

# MANAGING UNCERTAINTY

Innovation as a tool to address  
complex problems

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Managing Uncertainty: Innovation as a tool to address complex problems

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# INTRODUCTION

We live in complex times in which the problems we face challenge traditional solutions. The triple crisis we face, environmental, health, and economic has transformed old problems and created new ones, demanding new solutions. After decades immersed in a paradigm based on the certainty of progress, today we again refer to the future as uncertain.

However, uncertainty is not something new. Public problems have become increasingly complex for decades. Its causes have become increasingly more difficult to identify and define, and neither clear responses nor clear solutions exist to address them. Citizens' safety, urban segregation, obesity, and global warming are all public problems which lack effective solutions (Torfing & Triantafillo, 2016).

In the education sector, for example, the increasing complexity can be observed in relation to enrollment coverage at the primary and secondary education levels. During the second half of the 20th century the challenge of many countries faced had to do with achieving universal coverage of their school system. By the mid-1970s, Chile managed to do so at primary level (PNUD, 2017), and in the early 2000s, the coverage of secondary education reached 93% (SITEAL, 2020). This was accomplished through efforts focused on increased spending in the sector, higher teacher salaries, creation of the full school day, curricular reform, and the development of programs to improve the educational opportunities in the most disadvantaged communities and institutions (OECD, 2017a).

However, the challenge of attracting children and adolescents to the education system has now mutated into a new problem: concern for students who interrupt their educational trajectory by abandoning the school system. The Chilean Government has stated that one of its priorities is addressing the problem of children and adolescents between the ages of 5 and 18 who do not attend an educational institution (Gobierno de Chile, 2018), which amounted to 186,723 children and adolescents in 2019 (MINEDUC, 2020).

School dropout corresponds to the interruption of the educational trajectory of the student, who, having been enrolled in a given year does not enroll the following one, without having completed high school. In general, it is the consequence of a progressive distancing process between the child or adolescent and their educational community (MINEDUC, 2020). Historically, the interruption of compulsory education has been understood as "dropping out," a term that places the main responsibility on the student. This way of defining the problem has generated solutions based on assumptions that do not account for the full scope of the phenomenon of school abandonment, obstructing the design of effective solutions for its prevention and reversal (Portales-Olivares, Cortés-Rojas & Peters-Obregón, 2019). The disruption of an educational trajectory is a more complex and difficult public problem than increasing school coverage, requiring innovative intersectoral solutions that promote "*the building of virtuous relationships of inclusion and educational reintegration*" (UNICEF, 2008).

How do we generate solutions for complex problems? How do we address the uncertainty that the unknown creates? This document seeks to analyze how public innovation can be an appropriate mechanism for addressing the growing uncertainty in which we are immersed. Public innovation generally does not refer to a new product, but a change in the relationship between the service providers, in this case the State, and its users (Hartley, 2005), recognizing that public policies and services are co-produced and that users and their environments are fundamental parts throughout the process and its results. It also implies identifying the difference between the risks and uncertainties we face and learning how to manage them appropriately and differentially (Tan, 2020). Innovating requires, mainly, the capacity to recognize what we do not know and generate a strategy to learn continuously, transforming uncertainty into knowledge (Seelos and Mair, 2017).

## The uncertainty of complex public problems

Complex public problems have elusive and hardly univocal definitions, different stakeholders have diverse interpretations about them; they are dynamic over time; they present difficulties in identifying a clear solution, and they are often anchored in specific realities, making it difficult to scale the solutions that are created (UC Public Policy Center, 2019). These types of problems share a common characteristic: they create uncertainty.

According to Knight's classic definition (1921), it is essential to differentiate uncertainty from risk. When we face risks the distribution of the outcome in a group of instances is known (either through calculation a priori or from statistics of past experience), we might not know which one we will happen, but we know which ones could. In the case of uncertainty this is not true, the reason being in general that it is impossible to form a group of instances, because the situation dealt with is in a high degree unique. When we face risks, we know what can happen even if we are not sure whether it will happen or not. With uncertainty, however, we do not know what can happen nor whether it will.

