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It's complicated: Dewey, Schön and reflection-in-action

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Citation

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Abstract: While Schön's work is prominent in design literature, some of its concepts stay unclear. In this paper we examine the distinctions Schön made in 1992 between "reflection-in-action" and "reflection on reflection-in-action" (or "conversation with the situation" and "*reflective* conversation with the situation"). To clarify the meaning of these two terms, we will refer to pragmatist philosophy, using Dewey's work on *inquiry* and *epistemology*. Our results show that there is indeed a difference between the two expressions. Moreover, revisiting Dewey's and Schön's work allows for a new visual representation of the *reflection-in-action* process, which can then be used as a tool to enhance the designers' *reflection on reflection-in-action*.

Keywords: Reflection-in action; Reflective practice; Pragmatist inquiry; Dewey

1. Introduction

Are we using Schön's work properly? By "we", we mean the design research community. By "properly" we refer to questions raised by Beck and Chiapello during the DRS conference 2016. In their paper, they stressed that Schön was highly cited, but scarcely built upon or criticized (Beck & Chiapello, 2016). They even stressed that the meaning of "reflective practice" is often unclear.

While the question "what do we mean by reflective practice?" may sound rhetorical, it is central to the field of design. Indeed, many design researchers argue that Schön's reflective turn has been a cornerstone of research in design for the past 4 decades, as Schön gave a new breath to design research with his epistemology of practice (Bousbaci, 2008; Cross, 2011; Galle, 2011; Lawson & Dorst, 2013).

At the end of his life, Schön himself tried to clarify his wording. In his paper *The Theory of Inquiry: Dewey's Legacy to Education* (1992), he highlights a difference between what he

called the "conversation with the situation" (a form of reflection-in-action) and the "*reflective* conversation with the situation" (which is a reflection on reflection-in-action).

Nowadays, Schön's work on reflective practice is admittedly related to Dewey's pragmatist inquiry. However, such a connection has not always been evident. In his 1997 doctoral dissertation, Dorst links Schön's work with phenomenology and idealism, but not pragmatism (Dorst, 1997). Additionally, in *The Reflective practitioner How professional Think in Action* (1983), Schön refers to Dewey only twice, and relatively briefly. Nonetheless, Schön's doctoral dissertation (1954) built on Dewey's theory of inquiry, and in 1992, Schön reaffirmed his affiliation to Dewey:

> "Logic, which I took as the basis for my doctoral thesis, was the book that changed my mind about Dewey. Some thirty years later, in the midst of writing The Reflective Practitioner, I realized that I was reworking that thesis, now on the basis of empirical studies of professional practice that would have been out of order in the Harvard philosophy department of the mid-1950s. I was attempting, in effect, to make my own version of Dewey's theory of inquiry, taking "reflective practice" as my version of Dewey's "reflective thought" (Schön, 1992, p. 123).

Since then, many other researchers (Dalsgaard, 2014; Dixon, 2020; Lake, 2014; Melles, 2008; Rylander Eklund et al., 2021) highlighted the importance of the pragmatist toolbox and epistemology in design research.

In this paper, we will demonstrate that understanding Dewey's theory can help clarify Schön's writings. Specifically, we will compare the structure of Schön's "conversation with the situation" with Dewey's pragmatist inquiry. Thus, this paper will relate Dewey's work (*Logic The Theory* of Inquiry, especially the chapters 4 and 6) with Schön's work (*The Reflective Practitioner* and the paper *The Theory of Inquiry: Dewey's Legacy to Education)*. We will use the "conceptual analysis" method, defined as a "disciplined analysis of the concepts we think with"(Bardzell & Bardzell, 2016, p. 23).

Our aim is to strengthen the filiation between Dewey and Schön, while clarifying the differences that Schön made between a "conversation with the situation" and a "reflective conversation with the situation". We will show how their respective works are similar on two points: the "crisis" that they wanted to overcome and the solution they suggested (the inquiry). Then, we will dissect an alleged difference in their understanding of reflective practice. Finally, we will present a graphic model of design inquiry that can be seen as a fusion of both their theories.

