Maria Rosaria Strollo

# Experiential-Inductive Learning

## Pedagogical Framework for Reflective Professional Learning

PLA
Processi
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# Introduction

The central role of experience is among the most well-established insights in pedagogical reflection on education. Learning is not merely the acquisition of formalized knowledge but also engagement with situations in which knowledge is challenged, questioned, and reorganized through action and reflection. This insight is particularly significant for the education of professionals working in educational contexts, who are called upon to act in contexts where problems, variables, and opportunities for intervention are not always fully determinable in advance.

However, this theoretically acknowledged centrality of experience is not necessarily reflected in a corresponding transformation of the practices used to teach theories of experience. One can advocate the importance of experiential learning while continuing to teach its principles primarily through theoretical exposition; one can present reflexivity as a constitutive dimension of educational professionalism without offering students opportunities to observe and question their own ways of interpreting a situation. Thus, a gap emerges between the stated pedagogical principle and the instructional method through which that principle is learned: students are taught to learn from experience through theories of experience that they can acquire without having personally experienced the processes those theories describe.

The issue is not about replacing theoretical instruction with practical activity: individual experience, on its own, does not produce scientifically grounded knowledge, and participation in a situation, in and of itself, does not guarantee learning. Theory retains an irreplaceable function because it introduces concepts, distinctions, and interpretive frameworks that go beyond what can be derived from individual lived experience. The problem concerns, rather, the possibility of constructing a different relationship between experience and theoretical formalization, ensuring that knowledge does not necessarily encounter the student only before the experience, but can also intervene in what the student has experienced, observed, and begun



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to question. From this perspective, the hypothesis arises that theories of experience can also be learned through intentionally designed experiences. This does not mean asking students to independently reconstruct a theory based on their own lived experience, but rather placing them in situations where they can mobilize their existing knowledge and interpretations, confront the effects of their own choices, and subsequently reflect on what has happened. Theoretical formalization can then provide categories for reinterpreting the experience, distinguishing phenomena that were initially undifferentiated, and reconsidering interpretations that seemed obvious at the time of the action.

The proposal for Experiential-Inductive Learning is grounded in this relationship. Its distinctiveness does not lie in asserting that experience must always precede theory, nor in attributing a general superiority to active methods over explicit teaching. It lies in the possibility of designing the relationship among situation, interpretation, reflection, and formalized knowledge so that what is experienced can generate questions for which knowledge acquires a recognizable function and, in turn, alter how the experience is understood.

A central pedagogical issue concerns the possibility of bridging the gap between what pedagogy asserts about learning from experience and how these insights are translated into educational practice. From this perspective, the literature on teacher education provides a particularly relevant point of reference: although developed within a specific professional field, it offers categories and issues that can serve as interpretive lenses across different contexts in which Experiential-Inductive Learning may be applied. The proposed framework is structured around two distinct yet closely connected levels: cognitive and metacognitive. At the cognitive level, experience constitutes a situation in which the student engages with specific content, draws on available knowledge, formulates interpretations, and encounters problems that require subsequent conceptual elaboration. Theory thus functions not merely as information to be acquired, but as a tool for understanding, differentiating, and reorganizing what the experience has rendered problematic. At the metacognitive level, however, the focus shifts from the content learned to the process through which learning was constructed: the student is called upon to revisit the experience to recognize how they interpreted the situation, what knowledge they drew upon, what difficulties challenged their initial interpretations, and what role reflection and theoretical formalization played in their revision. It is precisely in the interaction between these two levels that a central pedagogical possibility emerges: learning through experience while, at the same time, making the very process of learning from experience an object of knowledge. In this way,



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theories of experience are not merely content to be learned, but become tools through which students can understand and conceptualize a process they have themselves experienced.

Within this perspective, the aim is not to propose a new theory of learning, but to articulate a pedagogical design framework that coherently links experiential engagement, inductive access to knowledge, reflection, problematization, formalization, and metacognitive return. Its distinctiveness lies not in the individual elements - which draw on established theoretical traditions - but in their configuration as a recursive architecture through which experience and formalized knowledge can mutually inform and transform one another.



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# 1. Experience and Learning: A Recursive Cycle

## 1.1. When Experience Becomes Knowledge

The relationship between experience and learning gains theoretical substance when the immediate equivalence between lived experience and acquired knowledge is abandoned. Having an experience does not necessarily mean learning: what happens to the individual may alter their way of understanding and acting, but it may also confirm existing interpretive frameworks, reinforce routines, or leave the structures through which they attribute meaning to situations essentially unchanged. The pedagogically relevant issue, therefore, concerns not the value of experience in and of itself, but rather the conditions and processes through which it can contribute to the construction of knowledge.

It is in relation to this issue that the perspectives of David A. Kolb, Donald A. Schön, and Jack Mezirow can be connected. Not because they describe the same process using different terminology, nor because they can be retrospectively traced to a unified model of experiential learning. Their contributions arise from different theoretical problems and focus on different levels of the relationship between experience and knowledge. Reading them together, however, allows us to distinguish three key issues: the transformation of experience into knowledge, the construction of knowledge through reflective interaction with practice, and the possible revision of the frameworks through which experience is interpreted.

In Kolb's theory of Experiential Learning, the first of these issues is articulated particularly clearly: "Learning is the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 38). The decisive element of this definition lies not only in the centrality attributed to experience, but also in the relationship among experience, transformation, and knowledge. Experience does not already contain knowledge that the subject need only extract from what they have lived through; rather, it



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becomes cognitively meaningful through transformation. This gives rise to a fundamental distinction for the perspective developed in this volume: experience constitutes a possible origin of the cognitive process, not its necessary outcome.

Concrete experience, reflective observation, abstract conceptualization, and active experimentation describe how Kolb articulates this transformation. Their theoretical significance lies above all in overcoming the oppositions between the concrete and the abstract, and between observation and action: knowledge is constructed through the relationship between these polarities, rather than through the exclusive primacy of either. The model thus allows us to recognize that the relationship with experience does not end the moment it is lived, but involves different processes through which what has happened can take on cognitive meaning.

Schön's contribution shifts the focus to professional practice. His critique of "Technical Rationality" challenges a conception of competence that holds that practical problems can be addressed by applying previously acquired theoretical and technical knowledge. This conception reveals its limitations when the professional is confronted with situations marked by uncertainty, instability, uniqueness, and value conflict (Schön, 1983). Under such conditions, the problem does not necessarily present itself as already defined: what should be considered problematic and the meaning to be attributed to the elements of the situation become part of the professional work itself.

Within this framework, reflection assumes an epistemic function, as Schön's characterization of reflection-in-action as a process of inquiry (Schön, 1983, p. 68) signals the transcendence of a unidirectional relationship between knowledge and application: existing knowledge guides action, but what emerges from the situation may, in turn, necessitate revising the initial interpretation, thereby making practice a space in which knowledge is not only used but also open to question.

The shift from Schön to Mezirow allows us to further distinguish the level at which such revision can occur. Changing behaviour, correcting a strategy, or redefining a problem does not necessarily entail questioning the structures through which that situation has been made intelligible. Transformative theory focuses precisely on these interpretive structures. Expectations, beliefs, mental habits, and perspectives shape what the individual recognizes as meaningful and how they attribute meaning to experience: "we transform our frames of reference through critical reflection on the assumptions upon which our interpretations, beliefs, and habits of mind or points of view are based" (Mezirow, 1997, p. 7).

Critical reflection on assumptions helps us distinguish between revising a response and revising the interpretive conditions that made that response



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plausible. Not every act of reflection leads to transformation: the individual may modify a strategy while keeping their interpretive framework essentially unchanged, or, under certain conditions, may come to question the assumptions through which they had initially constructed the meaning of the situation. In this second case, the transformation concerns not only what the individual knows or can do, but also how they interpret the experience.

This process also has an intersubjective dimension, since engaging with different interpretations allows us to bring into discussion what might otherwise remain self-evident from an individual perspective – "we learn together by analyzing the related experiences of others to arrive at a common understanding" (Mezirow, 1997, p. 7) – thereby exposing experience-based understanding to additional perspectives and making it available for debate and revision.

Reflection makes experience thinkable but does not exhaust the process by which it can become knowledge, since understanding what has happened, recognizing the reasons behind a decision, or revising the interpretation of a situation are significant outcomes that may remain closely tied to the context from which they emerged. Taken together, the perspectives of Kolb, Schön, and Mezirow do not, therefore, outline three successive phases of a single model but identify different levels in the relationship between experience and knowledge. Kolb focuses on the transformation of experience; Schön shows how professional knowledge is challenged when confronted with situations that are not fully determined; Mezirow extends the possibility of revising the interpretive frameworks through which experience acquires meaning. The three contributions thus converge in rejecting the automatic nature of the transition from experience to knowledge, even as they explain it through different theoretical categories and problems.

This convergence raises a further question about how experience, problem, and knowledge are organized within the learning situation, given that what the learner encounters can precede the complete systematization of knowledge and help make a problem recognizable. The shift from the level of learning to that of teaching thus raises a specifically didactic question: what changes when the subject encounters the particular before having at their disposal the general categories through which to interpret it? On this issue, the tradition of Inductive Teaching and Learning offers a second theoretical reference point, allowing us to shift our attention from the mere transformation of experience to the design of the sequence through which the subject is brought into relation with knowledge.



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## 1.2. The Tradition of Inductive Teaching and Learning

Alongside perspectives that have redefined the relationship between experience and learning, a second body of research is particularly relevant to understanding how access to knowledge can be organised: inductive teaching and learning. This is neither a unified theory nor a narrowly defined methodology, but rather a family of approaches that differ in origin, purpose, degree of structure, and the role attributed to the teacher, yet share the possibility that observations, case studies, questions, or problems may, at least in part, precede full theoretical systematisation. The term "inductive" should therefore not be interpreted solely in the formal-logical sense of moving from the particular to the general, but more broadly as referring to the temporal and functional organisation of the elements through which the learner engages with knowledge.