Uncertainty can paralyze an organization or challenge it to act. In the case of governments, uncertainty tends to complicate decision making, as it is difficult for the public sector to recognize that there is no solution readily available to the problem at hand. The uncertainty inherent in complex problems tests the methodologies and procedures commonly used to design public services and programs.

With the professionalization of public administration, states have developed mechanisms that emphasize the design of validated initiatives, focused on standardized implementation of activities and methodologies. It is assumed that officials are able to propose technical solutions to the problems or challenges faced and that the main difficulty lies in potential adverse situations, defined as risks. This approach focuses on standardization—through manuals, protocols, and guidance—and risk mitigation—through early identification and the incorporation of actions to control them.

Complex problems strain this way of doing things, as they create challenges for which the available evidence does not yet have answers, the answers that exist are insufficient, or they have not had the expected results. Traditional methods assume that the problem we face today is similar to problems we have faced in the past and that previous solutions serve to solve future problems (Knight, 1921). In the case of complex and uncertain problems, many times this assumption does not apply.

Addressing uncertainty requires a paradigm shift that applies to how institutions are managed, both in the public and private realms (Tan, 2020). As McGuinness (2020) proposes, it is necessary

to stop clinging to plans, metrics and rules and to be able to live with the anxiety of not knowing or being in control, having the courage to continue acting creatively and productively through uncertainty. Uncertainty demands being addressed through adaptative management of non-standardized processes (Head and Alford, 2015). In the public innovation sector, it requires processes and structures that support and accelerate innovative activities throughout its entire cycle (OECD, 2017).

## Innovation: process and result

The Oslo Manual (OECD, 2018) defines innovation as “a new or improved product or process (or a combination thereof), that differs significantly from the unit's previous products or processes and that has been made available to potential users (product) or brought into use by the unit (process)”.

Public innovation and social innovation are distinguished from other innovation activities as they share a main feature: creating social value through a new or better response to problems or needs. This social value materializes in created benefits or cost reduction for the most vulnerable or society as a whole, beyond what is expressed in private market activity (Mulgan et al, 2007).

In the case of innovation in the public sector, the OECD (2015) emphasizes three characteristics:

- a. **Novelty:** It must incorporate new approaches in the context in which it is implemented.
- b. **Implementation:** It must materialize actions, without remaining only as an idea.
- c. **Impact:** It must generate better public results in terms of efficiency, effectiveness and satisfaction of officials and users.

Innovation can be understood as both a process and result. Referencing social innovation, for example, the Stanford Social Innovation Review (2003) defines it by emphasizing the first thing: “*the process of inventing, ensuring support and implementing novel solutions to social needs and problems.*” In the same publication, Phillips et. al (2008) elaborated on innovation as a result, defining it as “*a novel solution to a social problem that is more effective, efficient, sustainable, or just than the existing solutions, and for which the value created accrues primarily to society as a whole rather than private individuals.*”

Based on the above definitions, we define public innovation as the process and the result of designing and implementing novel solutions to a social problem or need that are more effective, efficient, sustainable, or just than the existing solutions, and for which the value created accrues primarily to society as a whole rather than private individuals. Innovation is materialized when society appropriates the process and the outcome, using them in its favor.

This definition of innovation seeks to emphasize both the process and the outcome (Seelos & Mair, 2016; Centre for Social Innovation, 2019; Westley & Antadze, 2010), that is, to incentivize the creation of solutions that successfully resolve problems, but at the same time allow for understanding and recording how initiatives were generated to be able to scale them over time (Phills et. al, 2008).

The focus on the outcome seeks to assess the transformative value of a solution: first, the impact of the proposal on the resolution of the problem or need; second, the number of people benefiting from the solution; and third, the durability of the effects of this solution over time (Lawrence et. al 2014). The focus on the process seeks to evaluate the creation of knowledge. Assessing innovation only by its external outcome can dismiss the positive internal impact it generates in terms of learning, even in cases where innovation fails (Seelos and Mair, 2012).

## Managing uncertainty

Based on the above, innovating in the public sector involves a process of research, design and methodical testing, in which all of the involved stakeholders are engaged, and learning is managed continuously to iterate and refine the solutions, adjusting them to the specific needs of people and their environments.