2. A Similar crisis between knowledge and action

This first part of our comparison between Schön and Dewey's work will start with an explanation of the "crisis" that both Schön and Dewey tried to overcome concerning knowledge and action. We will show here that Schön's work resonates with Dewey's, despite being decades apart.

2.1 Dewey and the Rationality Crisis

Dewey began his philosophical journey with a critique of the rationalist foundations of scientific thought of its time, which were mostly Cartesian. Following Peirce, he rejected the idea of a perfectly ordered universe, governed by determinism. He criticized the ways in which modern science had infiltrated all aspects of human action, imposing a mechanistic attitude governed only by physical and mathematical laws. According to him, this view prevents the resolution of everyday problems, like political or economic problems (Dewey, 1938), which are too complex to be addressed by this reductionist approach.

For Dewey, this view comes from an outdated philosophical interpretation of the world, and not from the scientific method (or experimental method) itself. Indeed, Dewey showed that experimental science, despite the dazzling advances in knowledge it has enabled, is based on an obsolete philosophical model. Its concepts of *reality, knowledge* and *action* must be revisited.

According to Dewey, the logic of science was based on a philosophical notion of knowledge dating back to Aristotle, where knowledge is thought of as pre-existing to man and immutable. At that time, the techniques were separated into "inferior" and "superior". The inferior techniques consisted of daily practical work (framing, dyeing, pottery...). The higher techniques were those that dealt with more important spheres: "the welfare of the people and especially its rulers-and this welfare involved transactions with the forces that ruled the universe" (Dewey, 1938, p.72). Aristotle's system thus succeeded in transforming socio-cultural differences into a philosophical distinction. "The dualism of the empirical and rational, of theory and practice"(Dewey, 1938, p. 73). Dewey added that this vision of knowledge, of science, of theory, relegates man to a "position of spectator" (Dewey, 1929, p. 20). There is no interaction with knowledge, because it is pre-existing. The subject only discovers what is already there.

Unfortunately, according to Dewey, these concepts were embedded in the modern experimental method. This led to the idea that the scientific method makes it possible to "discover reality", which amounts to identifying knowledge with reality. According to Biesta and Burbules, Dewey believed that confusing knowledge with reality, or *"*what is known with what is real*"* (Biesta & Burbules, 2003, p. 15), is one of the major errors of modern philosophy. Indeed, if we confuse knowledge and reality, then human action is only deemed real if it can be validated by our knowledge: "*Love is only considered to be real if it can be explained in terms of hormones*" (Biesta & Burbules, 2003, p. 15). Things that cannot be analyzed are deemed to be unreal, and thereby irrational.

As a result, a line is being drawn between human action (which Dewey calls common sense) and the field of knowledge and theories. The former is considered irrational, while the latter is viewed as rational and unrelated to human action. This results in an impossibility to understand human action, because it is irrational, without logical foundations.

To overcome this situation, Dewey established a new logic of science (Dewey, 1891) and a redefinition of knowledge. Treating the subject like a spectator no longer functions when considering modern science—where knowledge and experimentation are undoubtedly linked (Christie et al., 2002). For Dewey, knowledge is rooted in action—His theory of action can be seen as a theory of knowledge through experience, or *"theory of experimental learning"* (Biesta, 2010, p. 107; Biesta & Burbules, 2003, p. 37). Knowledge is what we learn by reflecting on our experiences. It is not a question of acquiring fixed knowledge, but rather a predisposition to act: "*this learning is, however, not the acquisition of information about the world 'out there' really is. It is learning in the sense of the acquisition of a complex set of predispositions to act."* (Biesta & Burbules, 2003, p. 37).

Dewey's thus solved the crisis between knowledge and action by rethinking their nature and relationship. In fact, Dewey was eager to prove that his philosophy was so different from the previous ones that he avoided using the term "knowledge", or "epistemology" (Field, 2022). He showed that learning is a dimension inherent to human action, a position Schön' also adopted, as we will see now.