The framework proposed by Prince and Felder (2006) is, in this regard, a key point of reference. The authors include within the field of inductive teaching and learning approaches such as inquiry-based learning, problem-based learning, project-based learning, case-based teaching, discovery learning, and just-in-time teaching, whilst highlighting the differences between them. Their commonality does not lie in the identity of the procedures, but in the possibility of attributing to the particular a function that precedes the complete exposition of the general: "topics are introduced by presenting specific observations, case studies or problems, and theories are taught or the students are helped to discover them only after the need to know them has been established" (Prince & Felder, 2006, p. 123).

The reference to the "need-to-know" helps clarify from the outset that inductive organisation does not require the student to reconstruct a theory independently from a limited number of cases, since general knowledge can subsequently be introduced explicitly, constructed through guided comparison, or made available through sources and explanations. What changes, rather, is the relationship between the moment a problem is encountered and the moment the theoretical tools necessary to understand it become available.

More recent research further supports the value of this approach while tempering any interpretation of its general superiority over induction. Öztürk, Kaya and Demir (2022), after reviewing a wide range of studies on inquiry-based learning, report an overall positive effect on learning outcomes. The authors note that "the results revealed that IBLM has a medium-level positive effect [...] on learning outcomes" (Öztürk et al., 2022, p. 201). This finding does not allow us to attribute effectiveness solely to inquiry, but it reinforces the idea that problems, questions and phenomena



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can play a productive role when embedded within a suitably designed teaching framework.

The distinction between induction and deduction must therefore be understood in non-dichotomous terms, since, whereas in a predominantly deductive approach principles, definitions, or general models tend to precede the cases to which they are applied, in an inductive approach the particular may take didactic priority and contribute to the subsequent understanding of the general. The two approaches may, however, be part of the same sequence, as a learning pathway may start with a problem, lead to theoretical formalization, and subsequently use that knowledge to interpret further situations.

The importance of the order in which the problem and instruction are presented is further supported by research from Sinha and Kapur (2021). The authors compare sequences in which problem-solving precedes instruction with those in which instruction precedes problem-solving, explicitly posing the question: "Should students engage in problem-solving followed by instruction (PS-I) or instruction followed by problem-solving (I-PS)?" (Sinha & Kapur, 2021, p. 761). The results show a moderate advantage in favour of problem-solving followed by instruction, particularly when the initial phase is organised according to the principles of Productive Failure. The order is therefore not a neutral temporal framework but can influence the conditions under which subsequent instruction is understood and utilised.

The variety of approaches within the inductive tradition prevents it, however, from being equated with a generic "activity-based" pedagogy, since inquiry-based learning, problem-based learning, case-based teaching, project-based learning and discovery learning differ in the nature of the task, the degree of openness, duration, the function of the output and the level of support. Moreover, a student may be intensely engaged in an activity without constructing meaningful conceptual relationships, and conversely, may carry out complex cognitive activity in a highly structured situation. Therefore, what must be considered is not only the degree of overt activity but also the type of cognitive operations required.

At this level, the issue of guidance becomes particularly relevant, especially for novices, for whom a very open problem space may require a large number of cognitive operations in the absence of sufficiently organised schemas. Drawing on the constraints of cognitive architecture, Kirschner, Sweller and Clark (2006) criticised minimally guided instruction, arguing that "minimally guided instruction is less effective and less efficient than instructional approaches that place a strong emphasis on guidance" (Kirschner et al., 2006, p. 75).

This criticism does not, however, imply that inductive methods should be equated with a lack of guidance. Hmelo-Silver, Duncan and Chinn (2007)



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have shown that problem-based and inquiry-based learning can incorporate consistent forms of scaffolding that distinguish them from unassisted discovery, with guidance embedded in the task structure, the teacher's questions, feedback, resource selection, and the gradual introduction of information. Gorbunova, van Merriënboer and Costley (2023) have more recently revisited this issue, noting that the debate has long centred on comparing "inductive teaching methods [...] compared to deductive teaching methods" (Gorbunova et al., 2023, p. 1) and proposing a shift in focus to their orchestration within complex training programmes. The issue therefore becomes not one of choosing between guidance and autonomy, but of designing how both can be articulated.

Evidence on discovery learning also supports this distinction. Alfieri, Brooks, Aldrich and Tenenbaum (2011) show that outcomes differ depending on whether discovery is unassisted or supported by feedback, examples, scaffolding and requests for explanation. Lazonder and Harmsen (2016), reviewing a wide range of studies on inquiry-based learning, identify similar positive effects of guidance on learning activities, performance and outcomes. The openness of the task therefore has no independent pedagogical value, since its effectiveness also depends on the knowledge available to the learner and the type of support offered.

This principle is particularly relevant in teacher education, where Strat, Henriksen and Jegstad (2024), drawing on numerous studies of inquiry-based science education in pre-service teacher education, show that inquiry is used both to learn subject-specific content and processes and to learn how to teach through inquiry, while noting that "few studies highlight the transition between these" (Strat et al., 2024, p. 191). Experiencing a teaching approach as a learner and acquiring the ability to recognise and apply its principles as a professional are therefore interconnected but do not automatically coincide. This means that experience of the method must become the subject of reflection and formalisation if it is to contribute to the development of professional competence.

The relationship between initial experience and subsequent instruction is further clarified in studies on "productive failure": the principle does not lie in attributing autonomous educational value to failure, but rather in recognizing that an initial attempt - even an incomplete one - may prepare the individual to make different use of subsequent instruction. Sinha and Kapur (2021) show that the benefit of "problem solving before instruction" varies with the conditions under which the sequence is implemented. Kapur, Saba and Roll (2023) further clarify the issue by noting that "a frequent concern about constructivist instruction is that it works well, mainly for students with higher domain knowledge" (Kapur et al., 2023, p. 1). Their



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findings suggest, however, that the productivity of the initial phase also depends on the resources the learner generates and on how these outputs are subsequently incorporated into instruction.

This highlights an important distinction between immediate performance and learning, since a correct solution arrived at quickly does not necessarily guarantee understanding that can be applied in subsequent situations, whereas an initially incomplete attempt can pave the way for subsequent learning by revealing prior knowledge, strategies, or characteristics of the problem that subsequent formalisation can reorganise. Difficulty therefore does not have educational value in itself, as whether it proves productive depends on the structure of the task, the learner's resources, the guidance provided, and, above all, the relationship between initial exploration and subsequent instruction.

Research findings thus converge towards a conception of inductive teaching and learning that is less based on the opposition between methods and more centred on design variables. The following factors become significant: the moment the problem is presented, the amount of information initially available, the degree of openness of the task, prior knowledge, forms of scaffolding, the timing of explicit instruction, and how what emerges in the initial phase is subsequently revisited. In this sense, the timing of knowledge acquisition constitutes a pedagogical variable in its own right: introducing a concept before encountering a phenomenon is not necessarily equivalent to introducing it after that phenomenon has prompted a question.

Viewed in its overall development, the tradition of inductive teaching and learning does not, therefore, offer pedagogy an alternative to deductive teaching. Rather, it offers a set of insights for thinking more analytically about the encounter between the learner and knowledge: the particular can serve a generative function, not merely an applicative one; problems and instruction can be situated in different orders; discovery must be distinguished from unguided discovery; the necessary support varies with the learner and the task; induction, explicit instruction, and deductive application can all form part of the same sequence.

It remains necessary, however, to distinguish the inductive nature of the sequence from its experiential quality, since a learning path may move from the particular to the general through examples, data, or problems without these taking on specific experiential significance for the learner; similarly, an experience may be situated within a predominantly deductive sequence in which the theoretical categories are provided before the activity.

It is precisely from this distinction that the next problem arises: whilst the tradition of inductive teaching and learning shows that the particular can precede the complete systematisation of knowledge and, under certain



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conditions, prepare the way for subsequent learning, the question remains what happens when that particular is not merely presented to the student but is experienced in a situation in which they must act, interpret and make choices. This transition from inductiveness to experiential learning makes it necessary to distinguish more precisely among the functions of action, reflection and formalisation.

## 1.3. From Doing to Knowledge: Action, Reflection, and Formalization

The transition from inductiveness to experientiality requires distinguishing the operations by which a relationship with a situation can acquire cognitive value. Action, reflection, and formalization are understood not as rigidly ordered phases but as distinct epistemic functions that can overlap, interrupt, and resume one another: reflection can modify action while it is underway, an existing concept can guide what is recognized in experience, and formalization can generate new questions and necessitate a revision of the initial interpretation.

The distinction therefore retains analytical value, as it allows us to examine separately what happens when the subject enters a situation, when they distance themselves from what they have experienced, and when what has been understood is made explicit and compared with further knowledge, thereby clarifying the functions - and the relationships among them - through which action can gradually become observable, interpretable, and available for the construction of knowledge.

### *1.3.1. Experience as the Starting Point of the Learning Process*

Action assumes an epistemic function when it relates knowledge, expectations, and interpretive frameworks to a situation that can confirm, clarify, or reveal their inadequacy. Practice, therefore, does not replace theoretical knowledge: it constitutes a space in which what the subject already knows becomes operational and, precisely for this reason, is exposed to the situation's response.

Viewing learning as the transformation of experience allows us, from this perspective, to distinguish the mere exercise of a skill from the initiation of a cognitive process. A well-established procedure can improve performance without significantly altering the underlying understanding; a different



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situation arises when the effects of the action do not align with what was anticipated, rendering a previously available interpretation insufficient.

Professional practice takes on particular epistemic significance in the relationship among anticipation, action, and the situation's response. Indeed, it does not present itself as a succession of already-defined problems to which an appropriate solution can be applied: uncertainty, instability, uniqueness, and value conflict characterize situations in which the very definition of the problem becomes part of professional activity (Schön, 1983). To act, then, also means to interpret: to select elements deemed significant, to establish relationships, to formulate an initial configuration of the situation, and to compare it with the consequences of the intervention. In this sense, those who reflect in action "become researchers in the practice context" (Schön, 1983, p. 68): not because professional practice coincides with scientific activity, but because the individual can treat their own interpretations as provisional, observe the effects of their actions, and modify them based on what emerges.

Surprise, difficulty, and error can all be traced to the same epistemic problem without being considered equivalent, as they share the potential to reveal a discrepancy between anticipation and the actual situation.