A method of innovation based on the management of uncertainty requires as its first stage to identify it. Seelos and Mair (2016), after analyzing the trajectory of various institutions dedicated to social innovation, identify six types of uncertainty present in any process of social innovation:

### 1. Uncertainty about the definition of the problem or need

First it is necessary to correctly identify and define the problem being addressed. Do we properly understand the problem or need and the factors that cause it? This can involve multiple iterations and learning cycles to achieve a level of understanding that allows the design of a solution that addresses the causes (multiple, deep, diverse) of the problem. Insufficient or erroneous understanding of the problem and its causes can generate solutions that seem innovative but are not effective.

### 2. Uncertainty about the solution

Even if the problem has been properly identified, there will be numerous questions to address to create an effective and robust solution. Do the set of actions we are proposing represent a real solution to the problem? Uncertainty regarding the solution reduces the chances of turning the idea into effective innovation.

### 3. Uncertainty about the identity

Innovation can lead the organization in a direction that does not align with its institutional culture or purpose. This can happen due to proximity among people, technical expertise, or characteristics of the territory and its social and community organization. Does the proposed solution align with organizational purpose? If it is not properly aligned, the possibility that the commitment to innovation will be strong enough to overcome setbacks and persist in the escalation process is reduced.

### 4. Uncertainty about adoption

Will people in target communities accept and implement the proposed solution? Uncertainty about different user profiles, their characteristics, and the best ways to communicate and work together should be reduced so that the solution is built from their experience and reality. Not addressing this kind of uncertainty reduces the chances that a solution, even one that "apparently" works, will take hold among the intended users.

### 5. Uncertainty about management

Implementation depends on countless practical variables that must be properly managed. It is necessary to resolve which is the most efficient way to implement the designed solution and its practical implications. These include aspects such as the duration of activities and their order, associated costs, human resources (profile, recruitment, workload, supervision), training needs, coordination and partnerships with other institutions, monitoring mechanisms, and supervision. Does the ability to execute and supervise the innovation processes in a productive manner exist? Unproductive management reduces the possibility to implement and support a solution.

### 6. Uncertainty about consequences

We must analyze the direct consequences and externalities of the intervention regarding the users and their environment. Attention should be paid both to the positive and negative consequences. Is there a risk that the solution will not produce the desired effects or will cause negative side effects? It is common for implemented solutions to have more consequences than expected at the design stage. Addressing this uncertainty enhances the positive impacts of the intervention and reduces the possibility that the innovation generates a negative social impact at an aggregated level.

The proposed process of innovation based in the management of uncertainty aims to transform uncertainty into knowledge by managing learning during the full cycle of research, design, testing and implementation, to consolidate a solution relevant to the challenge addressed. To achieve this, hypotheses must be generated for each type of uncertainty and tested through a trial and iteration process that allows to generate, manage, and systematize learning on each matter.

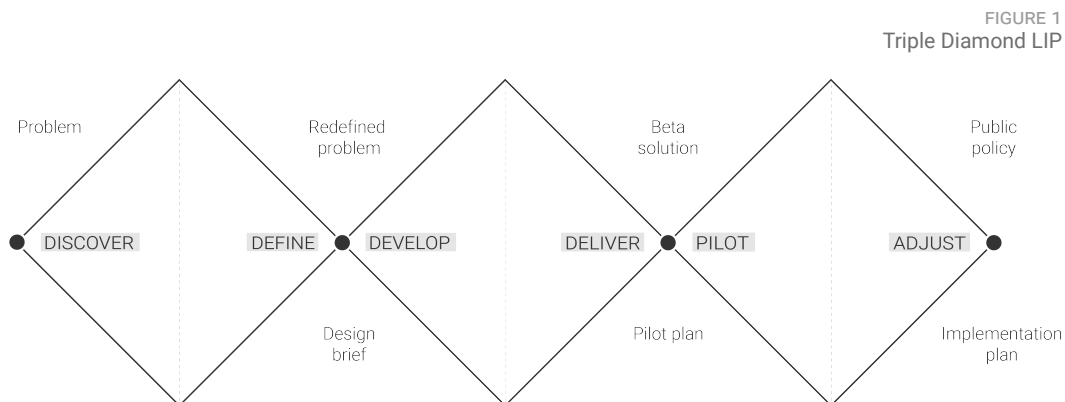
## Methodology of the Public Innovation Lab

Based on the methodology on the Design Council's Double Diamond (2007), the Public Innovation Lab (LIP) at the Pontifical Catholic University of Chile developed a methodology to implement public innovation processes centered on users and their environments (LIP, 2017).