2.2 Schön's crisis

Like Dewey, Schön identified a crisis in professional knowledge. Indeed, in *The Reflective Practitioner* (1983), Schön also proposes to review the relationship between knowledge and action by deconstructing the underlying epistemological principles of "professional knowledge".

Like Peirce and Dewey, Schön sees a disconnect between science and the affairs of everyday life. The scientific model of practice that dominated during the sixties, seventies, and eighties was known as applied science or *Technical Rationality.* It was believed that professionals solved problems based on scientific theories. Medicine and law, for instance, have clear goals (health, dispute resolution) and are based on rigorous fundamental knowledge. Conversely, professions of lesser prestige like social work, education or urban planning have unclear aims and do not have an established basis in scientific knowledge. This division of occupations is reminiscent of the one described by Dewey in ancient Greece. Schön links this divide with Positivism and the Vienna Circle (Schön, 1983, p.32). Positivists seek the irreducible elements that make up each phenomenon, to formalize them in a way that professionals can apply faithfully. Professionals solely "apply" and confirm the knowledge produced by researchers. The skills with which a professional implements this knowledge are not actually considered.

 Schön, like Dewey and Peirce before him, rejects this mechanistic perspective. For him, the main difference between the positivist view of professions and reality lies in the way professionals deal with the problems they encounter. For Technical Rationality, professional practice is about solving problems. But the situations faced by professionals are often unstable, embarrassing, and without clearly defined problems. For example, building a road is an easy problem to solve, provided you ignore the fact that it destroys the landscape and

can bother the neighbours. This is the type of problem that professionals encounter. This instability disturbs the positivist epistemology of professional knowledge, since including uncertainties in a scientific model seems to run counter to rigor. However, ignoring them removes the relevance of reflection: this is what Schön calls the "dilemma of 'rigor and relevance'" (Schön, 1983, p.42).

Schön recalls the importance of professionals: they are the ones who allow our society to function. Many professionals excel in their work and solve numerous problems daily: professional knowledge is therefore real and effective. Though, a certain discomfort arises from the fact that this knowledge is not justified, nor explained: "Professionals have been disturbed to find that they cannot account for processes they have come to see as central to professional competence." (Schön, 1983, p.19).

There is indeed a need to explain and describe professional skills. Schön believes that if Technical Rationality does not account for professional acts, a new model is needed. It is necessary to set up a new epistemology of practice which rejects the model of Technical Rationality. Inspired by Dewey, Schön shows that the rejection of the current model of applied science makes it possible to envision another source of knowledge: action. This knowledge is tacit and resides in our actions; we act appropriately in the face of a situation, without even thinking: "By knowing-in-action I mean the knowing built into and revealed by our performance of everyday routines of action" (Schön, 1992, p. 124). This corresponds to Dewey's theory of knowledge and is precisely the type of knowledge that professionals possess.

Similar to Dewey, Schön proposes that knowledge emanates from action. He ceases to consider action as applied knowledge and reflection as a separate activity, bringing them together instead: it is the famous "reflection-in-action". In this case, "knowledge" refers to embodied insights, tangible practices, or new processes to enact again—not to fixed theories found in books.

2.3 A less radical but similar handling of the crisis

Although Schön's analysis focuses on the epistemology of professional practice and not on epistemology in general, we find that he describes the same crisis of rationality as Dewey. He also arrives at the same conclusion: we must review our vision of "knowledge". Moreover, Schön, still following Dewey, emphasizes that the process to produce this knowledge is rooted in action.

Schön is not as radical as Dewey, nor does he avoid using the terms "knowledge" or "epistemology". However, he clearly states that he wants to replace the "Positivist epistemology of practice" with a new epistemology—a new way of "reflecting in action" in a situation.

Therefore, by putting Schön's and Dewey's work side by side, we see that the epistemological changes they both pinned down were profound. To make these changes

happen, they had to suggest new ways of explaining human action and thinking. This leads us to the explanation of the "pragmatist inquiry" and the "reflection-in-action".