None of them, however, possesses intrinsic educational value: an error can be corrected without understanding the conditions that gave rise to it; a surprise may end in mere recognition of the unexpected; excessive difficulty may lead to disorientation. Pedagogical relevance emerges when the discontinuity provides insight into how the subject interpreted the situation.

The error itself is not the same as the learning that may result from it, because its cognitive value depends on the transition from production to identification, interpretation, and correction: a "Generating Errors" phase can activate relevant prior knowledge, while in the subsequent "Detecting and Correcting Errors" phase, comparison with reference information and self-explanation can support revision of the response (Fiorella, 2023). From this perspective, "errors and failure experiences can profoundly influence the further stages of learning" (Narciss & Alemdag, 2025, p. 197). However, it is precisely the possibility of different outcomes that prevents us from treating the error as automatically productive. Individual characteristics, context, processing modes, feedback, prompts, and the climate in which the error is addressed all contribute to determining whether it is simply overcome or transformed into an opportunity for revision (Narciss & Alemdag, 2025).

Furthermore, the epistemic significance of action is not limited to knowledge already available in explicit form, since professionals can recognize patterns, select information, anticipate consequences, and make decisions without being able to immediately verbalize all the criteria



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involved. Action makes this knowledge observable precisely by rendering it operational, as the consequences produced allow us to examine not only what the subject claims to know but also the assumptions and criteria that become visible in how they handle the situation. Thus, practice is not the opposite of knowledge but one of the contexts in which knowledge operationally manifests its possibilities and limitations.

In vocational education, this implies that the experiential quality of a situation cannot be reduced to its authenticity or proximity to real-world practice. Authenticity, reflection, and collaboration are recurring conditions through which experience can gain greater educational significance (Radović et al., 2021), but their interrelationship is decisive: proximity to practice gains value when what happens can be reworked and compared with additional perspectives. Similarly, during the school practicum, written reflection can make aspects of practice observable that are less accessible in the immediacy of action (Orland-Barak & Wang, 2021). The point is not to ascribe an intrinsic formative capacity to writing, but to recognize a more general principle: professional experience acquires cognitive value when it can be revisited, described, and examined.

From this perspective, the nature of various learning situations can also be clarified, since internships, workshops, simulations, and case studies are not pedagogically significant simply because they are more "concrete" than theoretical exposition: authentic practice can be carried out through routines that remain unquestioned, whereas a simulation can support meaningful cognitive work when it allows participants to make decisions, observe their effects, and subsequently reconstruct what happened. The significant distinction, therefore, does not lie between the real and the simulated, but in the types of operations the situation makes possible. The assertion that "reflection is generally considered to be important for learning from simulation-based training in professional and vocational education" (Viktorelius & Sellberg, 2023, p. 809) takes on particular significance from this perspective: it shifts the focus from the simulated event to the work through which it is subsequently reconstructed. Debriefing, too, thus takes on meaning not as an appendix to the experience, but as a condition through which decisions, effects, and interpretations can become the subject of analysis.

Action can therefore be defined as initiating the learning process because it produces outcomes that were not fully available before the action took place: consequences to observe, discrepancies to recognize, errors to explain, and assumptions that can become visible in practice. Its potential does not lie in the act itself, but in the possibility of generating cognitive material to which one can return.



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It is precisely at this threshold that reflection emerges. What has happened must be set aside, at least temporarily, from the continuity of action: a decision can be reconstructed, a consequence linked to the conditions that produced it, an error compared with the preceding interpretation, and a surprise transformed into a question. Action thus initiates the process without exhausting it: it makes an experience available that can subsequently be taken as the object of inquiry.

### *1.3.2. Taking Distance from Experience to Construct Its Meaning*

If action makes consequences, discrepancies, and interpretations available for inquiry, reflection alters the subject's epistemic position regarding what has happened. The experience ceases, at least partially, to be merely the context in which the subject is involved and becomes something they can return to. This process is not merely a matter of recollection: reflection involves selecting elements, establishing relationships, questioning decisions, comparing intentions and effects, and calling into question what may have seemed self-evident during the action.

In fact, experience does not initially present itself as an already ordered object, since events, perceptions, emotions, decisions, prior knowledge, and others' responses unfold within a temporality in which not all connections are immediately recognizable. Returning to what has happened therefore requires reconstruction, as some elements gain relevance in retrospect, others are linked together, and still others take on a different meaning in light of the consequences of the action, with reflection intervening precisely in the space between lived and reconstructed experience.

Reflective distance, however, should not be identified exclusively with a temporal interval following the action. In reflection-in-action, surprise, uncertainty, or resistance can interrupt the routine flow of action and create space for the professional to question what they are doing. In this process, the subject "does not separate thinking from doing" (Schön, 1983, p. 68): interpretation guides action, and the effects of action feed back into interpretation. In reflection-on-action, by contrast, the suspension of operational urgency allows one to reconstruct what happened by drawing on connections that were not necessarily accessible during the unfolding of the situation.

Attributing this function to reflection does not, however, imply that any form of revisiting experience is reflective, particularly since the concept remains marked by a plurality of meanings and "a mutual agreement has still



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not been reached on how it should be defined or what processes should be initiated in teacher education programs" (Suphasri & Chinokul, 2021, p. 236). A narrative may remain purely descriptive, an evaluation may be limited to determining whether a performance was effective, and an experience may be recalled without questioning the criteria by which it was initially interpreted. By contrast, reflection acquires epistemic significance when it makes observable the relationship between what happened and the way the subject constructed it as a meaningful situation. Reflexivity, however, should not be considered a quality that develops automatically with the accumulation of experience.

This makes it possible to examine the elements to which significance was attributed, the knowledge mobilized, the criteria that guided a decision, the alternatives not considered, and the relationship between intentions and effects. In this sense, reflection means not only looking at the experience anew but also questioning one's own position within it. For this reason, this process cannot be taken for granted as a spontaneously available capacity: reflective practice constitutes "an inherently personal and relational process, occurring privately within people, and publicly, between people" (Marshall et al., 2022, p. 483). The individual work of reconstruction and inquiry can therefore be supported, guided, and shaped by the relational conditions in which interpretation is made explicit and discussed.

From this perspective, mediation plays a decisive role, since the mere availability of a record of experience does not automatically lead to reflection. Conditions must therefore be created to enable its use as a subject for inquiry. In initial teacher education, for example, "to enhance the quality of reflection among (pre-service) teachers, it is essential that they receive structured support throughout the reflection process" (Rothe & Göbel, 2024, p. 1). Questions, observation criteria, the comparison of perspectives, and the structure of the dialogue help transform a recalled episode into material for cognitive processing. Videos, narratives, journals, and observation protocols can serve precisely this function of externalization by making certain aspects of the experience accessible again and allowing the memory of the action to be compared with a record that can be reread, discussed, and reinterpreted. Among these tools, writing holds particular significance because it requires selecting, naming, and organizing what has happened. Reflective practice can thus support "self-reflection, decision-making, and problem-solving strategies" (Sudirman et al., 2024, p. 454). Here too, however, the value lies not in the tool itself but in the cognitive and interpretive processes it enables.

At this level, reflection and metacognition can be related without being considered equivalent. Reflection takes as its point of reference a situation or experience to which the individual returns; the metacognitive component



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emerges when attention is also directed toward the processes through which that situation was understood: what was observed, what strategies were used, what knowledge was considered relevant, what prompted a reevaluation, and how one's own understanding was assessed. Reflective writing, which we will explore in greater depth in the empirical section of this study, can, in this sense, enable participants to "consider their experiences and transform them into transferable knowledge" (Kingkaew et al., 2023, p. 1), opening a perspective that goes beyond mere understanding of the episode: the participant can begin to recognize how that understanding was constructed.

Participating in an experience and making the processes by which it is interpreted observable are therefore distinct operations. The relationship identified among experiential learning, reflective practice, and metacognitive awareness in initial teacher education (Ho & Lau, 2025) is significant precisely because it allows us to distinguish the content of learning from the process through which the individual gradually becomes aware of how they interpret, evaluate, and revise what they have experienced.

Furthermore, reflective work cannot be reduced to the individual dimension alone, since reflecting on one's own experience in isolation risks reconstructing it with the same assumptions that guided the initial interpretation, whereas engaging with others introduces different interpretations, questions, and choices that can make one's own perspective less self-evident. The "nonlinearity of the reflective process and the centrality of identity-work in collective teacher reflection" (Segal, 2024, p. 155) refers precisely to this dimension: intersubjective dialogue is not merely a sum of individual interpretations but a space in which meanings, criteria, and positions can be negotiated and reformulated.

Finally, reflection can engage different levels of understanding. Correcting a strategy does not necessarily entail questioning how the situation was initially constructed, whereas critical reflection can address the assumptions that underpin interpretations, beliefs, mental habits, and points of view (Mezirow, 1997, p. 7). Not every revision of an action entails revising the presuppositions that guided it, as the individual may modify a decision while keeping their frame of reference essentially unchanged, or may come to question the interpretive framework from which that decision had appeared plausible.

Reflection on action, metacognition, intersubjective dialogue, and critical reflection are therefore not mandatory stages in a single sequence. They represent different ways of engaging with experience and can intertwine in various configurations. What they have in common is the capacity to interrupt the immediacy of lived experience and to gradually make observable the relationship among situation, knowledge, interpretations, and decisions.



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This transformation, however, has limits. Making the experience thinkable, articulating an interpretation, or recognizing its presuppositions does not yet amount to possessing knowledge capable of transcending the singularity of the situation. What the subject has understood may remain closely tied to the episode from which it emerged and may not yet be sufficiently organized to be discussed using shared categories, compared with scientific knowledge, or applied to interpreting different situations.

### *1.3.3. From Situated Understanding to the Construction of Knowledge*

Reflection, therefore, is a necessary but not sufficient condition for the transition from experience to knowledge, since understanding what has happened, recognizing the reasons behind a decision, or revising the interpretation of a situation are significant outcomes that may still remain closely tied to the context from which they emerged. Formalization intervenes precisely at this threshold: not as a mechanical translation of lived experience into theory, nor as an immediate generalization of a particular case, but as a set of operations that render situated understanding explicit, organizable, argumentative, and comparable to forms of knowledge that transcend individual experience.