The design process originally created by the Design Council (2007) consists of two diamonds, which have been widened by LIP adding a third which is centered on the piloting and scaling stages necessary to transform a design into public policy. The model proposed is the Triple Diamond (see Figure 1) which is structured in 6 stages: Discover, Define, Develop, Deliver, Pilot, and Adjust.

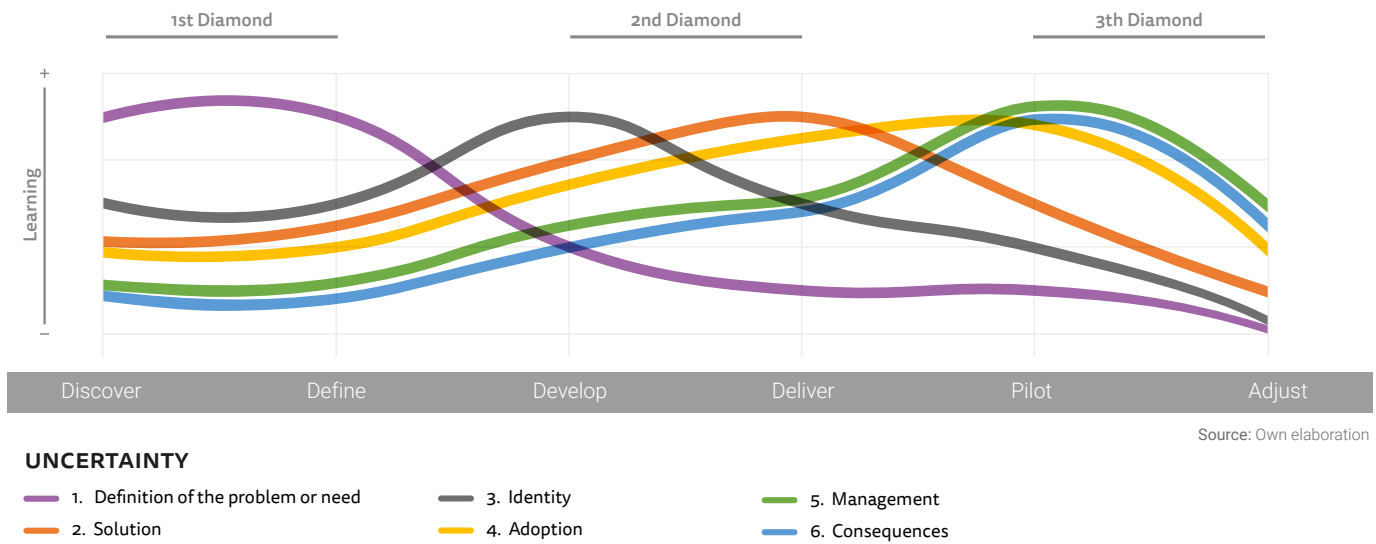
Every diamond seeks to manage, through specific tools, the different types of uncertainty that emerge during the design of solutions to public problems. The first diamond addresses the uncertainty through research, the second through prototyping, and the third through piloting. The learning generated in every stage is the fundamental mechanism that guides the process (Mulgan, 2006).

Moving through the three diamonds helps generate learning about the six types of uncertainty through a comprehensive approach and involves being attentive at all times to the hypotheses that have been formulated regarding each of them. Notwithstanding the above, each diamond is especially useful for generating learning about specific uncertainties. During the first diamond particular emphasis is placed on learning about the definition of problem or need and identity. Throughout the second diamond it becomes essential to learn about identity, solution, and user adoption. In the third diamond, piloting allows for learning especially with respect to management, adoption and consequences. Figure 2 summarizes the expected learning behavior throughout the three diamonds and their six stages.



Source: Own elaboration based on the Double Diamond (Design Council, 2007).

