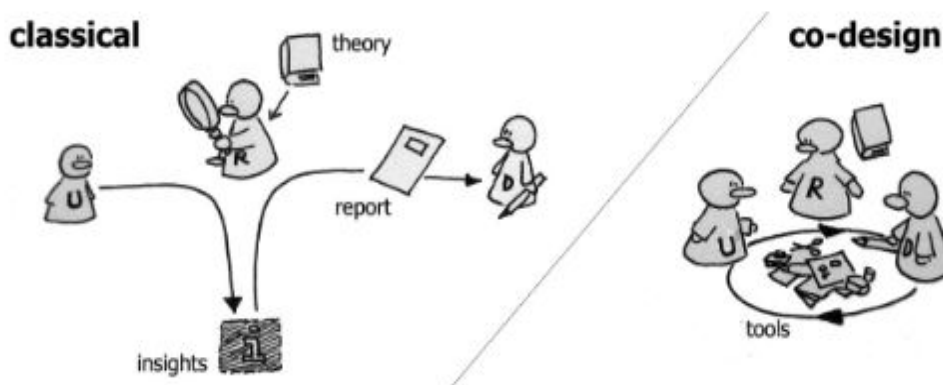

Figure 3. The classic roles of users, researchers, and designers in the design process (left) and their merging in the co-design process (right) [3].

3. The Collaborative Evaluation and Co-design Approach (CEC)

The collaborative approach is a proven approach that addresses all facets that a process involves. Applied to research, it focuses on the co-construction of knowledge with participants according to a collaboratively determined research objective [24]. A collaborative (or cooperative) learning approach involves people working together on activities or tasks in a group small enough to ensure that everyone is participating [25,26]. People in each group can work on separate tasks contributing to a common overall outcome or work together on a shared task. Eventually, working bringing all pieces of work together leads to co-design.

3.1. Exploratory phase and establishment of the resources and stakeholders' map

During the exploratory phase, it is crucial to learn about the general directives at the highest level of decision-making as well as actions underway in the specific sector targeted by the project. At the level of a country, this implies meetings with the key actors in the public to better understand and align one's actions to the national directives, the experiences in progress through the initiatives, and the actors concerned by the project.

At the local level depending on the coverage of the project, researchers can sample a number of study subjects randomly according to the proportion of each cluster. For example, when the study subjects are schools, a sample of schools may be constituted in consultation with representatives from the Ministry of National Education based on each school's monograph. After sampling, the exploratory work will consist of "casual" visits to the study's subjects in order to establish initial physical contact. These meetings are a good start to set up the map of stakeholders and resources. The process of establishing a stakeholder and resource map is described as follows.

3.2. Realization of the stakeholders and resources map

The aim is to identify the resources available within and around each unit of study, as well as local actors who influence directly or indirectly the functioning of the single unit of study.

The construction of the map of resources and actors is based on a technique known as the Collective Rapid Conflict and Strategic Group Identification Survey [27].

The process of building the stakeholder and resource map can be summarized in 3 steps:

Step 1: Identify the stakeholders

To create a stakeholder map, the first step is to identify all the stakeholders. These may include government agencies, people directly involved in the life of the school, local communities and associations, parents, employees, suppliers, students, etc.

Using whatever means available: brainstorming, focus groups, systematic or unsystematic individual surveys, literature, historical data, school records, etc., to make a comprehensive list of all the organizations, groups, and individuals who may have an influence on the life of the subject of study.

Step 2: Categorize the stakeholders

Once a comprehensive list of stakeholders is established, the focus becomes to categorize them relative to the topic or issue that will be evaluated. To do this, it is important to think about the resources and roles of each stakeholder in relation to the issue and group them into a few broad categories. Then, within each of these categories, group them into even more homogeneous subcategories. This will allow to divide the stakeholders into targeted groups and communicate more effectively and efficiently with each of them.

Step 3: Analyze the stakeholders

Still taking into account the issue, it is crucial to define the criteria according to which a stakeholder is indeed essential in this participatory process, or not. Any stakeholders that do not meet these criteria will be removed from the initial list of stakeholders.

It will then be determined, still in relation to the issue, on the axes of interest and influence as indicated in the figure below, where each stakeholder on the list selected fits in. This is not an arbitrary exercise, but a synthesis based on discussions and information collected during the exploratory phase.