The concept of "abstract conceptualization" in Experiential Learning (Kolb, 1984) helps us understand an initial aspect of this transition, since if knowledge emerges from the transformation of experience, conceptualization enables the construction of relationships, categories, and hypotheses that are not confined to the singularity of the episode; to abstract, therefore, does not mean abandoning the concrete but adopting a perspective from which certain relationships can be named, organized, and subsequently tested, thereby altering the status of what has been understood, from the evident significance a given interpretation holds for the subject to the possibility of making its reasons explicit and subjecting them to scrutiny.

This transition is particularly relevant in professional knowledge, which does not fully align with what the subject can articulate in propositional terms, since action mobilizes recognitions, distinctions, anticipations, and decision-making criteria that may remain only partially explicit. Formalization therefore does not entail converting this operational knowledge entirely into statements, but rather making some of the relationships that guide action sufficiently visible to be questioned and discussed, so that the epistemically significant transition is not simply from the tacit to the explicit but from individual interpretation to a form of



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knowledge about which one can ask what elements it is based on, what relationships it establishes, and under what conditions it can be revised.

In this process, language assumes a cognitive function, since naming a relationship or introducing a category is not equivalent to applying a label to something already fully known: the availability of concepts alters what can be distinguished within experience and makes observable configurations that, prior to formalization, might have appeared indistinct. Precisely for this reason, a naively inductive conception of knowledge proves insufficient, as an experience, even one carefully reflected upon, does not autonomously produce scientifically valid categories. What emerges from lived experience may appear plausible to the subject while still being based on incomplete information, premature generalizations, or unrecognized assumptions.

Formalization therefore requires the convergence of what experience has made intelligible with systems of knowledge that do not derive exclusively from it. Here, theory assumes a function distinct from both prescribing practice in advance and merely confirming, after the fact, what the subject believed they had already understood. It can introduce distinctions, concepts, models, and research findings through which the initial interpretation is confirmed, refined, or challenged. Experience and scientific knowledge can thus play a critical role in relation to one another: the former makes problems recognizable, for which formalized knowledge demonstrates its relevance; the latter allows for the comparison of interpretations that individual experience might otherwise leave unchallenged.

In professional education, this relationship implies that scientific knowledge should not be treated as a set of solutions to be applied directly to practice. In evidence-based practice, it is possible to distinguish between the ability to conduct research and the ability to apply it, with the latter including the capacity to reflect on the evidence and apply it to solving professional problems (Böttcher-Oschmann et al., 2021). The issue therefore concerns not only the availability of scientific findings but also the ability to assess their relevance, limitations, and applicability to the specific situation.

Establishing this relationship is part of professional competence: the statement that "research competence is a central foundation of teachers' professional practice" (Schröder et al., 2025, p. 1525) does not equate educational professionalism with that of an academic researcher. Rather, it points to the need for tools to critically examine the evidence, assess its relevance, and use it to form professional judgment.

In this sense, the concept of the "teacher-as-researcher" can also be interpreted. Stating that "teachers are also researchers of their own practice" (La Velle, 2024, p. 367) does not eliminate the distinction between professional practice and scientific research, but rather points to an



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epistemological stance: experience can be examined through observation, the formulation of questions, comparison with evidence, and the revision of interpretations. The professional does not become a producer of scientific knowledge simply by reflecting on their own practice, but can adopt an attitude toward it that prevents experience from being treated as a self-sufficient source of validation.

Formalization can thus be understood as an interface between situated and public knowledge. Building a bridge "between practical experience and wider forms of knowledge" (Knight, 2025, p. 2108) helps avoid two opposing reductions: treating academic knowledge as external and directly transferable to practice, or attributing epistemological self-sufficiency to professional experience. Professional knowledge is instead constructed through a process of mediation in which problems arising from practice are linked to broader cognitive resources, and these resources are reinterpreted in light of the conditions under which they must take on meaning.

The relationship between practice and research gains value when scientific evidence is recognized as relevant to professional problems, which is why research-based learning takes on significance in teacher education precisely "with the aim of equipping future teachers with the skills necessary to meet professional challenges" (Schweinberger et al., 2026, p. 171). The perception of research's professional utility does not, in fact, depend on mere exposure to the evidence but on the ability to understand its significance in relation to practical problems. Thus, formalization consists not in adding scientific knowledge to experience but in constructing a relationship through which both can contribute to an understanding of the situation.

The construction of knowledge also requires that what has been understood transcend individual evidence, a need addressed in research-based learning pathways through autonomy, engagement with theory, reflection, and "authentic and systematic knowledge creation through active participation in research processes" (Raberger et al., 2026, p. 33). Producing knowledge involves not only formulating questions and analyzing information but also making the results communicable by subjecting them to shared criteria for discussion, justification, and review.

The intersubjective dimension therefore confers an additional status on formalization, since knowledge that claims professional relevance must be open to scrutiny by others. This requires not merely articulating what one has understood but also demonstrating which elements support the interpretation, which relationships have been established, which alternatives have been considered, and under what conditions a revision might be necessary. At this step, knowledge takes on a truly argumentative structure, one that does not eliminate the uncertainty typical of educational situations but makes explicit



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and open to discussion the reasons on which a particular interpretation or decision is based.

Formalization also helps clarify the issue of transferability, since what is constructed from a given situation does not become transferable in the sense of allowing one to reproduce the exact same response in an apparently similar case; rather, what can transcend the original experience are categories, relationships, criteria, and questions that guide the interpretation of different situations, so that transfer does not coincide with the generalization of a solution but with the ability to apply knowledge critically when the conditions under which it must operate vary.

From this perspective, generalization must be distinguished from generalizability. Formalizing does not mean asserting that what is observed in one experience is valid in every situation; it means constructing an interpretation that is sufficiently explicit to be compared with further cases and revised when its explanatory power proves insufficient. Knowledge becomes more solid not because it is removed from discussion, but because the relationships on which it is based are made more visible and thus open to challenge.

For this reason, formalization does not mark a definitive conclusion to the process, since categories constructed from experience and compared with further knowledge can serve as resources for addressing subsequent situations. What has been formalized may alter what the subject can observe, distinguish, and question; new experiences can, in turn, demonstrate its relevance or reveal its limitations.

Action, reflection, and formalization thus identify distinct epistemic functions without constituting a rigidly prescriptive sequence. Action makes phenomena and their consequences available for inquiry; reflection enables the construction of meaning from experience; formalization makes what has been understood explicit, argumentable, and comparable with further knowledge.

## 1.4. Circularity and Recursivity: From Experiential Learning to the Formation of the Reflective Professional

The distinction between circularity and recursivity helps clarify the dynamic outlined in the preceding paragraphs. Circularity makes visible the return of knowledge to experience, whereas recursivity indicates something further: what is constructed through an experience can alter the cognitive, interpretive, and operational conditions through which subsequent situations will be addressed, so that the outcome of one process can become one of the



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conditions for the next, and the return does not therefore coincide with a return to the starting point.

Recursivity, however, does not necessarily imply a progressive direction. Previously constructed knowledge may enable one to recognize elements not previously observed, but it may also reinforce inadequate interpretations; a schema may facilitate understanding of a situation while simultaneously making elements that do not fit it less visible; professional experience may expand the available repertoire, but it may also entrench routines that are rarely questioned. What has been learned alters the conditions of subsequent experience, without guaranteeing that such an alteration will necessarily produce a more adequate understanding.

This clarification also prompts a more cautious interpretation of the cyclical model of Experiential Learning Theory, since, from Kolb and Kolb's (2017) perspective, the different modes of learning acquire meaning through the relationships they establish with one another. While the cyclical model highlights the continuity between experience and knowledge, the notion of recursivity makes it clear that a new experience is not approached under the same conditions as the previous one, because knowledge, categories, and criteria constructed during the process can influence how it is subsequently perceived and interpreted.

It is precisely this possibility that makes reflexivity central to professional training, since professionals approach situations not only through explicitly held knowledge but also through interpretive repertoires progressively constructed in relation to practice, which must therefore remain open to questioning: professional experience can enhance the ability to recognize patterns and make decisions, but it can also reinforce ways of interpreting situations that, precisely because they have become familiar, are gradually removed from scrutiny.

The formative challenge therefore concerns not only the provision of opportunities for reflection but also their depth and quality, since even when specific forms of support are provided to foster reflection-in-action, reflection may remain predominantly at a technical level (Grigg et al., 2024).

The quality of the reflective process also depends on the conditions under which it occurs. A comparison between individual and collaborative forms of reflection suggests that interacting with others can broaden the possibilities for analyzing practice (Zohrabi & Xodabande, 2024), so that reflection appears not as an exclusively introspective act but as a process that can be supported by mechanisms that make interpretations open to discussion and comparison.

The issue thus shifts from the descriptive level of learning to the strictly educational one, since the perspectives of Kolb, Schön, and Mezirow help us



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understand the various processes through which experience, reflection, and knowledge can interact, without, for that reason, providing a ready-made instructional methodology: whereas a theory of learning describes and interprets processes, educational design must determine which situations, tasks, mediations, and forms of guidance can intentionally support those processes, and directly transforming a theoretical category into a teaching procedure would therefore mean confusing these two levels.

Kolb's cycle, therefore, does not correspond to a sequence of activities to be replicated; Schön's "reflection-in-action" is not a technique to be applied at a specific moment in the lesson; and Mezirow's critical reflection cannot be achieved simply by asking students to reflect. Theoretical categories become relevant to instructional design when they enable the formulation of problems: which experience to propose, which elements to make observable, what degree of guidance to provide, through which forms of mediation to facilitate distancing from the experience, when to introduce theoretical knowledge capable of reorganizing what has emerged, and how to verify whether what has been constructed alters how subsequent situations are approached.

The distinction between learning theory and instructional design does not, however, imply a separation between theory and practice, whose relationship remains a persistent challenge in training trainers: university course content may be perceived by students as insufficiently practice-oriented when they fail to recognize the relevance of theory to professional situations (Kaupp, 2023). The problem is not simply a matter of increasing the amount of experience but of building connections through which theory and experience can become mutually intelligible.