FIGURE 2  
Behavior of Uncertainties in the Triple Diamond



Source: Own elaboration

## First Diamond/ Co-Knowing: Research

The first way to develop and test hypotheses to reduce uncertainty is through research. Co-knowing involves recognizing that research is a collective process that addresses systematizing and deepening formal and non-formal knowledge in the hands of all stakeholders. To achieve this, different stakeholders must be integrated, and methods triangulated in order to be able to approach the complexity of reality. Research is a collective exercise that should be as comprehensive and open as possible and whose results pertain to everyone involved. Much like services, research is also co-produced.

Research must consider secondary and primary sources, utilizing quantitative and qualitative methodologies. Secondary research is that which is done on existing sources, involving bibliographical review, background analysis, references, and analysis of quantitative data. These types of instruments allow the systemization of existing formal knowledge.

In-depth qualitative research is essential within this framework. It allows for inquiry into the formal and informal knowledge that is in the hands of stakeholders, clarifying initial uncertainties through conversation, observation and experimentation with the reality being addressed from the perspective of the people involved and their environments.

This process will answer some of the initial questions and generate many others, starting the process of iteration and learning management characteristic of innovation. In-depth qualitative research allows "listening, understanding, and empathizing with different types of users and agents, opening space to encompass the complexities of the individual and the collective" (LIP, 2017).

The research stage allows addressing in-depth uncertainty about the definition and understanding of the problem or need, reducing the possibilities of beginning an innovation process on an erroneous assumptions. Furthermore, this stage permits the generation of understanding on the context and the users, input that will be key in resolving the other types of uncertainty.

## Second Diamond/ Co-Create: Prototyping

The most relevant solutions are not found in the hands of a few people, but in the hands of many. Collaborative work is transformative in form and substance and is a key part of the process of innovating. Co-creating involves a profound process of deliberation, defined as the "exchange in which people can share their ideas and perceptions, but also actively listen to those of others, in such a way that new ideas or solutions are generated which are the product of the interaction between participants" (Bojer et. al., 2008). To co-create means to imagine, remember, iterate, modify, change, and revisit. It is a path that requires time and openness, letting go even of what we thought was fundamental when we began.

In order for co-creation to be accessible to everyone involved, it is essential to make ideas tangible, since abstract discussion of concepts often makes deliberation difficult and excludes certain groups of stockholders. Thus, prototyping tools become fundamental to the process. Prototyping refers to the design of a work model of a product or service that can be used to understand the reactions of people and their environments (Murray et. al,

2010). Osorio (2010) elaborates on the concept of prototyping to prototyping and testing cycles. These cycles are aimed at refining concepts through tests and iterations that allow the discovery of problems, decrease the occurrence of failures, and identify the best alternatives.

Prototypes vary at level of depth required. As solutions are tested and knowledge is incorporated, these can range from fast low-cost activities, to more complex processes requiring more resources of time and money (OECD, 2017c; Osorio, 2010). To the extent that prototypes become more complex, they may seek to test a limited version of the product or service, or a portion of it, in the “real world” to obtain feedback on the design of the solution with the findings of the practice (Murray et. al, 2010).

These prototypes allow the possibility of error, without implying internal invalidity of the experimentation process. Errors are catalysts for adapting new hypotheses about the service or product and its strategy. Through the experimentation, iteration, and validation generated by learning, the likelihood that delivered products or services will respond to the needs of users in practice increases, reducing both uncertainty and risk in the large-scale implementation (Traube et. al, 2017).

Several prototyping instruments exist. In general, the stage begins with a concept prototypes, which consists in making tangible (through diagrams, flow charts, models, and others) the conceptual structure of the proposal. This instrument allows for preliminary addressing of the uncertainty around the solution being designed, permitting quick understanding at a low cost. In this stage, regular design and iteration work with the users is key to refine the concept test and reduce the general uncertainties about the designed solution. The concept prototype also allows for early addressing of identity uncertainty, avoiding the involvement of the organization in the design of solutions that do not align with its institutional mission or anticipating a process of subsequent transfer of the solution being designed.

In the second stage, prototypes are developed from low to great complexity that permit deepening knowledge about uncertainties regarding the solution and the future adoption of users. A prototyping and testing process will allow for the necessary adjustments to the design so that it functions properly and increases the chances of adherence by future users. Prototyping also allows preliminary evaluation of aspects related to the management of the solution and its impact, but these will require a longer testing period for its future evaluation. Throughout the second diamond, data must be collected in order to turn experience and learning into applied knowledge.