3. A similar answer: The inquiry

3.1 Pragmatist inquiry

Inspired by Peirce, Dewey developed a process to describe how "knowledge" is produced from action: the pragmatist inquiry (Dewey, 1933 [1910], 1938). This style of inquiry is not the only process for acquiring knowledge—Indeed, it is quite possible to discover new possibilities for action by trial and error. Though, inquiry differs from trial and error since it involves a reflection on the experience, not just the simple observation of a result.

The result of inquiry is not "truth", but "warranted assertability"—Results are guaranteed in specific situations, allowing practitioners to overcome obstacles. The term "warranted assertability" is not just a replacement for the term "truth": it denotes Dewey's will to deeply change our vision of knowledge and beliefs, and that the result of the inquiry is not an end in itself and remains temporary.

Logic The Theory of Inquiry (1938), is the culmination of Dewey's reflections on inquiry, and is frequently regarded as his major work (Edman, 1938; Gérard, 1994). It lays out a definition of the pragmatist inquiry:

> "Inquiry is the controlled or directed transformation of an indeterminate situation into one that is so determinate in its constituent distinctions and relations as to convert the elements of the original situation into a unified whole." (Dewey, 1938, p.105)

Pragmatist inquiry is therefore a transformation of the situation. Dewey proposes to break the investigation process down into steps:

1. The Antecedent Conditions of Inquiry: The Indeterminate Situation
2. Institution of a problem
3. The determination of a problem-solution
4. Reasoning
5. The Operational Character of Facts-Meanings

Here is a brief articulation of these steps — The subject is in an uncertain situation; he has doubts and finds that the elements of the situation are discordant. When the subject becomes aware of his troubled situation, he can identify a problem. However, he must be careful in this problematization and be ready to modify it if need be. From this problematization, the subject will make a hypothesis and suggest a solution to the problem posed. He will then examine, mentally, the possible consequences of this solution; this is the reasoning step. If no major obstacles arise, he will test his hypothesis by putting it into action. Indeed, the situation cannot be modified by mental operations alone. If the practitioner's experiment resolves the situation, then the investigation stops. Although, his investigation will have likely taken on a new meaning, which demands a review of the original problematization. Thus, the cycle of inquiry continues, allowing for the growth and

development of the subject. Finally, one must remain cautious and not reduce the pragmatist inquiry to a succession of steps; as Garrison (1999) pointed out, this is an "organic" process.

3.2 Schön design inquiry

In 1983, Schön suggested that design is "a kind reflection-in-action", or more precisely "a reflective conversation with a unique and uncertain situation" (Schön, 1983, p. 130). We immediately recognize the importance of the *situation* of the pragmatist inquiry. Schön's stressed that:

> "In real-world practice, problems do not present themselves to the practitioner as givens. They must be constructed from the materials of problematic situations which are puzzling, troubling, and uncertain. In order to convert a problematic situation to a problem, a practitioner must do a certain kind of work." (Schön, 1983, p.40)

For Schön, Reflection-in-action is the ensemble of processes which allow for the transformation of the situation, and consists of four stages: naming (or description of the situation), framing, moving and evaluating.

At first, the practitioner is faced with a problematic situation which he is unable to solve (here, the problem is raised by an architecture student): "The student has set and tried to solve a problem and has been unable to solve the problem as set" (Schön, 1983, p. 130). It can be said that the situation is "indeterminate". The practitioner will then reframe the problem: "Problem setting is a process in which, interactively, we **name** the things to which we will attend and **frame** the context in which we will attend to them" (Schön, 1983, p. 40). To do this, the practitioner suggests a new angle of attack: "a direction for reshaping the situation." (Schön, 1983, p. 131). These correspond to the "institution of a problem" and the "determination of a problem-solution" steps of the pragmatist inquiry.

Then, the practitioner tries to check if the *frame* he has chosen to grasp the situation is viable. To this end, he will conduct experiments (**moving**): "This he does through a web of moves, discovered consequences, implications, appreciations and further moves." (Schön, 1983, p. 131). Here, we have both the search for a solution (reasoning) and the tangible experimentation from Dewey.