The possibility of bridging this gap also depends on how experience is integrated into training. In initial teacher education, process drama captures the idea that "you fully experience what you're learning" (Wells, Sandretto & Tilson, 2023), suggesting that the object of learning is encountered in a situation in which the learner is directly involved. This formulation is of interest not because experience should replace conceptualization, but because it evokes a relationship with knowledge in which what is to be understood is first made, at least in part, experiential.

It is precisely this relationship that makes a rigid separation between theoretical and practical knowledge problematic, and the perspective of practical theorizing attempts to "hold theory and practice together" (Burn, Mutton & Thompson, 2023) by conceiving them not as two self-contained elements to be linked only subsequently, but as dimensions that can mutually contribute to the construction of professional knowledge: practice poses problems for theory and can make its relevance evident, while theory



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introduces categories through which practice can be interpreted beyond the immediacy of individual experience.

This distinction is particularly important in the training of education professionals, since knowing about reflexivity is not the same as knowing how to reflect: knowing Kolb's model does not mean recognizing the processes by which one's own experience is transformed into knowledge; knowing Schön does not equate to the ability to question the interpretations that guide action; and knowing Mezirow does not determine the ability to recognize the assumptions through which a situation is constructed. If these abilities are part of the professionalism we aim to foster, they cannot remain merely subjects of theoretical exposition but must be provided with conditions in which they can be exercised, made observable, and subsequently conceptualized.

This raises a question about the pedagogical coherence between the content and form of training. If experience, reflection, and the construction of knowledge constitute dimensions of educational professionalism, training cannot limit itself to describing them as theoretical concepts but must also examine the instructional conditions under which they can become modes of learning.

It is precisely this point that raises the problem explored in the following chapter: how to translate insights into a deliberate instructional framework for experiential learning, reflection, and knowledge construction without reducing learning theories to rigid methodological sequences.



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# 2. Experiential-Inductive Learning: Experience, Reflection, Problematization, and Knowledge Construction

## 2.1. From learning theory to reflective training: the problem of didactic translatability

The insights developed in the previous chapter allow us to take as a starting point a now well-established distinction: describing the conditions under which experience can contribute to the construction of knowledge is not yet equivalent to establishing how those conditions can be intentionally organized within education. The problem of didactic translatability arises precisely from this gap. It is not a matter of transforming theoretical categories into a sequence of corresponding activities, but of identifying the design conditions that make certain processes possible, supportable, and observable.

This same distinction helps clarify the relationship between inductive teaching and learning and experience. The inductive tradition offers insights into the temporal and functional organization of the relationship among the problem, the learner's activity, guidance, and access to formalized knowledge. Adopting these insights, however, does not mean equating inductiveness with experientiality, nor does it propose the latter as a replacement for the former. The issue addressed here concerns, rather, the possibility of integrating some of these insights into situations in which the particular is not merely presented as a problem, case, or question, but is experienced through an activity that puts the subject's knowledge, interpretations, and criteria into practice. The experiential dimension thus opens up a possibility that does not necessarily belong to every inductive configuration: making what the subject produces in the situation part of the material upon which reflection, mediation, and formalized knowledge can subsequently act.

This issue pertains in particular to the training of educational professionals. Understanding models related to experience, reflection, or the transformation of knowledge is a necessary component of professional



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training; the further challenge lies in creating situations in which such knowledge can become part of how the subject observes, interprets, and discusses educational problems. Didactic translatability, therefore, concerns less the conversion of a theory into a method than the design of the relationships among the situation, the individual's activities, educational mediation, and knowledge.

The distinction between mere participation in an activity and experiential learning is particularly important, since, as has been effectively put, it is a matter of "fostering experiential learning, as opposed to simply delivering 'experiences'" (Valiente-Riedl et al., 2022, p. 232): what distinguishes an experiential learning environment is therefore not the presence of a concrete activity, but how the experience is linked to the cognitive operations required of the learner and to subsequent opportunities for processing, so that experience becomes a component of the learning framework rather than the framework itself.

An important consequence concerns what the initial situation should make possible: it is not enough to involve the learner in a task, since the task must activate knowledge, interpretations, and criteria that can later be analyzed, so that a decision, a prediction, a case study analysis, or the formulation of a hypothesis acquires educational significance when it produces something that can be revisited - an initial interpretation, a reasoned choice, a difficulty, a discrepancy, or a question.

Design thus serves to externalize thought. What the subject knows is not assessed merely by asking them to reproduce already formalized knowledge, but by placing them in a situation where they can apply that knowledge, in which the choices made, the relationships constructed, and the criteria used to make decisions become at least partially observable.

This need takes on particular significance in the training of educators, because educational professionalism also involves the gradual development of specific modes of observation. Professional vision can be understood as a "socially organized way of seeing and understanding events" and as the outcome of a "process of professional socialization" (Saglietti, 2020, pp. 44–45). Learning professionally therefore also means modifying what is recognized as pedagogically relevant. The availability of new categories not only expands the individual's declarative repertoire: it can transform the way they distinguish elements, attribute meaning, and construct possibilities for action.

It is precisely this effect that a training program can aim to make observable: if a situation is examined both before and after the introduction of certain conceptual tools, the comparison between the two interpretations allows us to examine what knowledge has made differently visible, so that



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theory appears not merely as additional content, but as a resource capable of altering the interpretability of the situation.

The relationship between theoretical contributions and practical knowledge can, in fact, help clarify and reorganize interpretations that have already been mobilized (Bakker et al., 2024). The key point is not to assign theory a function that takes precedence over practice, but to design conditions in which theory and practice can intersect within a task and become mutually interrogable. Practice makes problems recognizable, to which theory can become relevant; theory, in turn, introduces distinctions and categories that can alter how practice is interpreted.

The design must therefore consider not only what knowledge to introduce, but also when to introduce it and in relation to what interpretive material the subject has previously produced. Providing a category before the learner encounters a situation and introducing it after the learner has attempted to interpret it are not necessarily equivalent operations: in the second case, the new knowledge may encounter an interpretive structure that has already been mobilized and become a tool for recognizing differences between what was initially thought and what subsequently becomes possible to understand.

This dynamic does not automatically produce an epistemic transformation, since even cognitively rich experiences may offer only "opportunities for ad hoc epistemological development" (Guilfoyle et al., 2024, p. 1); participation can therefore create opportunities for revision without, on its own, guaranteeing an intentional reorganization of the relationship with knowledge, which, from an educational perspective, highlights the need to create opportunities for comparing successive interpretations and for recognizing the role played by new categories. It is here that the metacognitive level identified in the Introduction takes on a concrete, practical form.

Reflection thus enters the framework not as a generic invitation to "think about what has been done," but as an activity organized around traces produced during the experience. The need to treat it as a genuine learning activity, supported by the structure of the learning path, also emerges clearly in research on reflection in higher education (Veine et al., 2020). Questions, written reflections, artifacts, and the comparison of interpretations and group feedback must therefore be selected based on what one intends to make observable.

The openness of the situation, the difficulty, and social interaction can also serve different functions in the process, as shown in the professional development pathways of educators involved in tinkering activities, where "generative openings,multiple pathways for exploration," moments of impasse, and forms of "resolution through social interaction" emerge (Thomas Murphy & Martin, 2024, p. 367); a deviation from the expected



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outcome or a difficulty does not, therefore, necessarily constitute a malfunction in the process, but can become material for subsequent elaboration, provided it is supported by conditions that allow for its recognition and reworking.

From this perspective, the trainer's mediation becomes decisive: it does not consist of immediately providing the correct answer or of letting the experience unfold without intervention, but rather of regulating the balance between exploration and support, fostering an understanding of when a difficulty can be left open because it is generative, when it risks becoming disorienting, and when it is necessary to introduce questions, information, feedback, concepts, or explanations. In experiential settings, instructors "do not simply assume the role of facilitator" (Valiente-Riedl et al., 2022, p. 232): rather, the trainer's role shifts in nature and requires continuous decisions about the necessary mediations.

The relationship between teaching methods and the construction of knowledge takes on particular significance in university training for the educational professions. The link between how social pedagogical theories, concepts, and methods are taught and the understanding that students and instructors construct of pedagogy (Charfe et al., 2020) highlights precisely this problem: the form through which knowledge is taught is not necessarily neutral with respect to the type of relationship the learner will construct with that knowledge.

This does not imply that every piece of content must be taught in ways that mimic its subject matter, as the principle of coherence between content and form must be understood in a more limited sense. When a theory concerns processes intended to be developed as components of professional competence, such as reflecting on experience, interpreting experience, problematizing an interpretation, and using knowledge to reorganize it, training can provide conditions in which those processes also become practicable and observable.

Didactic translatability lies precisely at this level. It does not require reducing Kolb, Schön, or Mezirow to procedures, nor does it require students to "discover" scientific theories through experience alone; similarly, it does not require reducing inductive teaching and learning to a mandatory sequence in which the problem must always precede instruction. Rather, it requires using and integrating different theoretical frameworks as criteria for designing situations, guidelines, forms of mediation, moments of formalization, and opportunities to reflect on experience.

It is on this integration, not on the claim to replace or transcend the perspectives from which it derives, that the architecture of Experiential-Inductive Learning described in the following section is based.



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## 2.2. Experiential-Inductive Learning: principles and structure of the framework

Experiential-Inductive Learning is proposed here as a design framework in which experience and the inductive organization of access to knowledge serve distinct yet coordinated functions. The experiential dimension concerns creating situations in which the learner is called upon to draw on knowledge, interpretations, and criteria; the inductive dimension concerns regulating access to formalized knowledge so that it can also come into play in relation to issues made recognizable through experience. The proposal therefore does not intend to replace or supersede the traditions from which it derives, but rather to integrate some of their insights into a pedagogical framework in which what the learner experiences, interprets, and produces can gradually become open to inquiry. Its specificity does not lie in the simple temporal sequence of "first experience, then theory," but in the relationship among what the learner produces in the situation, what is made observable and problematic, and the cognitive tools subsequently introduced.

This clarification is necessary because simply reversing the order of problem and instruction does not, in and of itself, constitute a teaching strategy: "Productive Failure," for example, may involve students attempting to solve a problem before receiving instruction without the independent attempt at a solution necessarily being superior to observing examples before instruction (Hartmann et al., 2021), so that what matters is not the temporal order of the activity as such, but the function it can serve with respect to subsequent learning.