## Third Diamond/ Co- Produce: Piloting

Co-production is a principle intrinsic to the process of public innovation. Alford (2009) defines it as the active behavior by the user, which is conjoint with agency production, or is independent of it but prompted by some action of the agency, either intentionally or unintentionally creates private and/or public value on the form of either outputs or outcomes. Solutions should be centered on people and their environments and must be constructed and adapted with them. Being in charge of the design of a solution only delivers apparent control over it; real control is in the hands of those who use it. The innovation process implies testing and adjusting and being willing to make the necessary changes to assure its correct functioning.

The piloting of solutions is conceived as a long-term test of the solution that permits verification of these aspects and corresponds with a critical step before its implementation (IDEO, 2019). The pilot consists of the implementation and “beta” testing of solutions and their improvement through the involvement of more agents and users. The solutions are called “beta” because the design is recognized as not definitive and invites those involved to actively participate in its continuous co-creation (LIP, 2017). Formal management methods of data collection, learning and evaluation should be used during piloting to measure the extent to which the solution contributes to resolve the problem or need that motivates it.

Pilots help reduce uncertainty around the consequences of the designed solution, evaluating if it achieves the desired impact and whether it generates undesired adverse effects. Furthermore, the pilot helps address uncertainty about the management of the innovation, understanding the various practical aspects that determine the viability and scalability of the proposed solution and giving the opportunity to make adjustments during the pilot’s development that correct detected errors, address the limitations, and validate the impact of the changes made. The pilot will facilitate learning and create key knowledge that will allow for the scaling up of the proposed solution.

The cycle of innovation is not an infallible answer, which will always generate a successful result, this is why it should be considered also as a process, an investment that allows organizations and people to improve their ability to learn and accrue knowledge over time. Innovation as a process works only to the extent that one is willing to recognize our own limitations and put them to the test, accepting error and learning as guides. Seelos and Mair (2017) put particular emphasis on the central goal that to innovate is to transform uncertainty into knowledge, through learning. In this sense, the success of this process depends on the capacity of the institutions to learn and share this learning throughout organizations and the community.



# Managing uncertainty – A concrete example

The beginning of this article addressed how the problem of students abandoning their school trajectories has become one of the most complex challenges for the Chilean education system today. In this section the problem will be considered following an innovation process that sought to design new and appropriate responses to solve it. This example shows how various types of uncertainty can be addressed throughout the design, prototyping and piloting of an innovative solution.

The SÚMATE<sup>1</sup> Foundation has worked for more than 25 years promoting the recovery of educational trajectories, wellbeing, and social inclusion of children and adolescents who are in situations of poverty and exclusion. SÚMATE has developed various initiatives aimed at addressing the problem of the disruption of compulsory schooling; however, in the last few years it identified the need to innovate in this regard, designing new solutions that achieve to address this problem in more comprehensively.

## Research

Traditionally, the problem of the interruption of school trajectories has been understood as an individual problem, which affects the de-schooled student. However, based on experience and international evidence, SÚMATE found that this is not an individual problem of the students, but it involves their family, environment, territory, and educational community as a whole. As Portales-Olivares et. al. (2019), point out, *“When a student fails or, finally, abandons their schooling process, generally they do so because the dynamics of their educational establishment -and the educational system in general- collide with their life experiences. This collision or shock is expressed in the inability of the educational system and the schools’ professionals to deal with children and/or adolescents who exhibit demotivation and disruptive behaviors for the educational context.”*

From bibliographic and qualitative research, SÚMATE redefined the problem of the interruption of educational trajectory, which became understood as a complex and multicausal problem, being part of the educational system. A better understanding and definition of the problem allowed them to also define the necessity of addressing it through initiatives that have been implemented within educational communities and not outside, as had been done in Chile up until then.

## Prototyping

From this finding, SÚMATE developed a process of co-creation to design a solution that addressed the redefined problem. A concept prototype was designed based on a previous small-scale experience that had been implemented in a primary school, and the Ministry of Education and the Municipality of La Pintana, through its Department of Municipal Education, were invited to a process of iteration and prototyping in order to incorporate the re-entry process into formal education communities.