For this purpose, a scoring method is recommended to rate the interest and influence of each stakeholder on three levels (low, medium and high). To successfully complete this stakeholder map, a good knowledge of the profile of each stakeholder is necessary, because the more partial or inaccurate the knowledge, the less relevant the results of the analysis will be.

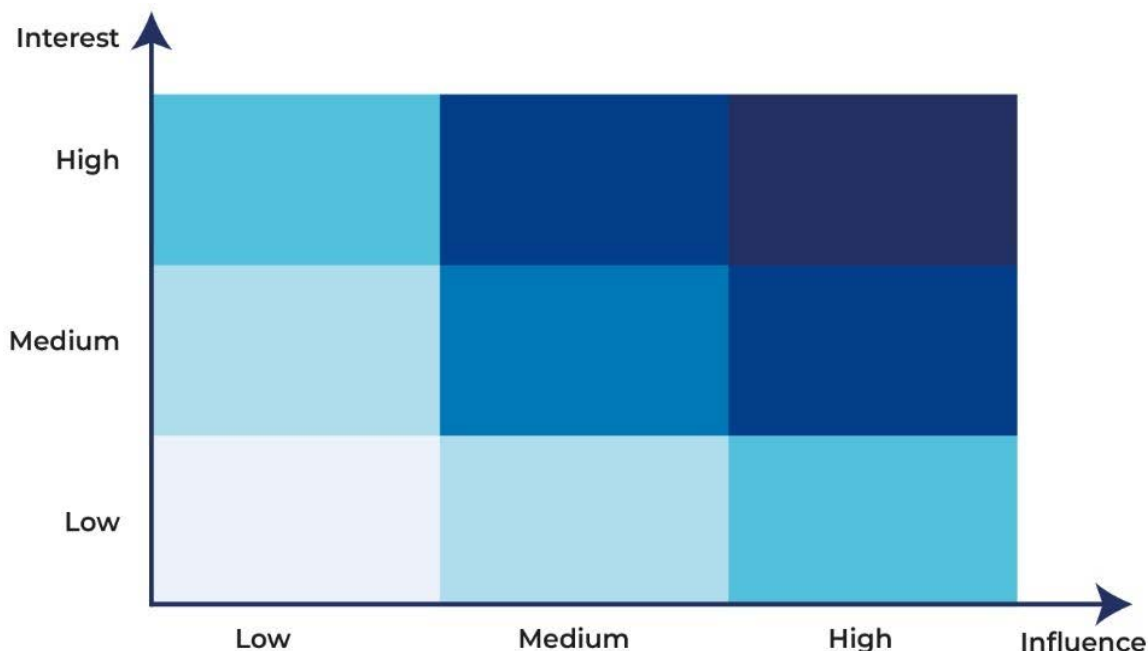A list of stakeholders and key resource needs will be developed.

Figure 1. Stakeholder Mapping Model (Influence X Interest).

3.3. Organization and conduct of the typical workshop

Depending on the framework of the study, the codesign workshops can be one-day or two-days workshops. They usually unfold in two main stages each with several sub-stages. The first stage generally consists of identifying and evaluating the reality or the performance of the main subject of the study (a school for example) by stakeholders. The second builds upon the results of this first part to identify and plan actions to be taken to eventually generate a co-designed solution.

In the first phase, researchers can divide the participants into relatively homogeneous interest groups and designate a rapporteur and a representative to report back to the plenary.

This step precedes the launch of an open discussion based on a short open-ended interview guide addressing crucial points of the topic of interest. This guide provides a list of themes to be revisited, but not to be suggested directly to the participants.

The inventory is carried out by the members of each group with the help of a facilitator. Each working group should then identify evaluation criteria and proceed to an evaluation by scoring. After these group discussions, their work is presented in plenary accompanied by pooling and discussion of the assessment and evaluation to agree on the findings. The figure below summarizes the process of the first phase which starts with separate homogenous groups' discussions, followed by a plenary session where the groups go back together once they finish their work. With the help of a facilitator, they present their findings and discuss them with the other groups. The conclusion of the plenary should include a collective validation of the final findings before proceeding to the next phase.

As stated above, the second phase of the workshops generally allows for the collective identification and planning of corrective actions based on the results of the first phase.