This set of actions taken by the practitioner produces all kinds of consequences, and some are more interesting than others. The practitioner must therefore assess (**evaluating**) the situation. This is where the concept of conversation comes into play: "But the practitioner's moves also produce unintended changes which give the situations new meanings. The situation talks back, the practitioner listens; and as he appreciates what he hears, he reframes the situation once again" (Schön, 1983, p. 132). This dialogue between practitioner and situation is in accordance with Dewey's affirmation: the situation cannot be restored only mentally.

We can say that Schön adapted the pragmatist inquiry to describe professional practice, more specifically design inquiry. Schön used Dewey's insights on the importance of the

situation (problems are not given) to show how designers have conversations (lead an inquiry) not only *in* a situation but *with* it as well.

4. Reflection on reflection-in-action

We noted in this paper that Schön addressed a crisis of knowledge very similar to Dewey's. We also established that they arrived at a very similar "solution": the inquiry. In the light of this comparison, one may ask what Schön's actual contribution was, and if his "reflection-in-action" is not just an appropriation of Dewey's inquiry. We believe this question bothered Schön himself, who, at the end of his life, tried to stress his own contribution.

In 1992, Schön declared that his model of design as a "conversation with the situation" is Deweyan in nature. However, the "reflective conversation with the situation" is supposed to supplement Dewey's work:

> "Reflective Conversation with the Situation. This is Deweyan inquiry, mediated by conscious reflection on the situation and, at the same time, on one's way of thinking and acting on it. As conversation with the situation is a version of reflection-in-action, so reflective conversation with the situation is a version of reflection on reflection-in-action—a version undertaken in the situation of action itself." (Schön, 1992, p.126)

For Schön, "reflective practice" is more than "reflection-in-action": it is a practice demonstrated by those who can take a step back and review their actions, all while performing said actions; it is "reflection on reflection-in-action".

However, this claim is linked to two difficulties that we will now examine: first, Schön seems inconsistent in his use of the terms "reflection-in-action" and "reflection on reflection-in-action". Second, "reflection on reflection-in-action" is already at the heart of Dewey's work.

4.1 Inconsistent term use by Schön

As stated previously, we wanted to see if there is really a difference between reflection-in-action (or conversation with the situation) and reflection on reflection-in-action (or the *reflective* conversation with the situation). If we take the examples given by Schön in 1983, the difference between "conversation" and "reflective conversation" does exist.

Jazz players, baseball pitchers or even children who balance blocks all conduct a conversation with the situation (a form of reflection-in-action). These actors solve their problems in the thick of action. In the end, the situation is transformed and typical action resumes. But from these examples of reflection-in-action, Schön goes on to say that he is not necessarily interested in any kind of reflection-in-action (or conversation), but specifically in the one performed by "good" professionals and their "double vision": "In a good process of design, this conversation with the situation is reflective." (Schön, 1983, p. 79). He further adds that

> "At the same time that the inquirer tries to shape the situation to his frame, he must hold himself open to the situation's back-talk. He must be willing to enter into new confusions and uncertainties. Hence, he must adopt a kind of **double vision**. He must

act in accordance with the view he has adopted, but he must recognize that he can always break it open later, indeed, must break it open later in order to make new sense of his transaction with the situation." (Schön, 1983, p. 164)

The examples where Schön uses the term "*reflective* conversation with the situation" are developed in the subsequent chapters of the book: descriptions about an architect, a psychiatrist, a manager, and an engineer. In each example, Schön highlights the ability of these "good" professionals not only to think in action, but also to reflect on their *frame,* their *role,* their *repertoire* and to maintain the "double vision". The chapter about the architect is even clearly labeled as "Chapter 5: Design as a reflective conversation with the situation".

Being able to reflect-in-action, simply with the goal of finishing a project, is not enough to produce knowledge. Professionals should take it one step further and reflect on their reflection-in-action. This does not mean designers should do academic/scientific research about their practice, but that they should be able to think about what they are doing and improve their practice on the go.