At this stage, a prototype was designed with the goal of reincorporating de-schooled children and adolescents with two or more years of school lag into the educational system, seeking to repair damage caused by multiple experiences of school failure within the formal educational system. The design considered that the children and adolescents were to be taught in a multigrade classroom inside a municipal school, led by two teacher-tutors, through the use of innovative methodologies that sought to help them develop their maximum potential.

The collaborative work with these participants allowed proper identification of the solution’s potential users, the roles that the school and SÚMATE would have to develop, the possible establishments where it could be implemented, and general aspects of management. During this design phase, uncertainty related to solution, user adoption, identity, and management were partially reduced.

When they managed to achieve a consolidated prototype, the Ministry of Education presented the initiative to the InnovaFOSIS<sup>2</sup> Program, a grant fund that finances social innovation pilots with the potential to become public policy, obtaining an important part of the resources needed to transform the designed prototype into a learning pilot.<sup>3</sup>

## Piloting

The funding obtained allowed SÚMATE to implement the pilot Aulas de Reingreso, in the district of La Pintana, between December 2018 and March 2020, using the learning management methodology designed by InnovaFOSIS and with the support of the UC Public Innovation Laboratory.

Despite the Foundation’s extensive trajectory and the collaborative work carried out during the prototyping stage, the pilot’s execution forced the executing team to constantly manage uncertainty.

<sup>1</sup> Chilean foundation, dependent on the non-governmental organization Hogar de Cristo. See more information at <https://www.hogardecristo.cl/sumate/>.

<sup>2</sup> InnovaFOSIS is an initiative from FOSIS dependent on the Ministry of Social and Family Development, which finances the execution of learning pilots that have the potential to become social programs under the State.

<sup>3</sup> SÚmate Foundation collaborated with a percentage of the financing.

Many of the assumptions on which the original design had been based were strained during execution and many activities had to be adjusted to achieve the promised results.

### Users

Given that the prototyping stage did not include direct user participation, it was in this dimension where the greatest amount of uncertainty was present and the greatest learning was generated.

The original design was based on the assumption that as there were many de-schooled adolescents in the chosen district, it would be relatively easy to find 25 adolescents interested in beginning the process of re-entry. In reality, this process was much more difficult than anticipated. The first discovery was that the schools had little to no information regarding the adolescents that were not in the school system and few territorial networks that could help in contacting them. To locate potential students it was necessary to implement a strategy with the territorial community (neighborhood committees, social organizations, clinics, municipal services, etc.).

With regard to the willingness to participate in the pilot and adhere to its activities, SUMATE found very little value was placed on finishing formal education, even less than what had been expected. Additional outreach activities were needed to build trust and present the initiative to adolescents and their significant adults in order to motivate them to become part of the program.

### Needs

During the design state much emphasis had been placed on the development of methodologies to meet the educational training needs of the teachers and students. However, the pilot identified two needs that had not previously been sufficiently assessed.

On one hand, the pilot showed the importance of establishing links with adolescents to build the trust and closeness needed for classroom work. Particular attention should have been paid to the language used and to the promises and commitments acquired during this stage. Building and maintaining trust among participants was a recurring theme throughout the intervention, which involved design changes. On one occasion, a planned field trip could not be completed due to the lack of an administrative permit, which led a participant to abandon the program. The mistrust encountered was so high that any breach of a promise or commitment, real or perceived, became an important source of conflict. This involved profoundly changing teacher-student relationship practices to build and consolidate relationships of trust.

On the other hand, it was found that at least three months of previous work before the official start of classes were needed to develop basic necessary skills. It was identified that the adolescents had to understand and appropriate their new role, and that significant adults should understand how to support the

beginning of this re-entry process. This involved redesigning the solution so that activities begin before the formal start of classes, so as to establish certain minimum conditions necessary for the beginning of the experience within the school.

### Solution

The original design of the solution was based on the premise that school reintegration needed to be addressed under the formal system, but the pilot showed the importance of engaging the educational community as a whole from the very beginning. Opening a space within the school, which receives students in their re-entry process, is only the first step; the success of the initiative depends on the school making the process its own and taking it on as part of its daily routine. This implies deeper, time-consuming changes, as they involve modifying behaviors, routines, and practices that are deeply rooted in communities.