This time though, the co-design work of possible solutions is to be conducted in heterogeneous groups. This makes it possible to leverage collective intelligence through fruitful conflicts to design solutions. It is also a solid starting point for the implementation of the proposed and planned solutions. The use of tools such as planning boards, 3D modeling, and scoring tools can make the activity playful, inspiring, and tangible.
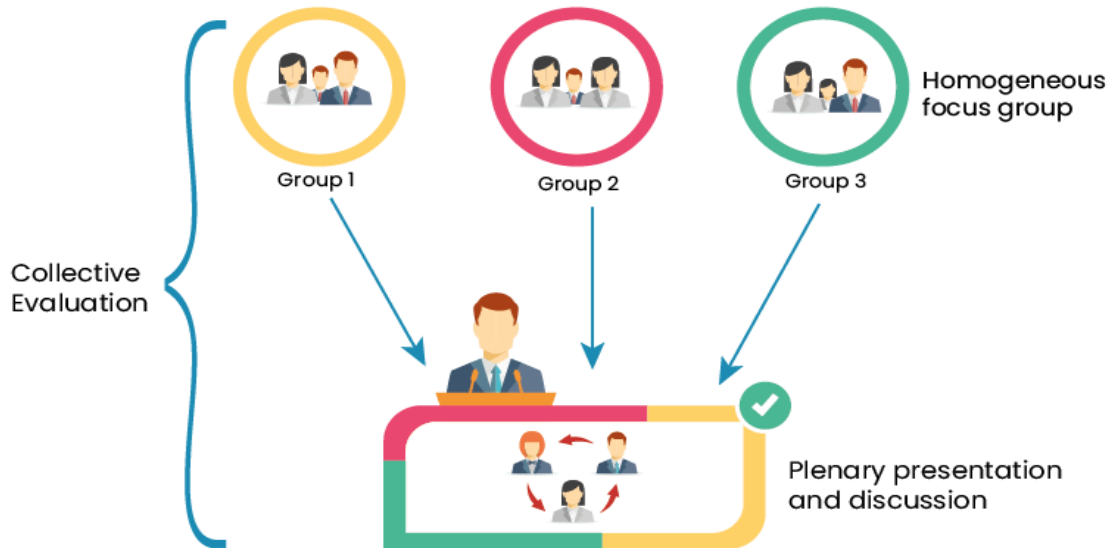
Figure 2. Collaborative evaluation and co-design of corrective actions − Phase 1.

The output of the work of each group must be as detailed as possible. At the end of this second work session, each heterogeneous group presents its work in plenary to leave room for discussions about the optimal options.
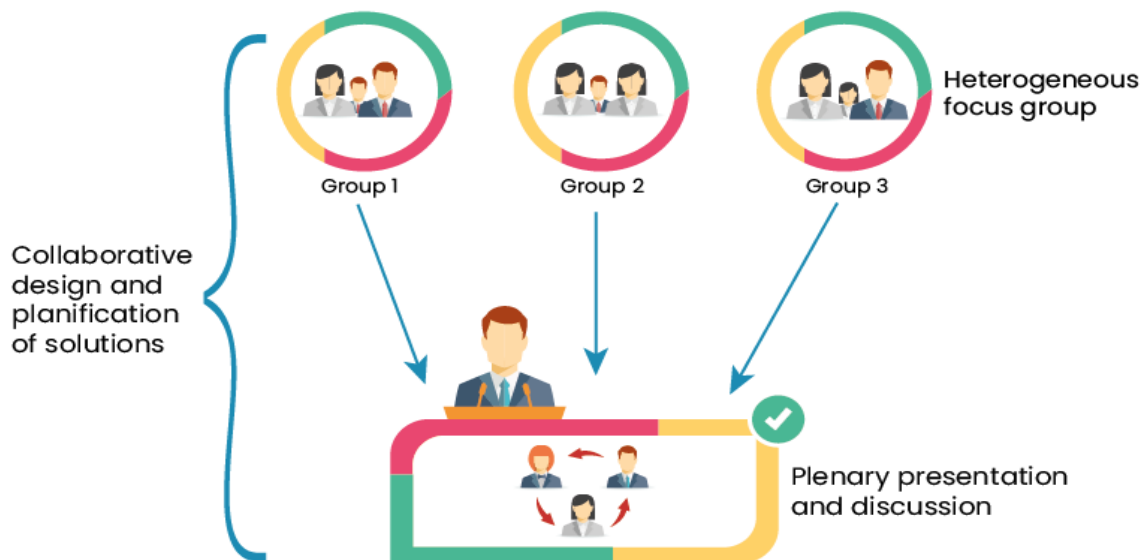The workshops wrap up with a synthesis of the results.