However, Schön is not consistent in his use of the different expressions. At the end of the chapter 5, instead of using the term "reflective conversation", Schön goes back to "reflection-in-action" (a simple conversation) (Schön, 1963, p.69). Sometimes, he only differentiates "conversation" from "reflective conversation" in terms of "degree" (Schön, 1983, p.167), rather than settling on a clear distinction.

These inconsistencies lead to confusion, making it difficult to blame design researchers who use the terms "reflective conversation" and "reflection-in-action" interchangeably. As said earlier, we think Schön himself realized his mistake and probably wanted to clarify his position, albeit quite late.

4.2 Not really different from Dewey?

Another concern is Schön's claim that the "reflective conversation" is an augmented or enhanced vision of Dewey's inquiry—a "mediated one" (Schön, 1992b, p.126). We argue that it is not. Indeed, several authors stress that Dewey's inquiry is intrinsically reflective— Knowledge, for Dewey, is a question of reflection on one's experience and not just the act of experiencing. Dewey emphases it in *Democracy and Education*:

"When we reflect upon an experience instead of just having it, we inevitably distinguish between our own attitude and the objects toward which we sustain the attitude […] Such reflection upon experience gives rise to a distinction of what we experience (the experienced) and the experiencing—the how" (Dewey, 1916, p. 173).

Garrison stressed that pragmatist inquiry always implies taking a step back to see the whole picture: "The process is continuous, involves many feedback loops, and reticulated, mutually modifying, relations. To understand the parts, it is necessary to understand the whole, but to understand the whole we must understand all the parts". (Garrison, 1999, p. 302). Biesta also clearly enunciated the importance of reflectivity in knowledge formation:

> "One important implication of this is that experience in itself does not provide us with any knowledge. Dewey rejected, in other words, the view that experience provides us with elementary 'bits' of knowledge which, when put together in a systematic of logical manner, result in knowledge."(Biesta, 2010, p. 108)

To transition from experience to knowledge, one needs to reflect upon their experience. Which, to Schön, corresponds to *reflection on reflection-in-action* or *reflective practice*. This reflectivity is what separates intelligent human action from simple human action, or trial and error.

Thus, we disagree with Schön's assertion that he "augmented" Dewey's pragmatist inquiry. In our eyes, Schön's idea of "reflection on reflection-in-action" is not his greatest contribution, but rather the fact that he carefully explained reflection-in-action. While Dewey gave some general examples of the use of pragmatist inquiry, Schön's examined several cases of professionals conversing with the situation. Therefore, he was able to specify some design activities, like framing, which had a major impact on design research (Dorst, 2015).

Schön also worked on what he called "constants" in professional practice—elements that tend to be stable during a design project and support reflection-in-action, such as the repertoire (of solutions, cases and exemplars encountered in previous practice), or the media (representative tools, like sketches and prototypes) of practitioners (Schön, 1983, p.270).

To conclude, reflective practice is a form of reflection on reflection-in-action, and it produces "knowledge" in a pragmatist fashion. We think that Schön was right to stress the difference between *reflection-in-action* and *reflection on reflection-in-action*. However, he was not always consistent in his explanation, and this caused some confusion. Moreover, the Deweyan theory of knowledge is so different from what came before that its intrinsic reflective dimension might have been difficult to understand.

5. Celebrating those similarities in a new visual representation of reflection-in-action

To complement these reflections on reflective practice, we tried to illustrate the "transaction with the situation" (figure 1) described by both Dewey (1938) and Schön (1983).