For example, it is key that the students being reinserted are integrated into the educational community and included in all regular school activities (assemblies, student center, field trips, events). The design of stable and pre-defined routines and common spaces (recess, check-in times, library, etc.) should also be considered.

### Management

The area in which the pilot probably generated the most learning was the management of the designed solution. Management-related aspects underwent constant changes and adaptations throughout implementation to respond to a complex and changing territorial reality. An example of this was the fact that the school selected for the pilot was changed three times for contingency reasons, ranging from a teacher strike to a pest infestation.

While the design allowed for a period of time for installation, it was not enough and had to be extended. More time was needed to insert activities within the regular functioning of the school and for the hiring of teachers that were not part of the teaching staff. In order to involve the governing body and the school's teachers, mechanisms had to be designed which had not been originally contemplated for awareness-raising and joint work with existing school staff.

With regard to the personnel needed to carry out the initiative, it was confirmed that teachers in charge of the classroom are a key factor in the success of the classroom and that they must be made an integral part of the educational community.

### Consequences

The pilot achieved the expected results on reintegration, but showed that its success requires a greater effort than initially considered, especially in terms of the preparation and accompaniment of students, their families, schools and the community.

Generating an educational community open to permanence and re-entry involves changes in the behaviors and methodologies that take time to incorporate into school routines. Of 18<sup>4</sup> teenagers enrolled, 15 completed the school year, 10 caught up with their age cohort by doing two years in one, and moved up a grade, 3 caught up and passed their grade so they were promoted to sophomores and remained in the program for 2020, and two did not pass their grade but re-enrolled the following year.

The pilot made it possible to understand in greater depth some of the implications that the re-entry process has on the lives of young people. Its implementation showed that re-entry into the school can be disruptive to adolescent routines. Many of them, for example, spent time working or caring for others, activities that are "disrupted" by the re-entry process. It was important to identify these secondary consequences and address them with participants, in order to ensure that re-entry is maintained over time and is sustainable for their context.

### Identity

The pilot reinforced that re-entry is a matter that pertains to the educational community and must therefore be led from the school. The importance of directors and teachers leading the project and making it their own was noted, as much of the success of re-entry is about reinserting students into the school's dynamics in a manner relevant to their needs.

The experience of the SÚMATE Foundation, creating an innovative solution to a complex and long-standing problem, shows the application of the different stages and instruments to clarify the uncertainty and adapt the design to the reality of the territory. Indeed, this experience led SÚMATE to consider what was learned and develop a larger-scale pilot in partnership with the Ministry of Education, which seeks to generate a technical model that allows the State to scale the experience on a national level. Currently, it is being developed in 3 areas in Chile (Coquimbo, Andacollo, and La Granja) with the prospect of increasing to 9 areas during the year 2021. ♦

4 Two students abandoned the program and one left due to moving to a different home.

# CONCLUSIONS



The crises and changes we are experiencing mean that uncertainty has settled into everyday life. The private sector, the public sector, and the third sector are being forced to rethink how to address unresolved and new problems, which seem to exceed the solutions we had for them.

Recognizing and managing uncertainty allows for a paradigm shift that focuses on the ability of individuals and organizations to recognize their limitations and assumptions and learn from mistakes. It is a cultural change that involves designing from knowledge and the best formal evidence available, but also from the assessment of informal knowledge, the subjectivities, and from the humility of recognizing what is not known and is only assumed.

Embarking on the process of innovation makes sense as long as one is willing to make mistakes, learn, and apply what one learns. These activities require time and resources, and are often more difficult to plan, pay for, and implement; they often take longer and do not always result in a successful solution. Despite these limitations, if innovation is understood as a process and not just as a result, it allows learning and sharing the resulting knowledge with others, which generates social value.

To innovate effectively, our capacity for learning management must be strengthened. Learning has the potential to transform uncertainty into materialized knowledge and turn it into concrete actions, but not learning implies a significant waste of resources, willpower, and effort. The capacity to generate social value and solve complex problems depends, largely, on the capacity of people and institutions to work with others and learn from the process.

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