A primary design function is to construct a generative situation that requires the learner to do more than simply participate or perform an activity, calling instead for a prediction, an interpretation of a case, the selection of elements deemed relevant, the formulation of an explanation, a choice among alternatives, or the justification of a decision; what matters is not necessarily the correctness of the initial response, but the fact that the learner must use the resources at their disposal to construct an initial interpretive relationship with the situation.

The experiential quality does not, therefore, coincide with the degree of realism of the proposed situation. An authentic case may be epistemically poor when it requires only the reproduction of an already known procedure; a constructed situation, a simulation, or a scenario, on the other hand, can take on a strong experiential function when they compel the subject to engage interpretatively, by selecting information, anticipating consequences, or taking a position before the outcome is known. The distinguishing criterion



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concerns what the situation allows the subject to mobilize and subsequently subject to inquiry.

A second design function concerns the articulation of available interpretations, since a prediction, a choice, or an explanation gains greater educational value when it can be preserved and retrieved through processes such as verbalizing, writing down, or recording a decision, comparing different outputs, or constructing a representation, which make certain operations less fleeting and allow the individual to return to them later; explicitation is not the same as reflection but establishes some of the conditions that make reflection possible by providing material on which reflection can be exercised.

This involves a design choice that is often overlooked: deciding, before the activity begins, which traces of the initial interpretation should be preserved. If a prediction disappears as soon as an explanation is provided, it becomes difficult to reconstruct what the new knowledge has actually altered. When, on the other hand, the initial output remains available, it can change function over the course of the process: from an initial response, it becomes an object of comparison.

From this perspective, introducing reflective breaks within a university course can support students' growing awareness of the skills they have developed (Adinda & Denami, 2023). The key design consideration is that intentionally interrupting the flow of the activity creates space for what has been done and makes it accessible again for analysis. Reflection is thus not necessarily deferred until the end of the experience but can be fostered through specific conditions for re-examination that cut across the entire program structure. It may initially concern how the student interprets the situation; subsequently, the criteria that guided a decision; and later, the discrepancies that emerged when comparing their interpretation with other interpretations or with formalized knowledge. The design challenge does not simply consist of providing "a moment of reflection," but rather in determining what the subject should revisit, through which clues, and with what questions.

A third design function concerns the emergence of a potential interpretive shortfall. This expression does not introduce a new psychological construct but rather designates a pedagogically relevant condition: the moment when the knowledge, categories, or criteria mobilized prove insufficient to render some element of the situation adequately intelligible. This insufficiency may manifest as an unconfirmed prediction, an inability to distinguish among competing interpretations, a contradiction among explanations, difficulty justifying a decision, or the recognition that a necessary category is missing.

It does not necessarily coincide with error, since an incorrect answer can simply be replaced by the correct one without raising any questions, whereas



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the learner may recognize that their repertoire does not allow them to choose between two plausible interpretations without having committed any formal error; the pedagogically significant step, therefore, is to transform the difficulty into recognition of what is still lacking to understand adequately.

The initial difficulty, however, has no intrinsic educational value (Hartmann et al., 2021), but it becomes relevant when it is made manageable and linked to subsequent opportunities for processing. Instructional design must therefore balance openness and difficulty with available knowledge, avoiding both disorientation and situations that can be entirely resolved using established schemas.

A fourth design function is problematization, which should not be equated with the instructor simply presenting a problem: an assignment may pose a question yet fail to become a genuine issue for the learner, who may simply seek the expected answer, whereas problematization involves the gradual articulation of a discrepancy: *What can't I explain? Why do two interpretations lead to different conclusions? What criterion is missing? What knowledge would be necessary to make a decision?*

In educational professions, this function takes on particular significance because many situations are not structured to already contain an unambiguous definition of the problem. Educational work often requires establishing in advance what should be observed, which elements are relevant, what meanings can be attributed to behaviours, and what issue is actually at stake. Problematization is therefore not an ancillary technique but a function through which the individual can move from a general perception of a difficulty to the construction of a question that can be addressed both cognitively and professionally.

The resulting cognitive question need not arise spontaneously or be formulated entirely by the trainee, since the trainer can intervene through questions, follow-up prompts, comparisons of outputs, new information, and delineation of the problem. Guidance does not interrupt problematization: it can precisely constitute the means by which a difficulty that is too vague is transformed into a manageable issue. Inductive reasoning, therefore, does not mean abandoning mediation, but rather involves a specific organization of the temporal and functional relationship between what the trainee is attempting to understand and the cognitive tools made available to them.

A fifth design function concerns formalization and engagement with formalized knowledge, whereby theories, concepts, models, and research findings are introduced in relation to something the subject has already attempted to observe or interpret, not necessarily to confirm what has emerged but to refine an initial interpretation, reveal its inadequacy, contradict it, or bring to light aspects that were not previously recognizable.



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In this sense, engaging with formalized knowledge allows one to transcend the singularity of the situation without erasing it, since the challenge is not to replace experience with theory but to provide categories and models through which what has been observed can be reinterpreted and compared. Across contexts, the relationship among experience, reflection, and conceptual tools can support an understanding of the complexity of professional practice (Pham et al., 2023). This reference is adopted here solely in relation to this general principle.

Formalization can take different forms: explicit instruction, reading scientific texts, comparing with models, analysing evidence, working through examples, or combinations of these methods. The distinguishing feature is therefore not the absence of explanation, since a systematic explanation may indeed be necessary at certain moments, but rather the functional relationship it establishes with what has already been produced.

The value of this relationship becomes particularly clear when initial work is preserved and compared with subsequent knowledge, since learning can be facilitated by prompts that require comparing incorrect outputs with correct solutions (Loibl & Leuders, 2019); in the present framework, this principle assumes a broader scope, as what was produced before formalization gains value when it is preserved and compared with tools that help assess its adequacy and limitations.

A sixth design function is the interpretive return, through which, after encountering formalized knowledge, the subject is reconnected with the initial situation, their initial interpretation, or the decision previously made in order to make the difference brought about by knowledge observable: *What can I now distinguish that I could not before? Which element do I interpret differently? Why does a choice that was initially plausible now seem insufficient? What criteria can I use that were not available at first?*

Interpretive return thus makes it possible to experience the professional function of theory, since the relevance of a category need not be merely stated by the instructor but can become evident in what it enables one to see, explain, or decide differently. The situation may be materially the same, but it is no longer cognitively identical for the subject who returns to it.

A seventh design function concerns transfer to a subsequent situation, understood not as the reproduction of the same solution but as the capacity to question the relevance of what has been learned when conditions change: a category may prove useful, require adaptation, or reveal new limitations, and, in the latter case, a further interpretive shortcoming may emerge and reopen the process of problematization, thereby giving the recursivity discussed in the previous chapter a specifically design-oriented function.



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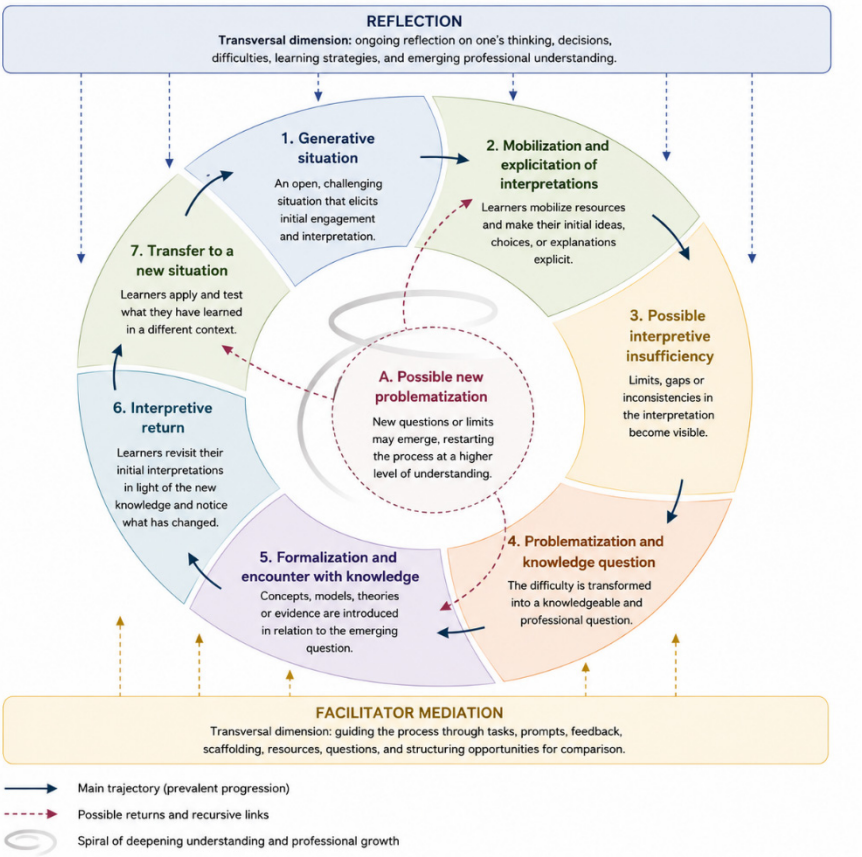



*Figure A: Functional spiral of experiential-inductive learning design.*

The spiral representation (figure A) should be understood in functional rather than algorithmic terms. The relationships depicted suggest a possible progression, not a mandatory sequence. The act of explicitation can already alter the initial interpretation; intersubjective comparison can generate problematization; partial knowledge can be introduced even as the problem is still being constructed; formalization can reopen reflection; interpretive return can reveal that the initial question was inadequately formulated. The spiral form also makes it clear that this feedback does not return the subject to the same point: what has been learned alters the conditions under which a subsequent situation is addressed.

Reflection should be considered a cross-cutting dimension of the framework rather than a single phase, since it can occur when the subject articulates an initial interpretation, recognizes a difficulty, compares different



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interpretations, encounters formalized knowledge, or revisits their initial work, with the object to which reflection is applied and the function it assumes changing across the process.