To stress the importance of the "situation", we added several references to it. First, the whole background of our visual representation is the situation, because as Dewey stressed, action always happens in a situation. Second, we added dark green arrows that correspond to the continuous transaction with this situation. Practitioners are not just *in* the situation, they must deal *with* it, transform it. This is also conveyed by the triangle at the beginning of the process of inquiry: practitioners encounter indeterminate situations. Indeed, "The first attitude developed by the subject toward the indeterminate situation is therefore of an 'interrogative' nature. The situation is 'questionable'; the investigator asks questions (Schön's *talks* and *moves*)" (Bousbaci, 2020, p. 250, we translate). After the inquiry, the

situation will be more determinate, but not perfectly "rounded up"—hence the oval shape at the end of our graphic.
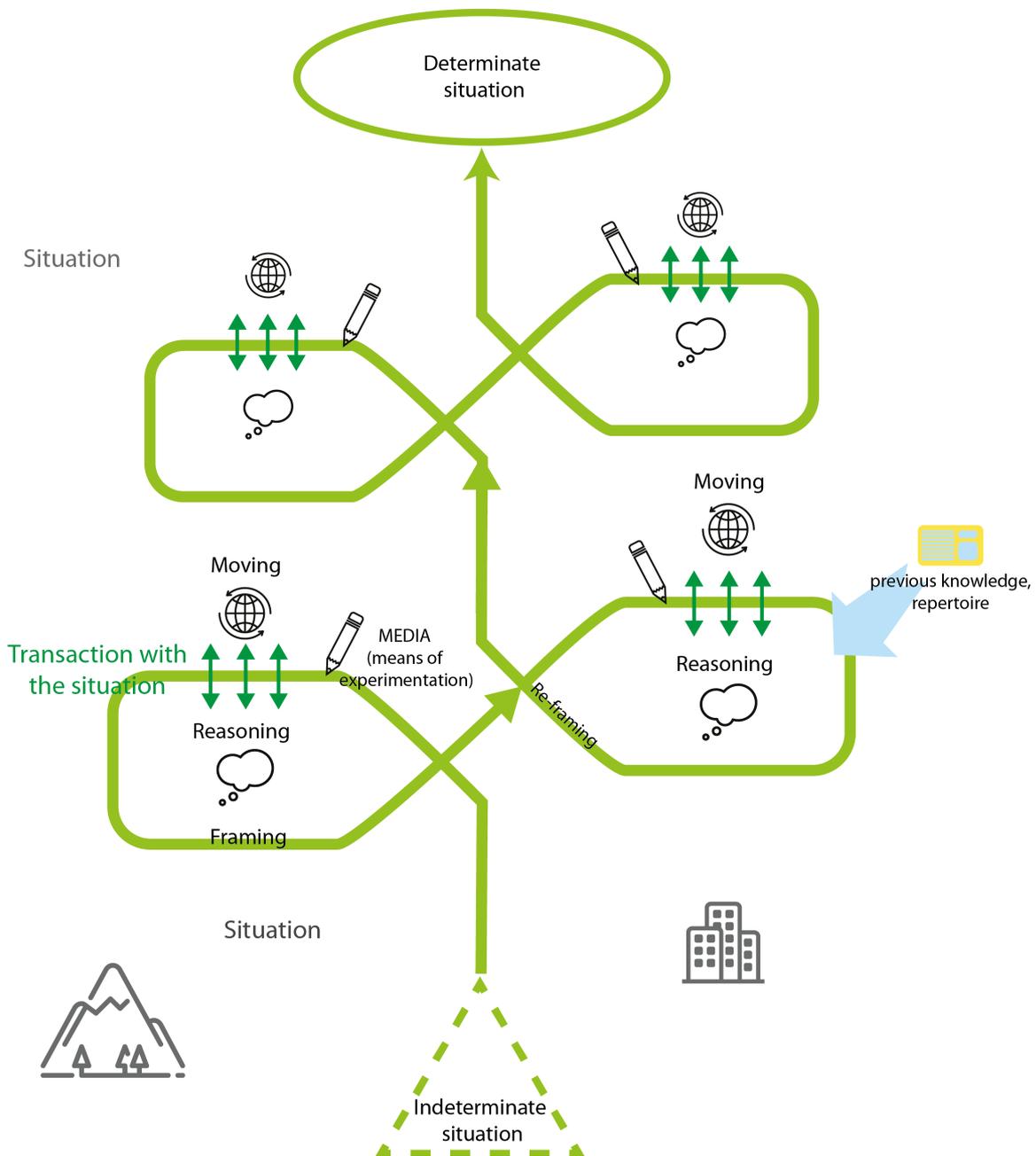
Figure 1. Reflection-in-action as a transaction with the situation