Figure 3. Collaborative evaluation and co-design of corrective actions − Phase 2.

4. Considerations for the Overall Success of this Approach

To ensure that the workshops will lead to optimal results, four basic principles need to be observed.

4.1. The proper representation of the actors involved and the free expression of all:

It is essential to ensure that the various categories of stakeholders are invited and represented. All the social categories concerned by the service, in particular the disadvantaged categories, must express their points of view without fear.

4.2. Skilled facilitators guiding group discussions

The role of facilitators is to ensure that the views of all stakeholders in each group are taken into account during the assessment and planning process. They assist the various stakeholders and groups in expressing their opinions, whatever they may be, in a constructive manner. They are also responsible for preventing conflict situations from escalating. They must be able to analyze issues and defuse explosive situations. Facilitators stand as mediators between participants, their ideas and their formulations, help participants to express their thoughts, reformulate them, question them, deepen them and present them appropriately in plenary. They should not be so involved in the community nor in the study unit or the territorial administration to the point of possibly putting the interests of one group ahead of those of others. Finally, they should be familiar with the discussion guides provided to master the facilitation of discussions. Instead of asking how classes are going in the context of the pandemic, a good facilitator will, for example, be interested in stories of how school operations were managed at the beginning and throughout the Covid 19 pandemic. Facilitators need to be able to engage participants' verbal expressions as well as their visual expressions. Their role is pivotal in the collaborative creativity stemming from the group discussions. Here are key points skilled facilitators embody.

- Mediating between the participants, does not act as a "stakeholder".
- Articulate the statement of work and keep the focus on the tasks' list.
- Encourage inclusion of all participants.
- Keep things moving toward the resolution of the statement of work.
- Stay objective and pay attention to timing.

Facilitators should agree on the facilitation roles beforehand to avoid any "mess-ups" that could negatively influence the group work. It is, therefore, preferable that one person facilitates, and another person takes notes.

4.3. Engage everyone in a constructive and genuine dialogue

It is important to ensure that participants' assessments and judgments of performance and reality do not degenerate into confrontations or invective that are destructive to the process. To do this, at the beginning of the workshop and after a round of introductions by the participants, the facilitators present the objectives, the program, and the approach to the workshop.

The working groups should be set up in such a way as not to disrupt or be disrupted by the discussions in the other groups. The discussion is initiated by an open-ended question that does not guide the answers. Only after a certain amount of time has passed can the moderator reopen the discussion to explore dimensions that may not have been covered.

Feedback is a delicate period, as participants become aware of the critical gaze that other categories of actors will have of them. Facilitators should keep in mind that the plenary session is not intended to produce an average assessment, but to compare points of view so that each category of stakeholder can adjust or not its assessment. Finally, the identification and planning of corrective actions must specify the roles, responsibilities, and needs of each category of stakeholder in addition to being fun and as precise as possible.

5. Conclusions

The initial objective of this work was to explore the foundations and the use of the collaborative evaluation and co-design (CEC) approach. The literature showed that addressing effectively problems in an increasingly complex world is the key benefit of a collaborative

approach to designing solutions-innovations. However, its implementation with the effective participation of all stakeholders remains challenging. Therefore, this work set out to fill in this significant gap. The major empirical findings are summarized based on the conclusions of the empirical chapters announced previously, epistemological foundations and application process. In the first chapter, the "Meaning making" by the actors was identified as the epistemological foundation of the CEC approach, followed by a detailed explanation using five theories to analyze the process of "meaning making" by actors and, thus, the process of the CEC approach; interactionist theory, actor-network theory, activity theory; co-design theory and systemic theory. This process was illustrated in the second chapter where the exploratory phase and establishment of the resources and stakeholders' map, as well as the organization and conduct of the typical workshop, including their different sub-stages, were identified as the two major steps of the CEC approach use. The study concluded that this approach is effective in resulting in workable and sustainable solutions. However, its effectiveness is strictly conditioned on the good adoption of the different steps previously announced. Furthermore, the map of stakeholders and resources resulting from the exploration phase must be comprehensive and precise to generate productive and creative discussions later during the workshops. The quality of the results of the workshops depends largely on the ability of the facilitators to engage everyone in a constructive dialogue and to ensure that everyone can properly express their ideas on the various aspects of the issue.

Conflicts of Interest. The author declares no conflict of interest.

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