The trainer's mediation also permeates the entire framework and may include structuring the situation, prompting clarification, comparing interpretations, adjusting the level of difficulty, supporting the formulation of a question, introducing a theoretical category, providing feedback, encouraging a return to the initial work, or setting up a subsequent situation. Autonomy and guidance are therefore not incompatible extremes: the design question concerns what kind of mediation is necessary at a given moment so that the subject can progressively take on a greater share of the interpretive tasks.

The temporality of knowledge is, consequently, a design variable: different types of knowledge may be necessary before, during, or after the experience. The question is therefore not whether theory should follow experience, but when, in relation to which of the subject's productions and for what function, it should be introduced.

The framework's specificity does not lie in the originality of its individual components-which belong to established theoretical and research traditions-but in their design configuration. Generative situations, initial productions, explicitation, recognition of interpretive insufficiency, problematization, formalized knowledge, interpretive return, and transfer are interrelated so that the subject can not only acquire knowledge but also observe how this knowledge changes their own way of interpreting.

In this sense, the Experiential-Inductive Learning framework does not constitute a new general learning cycle or a methodology intended to replace deductive approaches or forms of explicit instruction, but offers a possible educational framework for intentionally integrating the experiential dimension with an inductive organization of access to knowledge while maintaining forms of guidance and formalization consistent with the characteristics of the situation; its relevance must therefore be assessed in relation to the objectives, content, participants' level of expertise, and training conditions, since other teaching frameworks may prove more appropriate in different situations.

The architecture outlined here provides the interpretive framework for the educational experiences examined in Chapter 4. The approaches presented should not be understood as direct applications of a fixed sequence but rather as situated configurations through which some of these functions-experience, explicitation, problematization, formalization, and interpretive return become observable in practice.



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# 3. Experience, Neuroscience, and Freedom in Educational Action

## 3.1. The Neuroplasticity of Experience and the Modifiability of Interpretive Repertoires

The previous chapter defined Experiential-Inductive Learning as a design framework in which experience, explicitation, problematization, formalization, and interpretive reflection are interrelated, so that what the individual experiences and produces can gradually become open to inquiry and reorganization through knowledge. However, a further question remains: what conditions of modifiability of interpretive and action repertoires can support such a formative dynamic, without constituting its biological foundation? At this level, the reference to neuroscience can serve a heuristic function: not to deduce a pedagogical theory or teaching methodology from the description of brain processes, but to examine the compatibility between certain findings regarding plasticity, prediction, memory, affectivity, and situated cognition, and a conception of education as a progressive opportunity to freely and autonomously review, expand, and reorganize the ways in which the subject interprets and addresses situations.

The reference to contemporary neuroscience is used here in a limited capacity, not to derive a definition of educational freedom from neurobiological processes or to establish a pedagogical theory of freedom on biological grounds, but to examine whether and to what extent knowledge of plasticity, the predictive and situated nature of cognition, and the integration of cognitive, affective, and social processes is compatible with a conception of the individual as capable of expanding, modifying, and reorganizing, within certain constraints, the repertoires through which they interpret and address situations; from this perspective, freedom is understood not as the absence of determinations, but as a possibility constructed within biological, cognitive, affective, social, and cultural constraints. The brain is neither a



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merely reactive system nor a device in which experience leaves immutable traces; it modifies its own configurations through interaction with the environment, while what has been previously learned helps orient how subsequent situations are perceived, anticipated, and interpreted (Parr et al., 2022; Pessoa, 2022).

Neuroscience can therefore help clarify some of the conditions that make the modification of interpretive and action repertoires possible, without determining either the pedagogical meaning of freedom or the direction such modification should take.

A first relevant condition is the nervous system's plasticity, defined as "the brain's ability to reorganize itself structurally and functionally in response to experience and learning" (Granado de la Cruz et al., 2025, p. 1), a finding that is pedagogically significant not because it allows teaching strategies to be derived directly from descriptions of neural processes, but because it challenges any conception of learning as the mere recording of information within essentially static structures: experience modifies the system that processes it and, in this sense, contributes to transforming some of the conditions through which subsequent experiences will be processed.

The relationship between experience and neural modification must not, however, be interpreted in terms of simple causality, since experience does not automatically produce a specific brain configuration, just as plasticity does not imply that any experience necessarily produces learning; what the subject encounters is processed through pre-existing structures, expectations, knowledge, affective states, and relational configurations, so that plasticity describes a possibility of change rather than the pedagogical direction that such change will take.

This dynamic is consistent with the recursive conception outlined above: what is learned contributes to the conditions under which subsequent experiences are processed. Every new encounter with reality, in fact, takes place on the basis of at least partially transformed configurations, and previously constructed knowledge does not merely constitute content available in memory but also contributes to the organization of the possibilities through which new information can be selected, interpreted, and related. This compatibility does not, however, constitute a neuroscientific foundation for pedagogical recursivity, but rather signals a convergence between different levels of description.

Freedom can therefore be understood not as independence from prior experience, but as the possibility of using what experience has constructed without being rigidly determined by it. A system incapable of change could only reproduce existing configurations; a plastic system, on the other hand, can reorganize them in relation to new conditions. Plasticity is not



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synonymous with freedom, but it constitutes one of the biological conditions that make it possible to modify the repertoires through which the subject interacts with the environment.

This possibility becomes even clearer when considering the predictive nature of cognition, since the perspectives of predictive processing and active inference describe the brain as a system that does not passively await information but continuously formulates predictions about the causes of sensory inputs and compares them with what actually happens, with perception itself emerging from the interaction between expectations constructed through experience and environmental signals (Parr et al., 2022).

The relevance of this perspective to the problem addressed here lies in the fact that the past is not merely an archive of information, since previous experiences contribute to the construction of models through which the subject anticipates what might happen; while these models make action possible by enabling the rapid selection of interpretations and responses without having to reconstruct the entire situation each time, their very effectiveness can also become a constraint, insofar as what has worked in the past tends to shape subsequent perception and decision-making.

Freedom, therefore, cannot be equated with the absence of predictive models, since action would be difficult to organize without expectations, patterns, and prior knowledge; rather, it lies in the ability to revise these models when the situation produces elements they fail to explain adequately, so that the discrepancy between prediction and experience can assume a potentially generative function.

Predictive error should not be viewed merely as something to be eliminated: it signals a gap between the model the subject used to anticipate the situation and what the situation actually presents. The system is therefore not free because it lacks anticipations, but because it can, within certain limits, modify anticipations that are no longer sufficiently adequate.

This perspective also allows us to reinterpret the role of uncertainty, since a completely predictable environment would primarily require the reproduction of established responses, whereas a totally unpredictable environment would make it extremely difficult to establish any stable orientation; action unfolds instead in the intermediate space where the subject can draw on previous models while encountering elements that necessitate their revision.

In this context, contributions from neurodynamic perspectives and complexity theory are also relevant, since chaotic dynamics can allow the brain to escape overly stable configurations (Skarda & Freeman, 1987), with chaos referring not to a lack of organization but to the possibility of transitioning between different configurations: whereas an overly rigid system would



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remain bound to the same attractors, a system capable of reorganization can produce new configurations in response to changing conditions.

From a pedagogical standpoint, the value of this perspective must be approached with caution, since there is no direct correspondence between neural dynamics and educational freedom; there is, however, a compatibility between the system's ability to avoid remaining rigidly confined to previous configurations and a conception of education as the expansion of interpretive and action possibilities, in which freedom does not require the absence of structure but rather the possibility of reorganizing established structures when they are no longer sufficient.

This interpretation also clarifies the relationship between memory and the future, since memory does not simply preserve the past but makes materials available that can be recombined to construct anticipations, hypotheses, and possible scenarios, thereby linking past and future within intentional action as previous experiences provide resources through which the subject can imagine what has not yet happened and compare alternative paths (Parr et al., 2022).

The ability to anticipate different scenarios takes on particular significance with regard to freedom, since a choice can be considered as such only when the subject has, at least potentially, alternatives available; these alternatives need not already have been experienced in the same form, but can be constructed by recombining elements of previous experience, comparing possible consequences, and imagining configurations not yet encountered. Past experience can thus become a resource for constructing the possible rather than serving solely as a constraint that determines repetition.

The cultural dimension plays a profound role in this process: the frameworks through which an individual interprets a situation are not constructed in isolation but emerge within shared practices, languages, relationships, and symbolic systems. The relationship between neurobiological organization and culture can be understood as mutually influential: the cognitive frameworks through which the individual interprets and directs their own actions cannot be attributed solely to biological predisposition or to simple cultural transmission, but develop through ongoing interactions among plasticity, social participation, and culturally mediated experiences (Han, 2017).

The individual does not merely receive the models of their own culture but reconstructs them within their experiential history, a capacity that creates significant space for a pedagogical conception of freedom by allowing what has been received to become material upon which interpretation, judgment, and choice can be exercised; even in this case, however, freedom does not equate to independence from culture, but concerns the possibility of using



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these repertoires without treating them as the only possible way to organize experience.

The 4E framework of cognition (embodied, embedded, enactive, and extended) allows us to further develop this point by conceiving cognition not as an activity exclusively internal to the brain, but as emerging from the interaction among the organism, the body, the material environment, and social relationships (Newen et al., 2018; Gallagher, 2023), so that experience assumes a constitutive function rather than merely representing the material upon which an already formed cognitive system subsequently operates.This perspective makes the conception of freedom as an exclusively internal property of the individual even less tenable, since the possibilities for action also depend on the characteristics of the environment, the available resources, the relationships in which the subject is embedded, and the opportunities for interaction that a situation makes accessible: an individual may possess certain abilities yet be unable to exercise them in a context that does not provide the conditions to mobilize them, whereas changes in the environment can make possibilities for action available that were previously inaccessible.

Freedom thus takes on a relational dimension. It concerns not only what the individual possesses but also the dynamic relationship between individual repertoires and situational conditions. This point is particularly relevant to education, as it shifts the focus from the mere development of internal competencies to the design of environments where such competencies can be mobilized, tested, modified, and expanded.

Regarding the affective dimension, the traditional distinction between cognition and emotion appears increasingly inadequate for describing how the systems involved in perception, evaluation, and decision-making function: cognitive and affective processes are deeply intertwined, calling into question rigidly modular representations of the brain (Pessoa, 2022). The interpretation of a situation and the selection of possible courses of action therefore do not depend exclusively on an abstractly rational evaluation of the available information.