The process of reflection-in-action is composed of loops, each corresponding to a new frame. As such, it underlines the process of framing and reframing (or re/definition of the situation). In each loop, designers try to find a solution to their problem through reasoning, using their favoured "media" (like the architect's sketch pad) to converse with the situation

by making moves (and evaluating their consequences). As opposed to a cognitivist approach, they are in conversation *with* the situation, actively modifying it (dark green arrows).

We also added the "repertoire" (Schön, 1983, p.270) to the graphic, to stress that designers' prior knowledge allows them to frame the situation and establish a new hypothesis (which correspond to Dewey's "continuity" of knowledge).

Contrary to a concentric spiral model of the design process (see Wynn, D., & Clarkson, J., 2005, p. 36), this representation is "open". This clarifies the "content" of each loop, but also makes the size of each loop variable. Indeed, in the design inquiry, the designers must sometimes change their frame—for example, to go back to a "larger" frame and start over with the definition of the situation. While the image of a concentric spiral gives the impression that the designers "withdraw" into themselves and their solution, this representation highlights the fact that it is necessary for designers to be open to the situation—to be in *conversation* with it.

One limit of this graphic is that it only represents reflection-in action, not *reflection on reflection in action* (or reflective practice). However, by asking students or professional designers to detail their process, we make them conscious of their reflection-in-action. Thus, using this model in the classroom is a form of reflection on reflection-in-action, but it is done after the action. To become true reflective practitioners, students would have to internalize the model (and the concepts that it represents) and use it in the midst of action.

6. Conclusion

In this paper, we described the confusion between "reflection-in-action" and "reflection on the reflection-in-action" in Schön's writing. While this inconsistency may prove unimportant, Schön's himself tried to clarify it—which caught our attention. Moreover, this confusion has already been stressed in design studies (Friedman, 2008). Thus, we offered a new avenue to clarify the difference between those two expressions by going back to Dewey's work on the pragmatist inquiry.

By re-examining the philosophy that inspired Schön—pragmatism—we were able to specify the origins of his epistemology of practice. We saw that his interpretation of design practice as a conversation with the situation closely resembles Dewey' inquiry. Both tried to overcome the tenuous relationship between action and knowledge, which tended to separate human action from rationality.

By reinstating practice (be it professional or general) as a source of knowledge, both authors defined a new epistemology of practice. Practitioners are not blindly applying theories made for them by researchers. They reflect upon their actions while conducting them: this is reflection-in-action. The idea that there is knowledge in practice is what Schön's calls "knowing in action".

However—and this is where resided the alleged difference between the two authors—"reflection-in-action" is not solely enough to produce knowledge: one needs to take a step back and reflect on their reflection-in-action. Practitioners can produce their own knowledge and become "researchers in the context of practice" (Schön, 1983).

Neither Dewey's initial description of the pragmatist inquiry nor Schön's "conversation with the situation" model explicitly mention this "step back"; though, both Schön's and Dewey's writings stress the importance of reflectivity. This nuance might be at the heart of this confusion.

In the end, our move to clarify the situation was to represent the design inquiry, the reflection-in-action that designers follow, using both Dewey's and Schön's theories. But we could not represent "reflection on reflection-in-action": this is a process that each one of us needs to do by themselves in order to produce knowledge.

We think it is important to clarify Schön's work, because the epistemology of practice defended by Dewey and Schön is often challenged. We can see that positivist epistemology of practice is still present in new design disciplines, like engineering design (McMahon, 2021), game design (Chiapello, 2017) or design management (Johansson‑Sköldberg et al., 2013). By outlining how pragmatist epistemology is tied to professional practice, we contribute to better describe designers' activities. We also hope to participate in furthering design research using pragmatist foundations (Bousbaci, 2020; Chiapello, 2019, 2021).

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