Professional autonomy, therefore, cannot be conceived of as the neutralization of the affective component, since emotions, bodily states, and evaluations contribute to the construction of relevance and shape what is perceived as urgent, risky, desirable, or possible; training can, however, help make these processes more recognizable, allowing the individual to avoid immediately equating the initial affective response with the only possible interpretation of the situation.

The issue of freedom thus gradually shifts from the abstract availability of alternatives to the ability to construct and evaluate them: it is not enough



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that, in theory, multiple possibilities for action exist; the subject must be able to recognize them as such. A possibility that cannot be perceived, imagined, or conceptualized does not actually enter the realm of decision-making.

It is precisely at this point that knowledge and freedom enter into a particularly close relationship, since knowledge can expand the realm of the possible by introducing distinctions, categories, relationships, and models that make previously indistinct elements recognizable: an individual who possesses only a single interpretive framework tends to reduce different situations to that framework, whereas the acquisition of additional conceptual tools allows for the formulation and comparison of alternative hypotheses.

For the educator, being free also means having the epistemological tools to use such knowledge without transforming it into a new form of technocratic prescription. Neuroscience, therefore, does not underpin biopedagogy by providing direct instructions on what to teach or which method to adopt. Its contribution lies in providing additional levels of understanding of the processes involved in learning, which must then be interpreted within the context of pedagogical issues, educational goals, and concrete professional situations.

This distinction is particularly relevant to the relationship between scientific evidence and educational decision-making, since a description of cognitive functioning may indicate constraints, possibilities, or conditions that affect learning but cannot independently determine which goals education should pursue, as pedagogical decision-making always involves a normative and contextual component that goes beyond the description of brain functioning.

Neuroscience literacy in teacher education must also be situated within these limits, with brain science literacy defined as "an individual's foundational understanding of brain science concepts, critical cognition, and the ability to apply such knowledge to guide learning and healthy living" (Yang et al., 2024, p. 2); its pedagogical significance lies not in the assumption that greater knowledge of the brain automatically leads to better practices, but in the possibility that such knowledge becomes one of the resources through which professionals critically interpret learning processes and educational decisions.

Furthermore, the observed effects must be interpreted without overestimating their scope: for creative thinking, "a small but positive effect" was found (Peng et al., 2025, p. 5), which calls for avoiding overly strong interpretations of the relationship between neuroscientific literacy and cognitive development. Neuroscientific knowledge can contribute to professional development, but its value depends on how it is integrated with pedagogical, disciplinary, contextual, and professional knowledge.



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Similarly, creative thinking involves the dynamic interaction among different brain networks (Beaty et al., 2015), challenging the notion of creativity as an isolated function. Here, too, the evidence does not prescribe a specific educational methodology but rather challenges overly simplistic representations of cognitive processes and supports a conception in which action emerges from the dynamic interaction among different systems.

The contribution of neuroscience to educator training must therefore be situated within an epistemologically prudent perspective. Neuroscientific evidence can broaden our understanding of how experience, memory, prediction, emotion, and the environment contribute to the construction of action, but it cannot replace pedagogical reflection on the goals, values, and responsibilities that guide educational intervention.

Professional freedom can thus be defined as a progressively developed capacity to avoid automatically accepting the first available interpretive framework as the only possible one. It requires the ability to suspend, at least temporarily, the habitual response, recognize elements that contradict it, mobilize alternative categories, anticipate different consequences, and make a context-specific decision.

Neuroscience helps clarify certain conditions that make the educability of such freedom compatible and plausible, though not biologically proven: plasticity makes it possible to modify structures built through experience; the predictive nature of cognition allows for the revision of models when they encounter unforeseen elements; the system's complexity makes non-rigidly predetermined trajectories possible; the social dimension broadens available perspectives; memory allows the use of past experiences in constructing future possibilities. None of these processes, either in isolation or collectively, determines educational freedom: they describe certain conditions of possibility, while their transformation into professional autonomy depends on formative, cultural, and strictly pedagogical processes.

The educational challenge, then, is to understand how these possibilities can be intentionally fostered, since, if professional freedom requires expanding interpretive repertoires, recognizing the limits of one’s own anticipations, constructing alternatives, and using knowledge without turning it into a prescription, education cannot be limited to transmitting theoretical models or accumulating experiences but must create conditions in which the individual can relate experience to knowledge, encounter the limits of available interpretations, and use new tools to reorganize them.

From this perspective, freedom is not an outcome separate from learning but a quality of the relationship the individual progressively builds with what they learn: not depending rigidly on a single interpretation, not accepting a theory as an automatic prescription, not equating past experience with the



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only possible future, and keeping open the capacity to revise one's judgment when the situation requires it.

The transition from neurocognitive conditions to professional freedom is therefore not automatic: plasticity enables change but does not determine its direction; prediction enables anticipation but can also reinforce rigid expectations; memory makes past experiences available but can support both innovation and repetition; culture expands the symbolic repertoire but can also limit what is considered possible. It is the educational process that can progressively transform these conditions into resources for more conscious action.

The educator's freedom can thus be conceived as the capacity to recognize, question, and, when possible, modify the impact of these constraints through knowledge, reflection, and experience. This shifts the discussion from the conditions that make the revision of interpretive frameworks possible to the pedagogical problem of their formation.

## 3.2. Experiential-Inductive Learning as a Possible Tool for the Educator's Freedom of Action

If professional freedom does not mean the absence of constraints, but rather the ability to recognize them, have alternatives available, and choose among them consciously based on the characteristics of the situation, the pedagogical question is which training conditions can help expand this capacity. The training of educators can, in fact, produce different effects: it can provide models, procedures, and criteria that expand one's professional repertoire, but it can also transform those same models into prescriptive frameworks applied regardless of the conditions in which educational action takes place. In the latter case, an increase in knowledge does not necessarily lead to an increase in freedom: the educator may be familiar with a greater number of theories yet continue to apply them in essentially heteronomous ways. The problem, therefore, concerns not only how much professional knowledge is acquired, but also the relationship the individual learns to build with that knowledge.

It is precisely at this level that Experiential-Inductive Learning can be examined as a possible approach consistent with certain formative conditions of professional freedom. Its relevance does not depend on its tendency to give greater weight to the subject's experience or activity, but rather on the type of relationship it establishes among situation, knowledge, and decision. Within the framework outlined in the previous chapter, knowledge is not intended to fully anticipate the meaning of the situation, but rather constitutes



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a resource that must be selected, examined, and redefined in light of the problems actually encountered. For the educator in training, this means practising not only the application of a theory, but also the assessment of the conditions under which it may be relevant.

A first condition, therefore, concerns the possibility of suspending immediate application, so that, when faced with a situation, the educator is not simply called upon to identify which familiar procedure should be used but to construct an interpretation of the context before deciding which knowledge to draw upon, thereby creating a space between problem and response in which different explanations can be compared, the adequacy of available criteria verified, and, when necessary, the insufficiency of existing models recognized.

Within this space, one of the least visible forms of professional heteronomy can be countered: dependence on theoretical repertoires treated as closed systems. Having many methodological options at one's disposal does not, in fact, equate to being able to choose among them. Professional pluralism requires distinguishing the underlying assumptions and conditions of applicability of these options, assessing their fit with the context, and, where appropriate, relating them to one another without reducing them to a baseless syncretism. Professional agency, in this sense, requires that scientific evidence be incorporated into judgment alongside sensitivity to the concrete conditions of action, rather than functioning as standardized procedures to be applied regardless of context (Darling-Hammond et al., 2017; Biesta, 2022).

The inductive structure of training serves a specific function here: placing the educator in a situation where the answer is not fully available in advance compels them to determine which elements are relevant, which interpretations are plausible, and which knowledge can be usefully mobilized. Precisely because the answer is not prescribed, the equivalence of all possible solutions does not follow; rather, explicit criteria become even more necessary to justify the choice. Freedom is thus distinguished from arbitrariness: being professionally free does not mean being able to choose just anything, but rather being able to explain why, among the realistically available options, a particular decision appears most consistent with the objectives, the available knowledge, and the characteristics of the situation.

In this sense, the educational setting can become a space for practising decision-making, since the challenge not only makes the learning of content more meaningful but also places the educator in a position to select among alternatives and make visible the reasons for the decision - which elements were considered, which were excluded, which criteria were used, and which



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consequences were anticipated - so that professional freedom also includes the ability to provide a reasoned justification for one's actions.

The availability of alternatives, however, is not sufficient, since an excess of unstructured possibilities can lead to disorientation rather than expanding the capacity for choice, which is why mediation within the Experiential-Inductive Learning framework plays a decisive role: scaffolding can support the gradual exercise of autonomy by offering temporary guidelines for addressing situations whose complexity would otherwise be overwhelming and, as competence increases, can be progressively reduced, transferring an increasing share of interpretive and decision-making responsibility to the individual. Professional freedom does not, therefore, stem from the mere absence of guidance, but can develop through the gradual assumption of functions initially supported by external mediation.

From this perspective, the role of theory can be reinterpreted: a pedagogical theory can function as a prescriptive framework or as an interpretive tool. In the first case, it risks narrowing the scope for choice, as it tends to reduce the situation to an example of predefined categories; in the second, it can broaden it, making aspects recognizable that would otherwise remain less visible without that tool. The educational question then becomes not merely "Which theory do I know?", but "Which theory allows me to better understand this problem, under what conditions, and by leaving out which aspects?"

Freedom of action can thus be linked to the transition from received knowledge to available knowledge. A received theory may be reproduced because it is part of the educational curriculum, because it is proposed by a scientific authority, or because it aligns with the prevailing model in the professional context. It becomes available, however, when the individual understands the conditions under which it is relevant and can responsibly decide when to use it, when to integrate it with other frameworks, and when to recognize its limitations. In this transition, knowledge ceases to function as an external directive and can become a resource for professional agency.

The issue becomes particularly relevant when potential prescriptions stem not only from pedagogical theories but also from assessment systems, technological platforms, learning analytics, and artificial intelligence tools. These resources can expand the information available for decision-making and, at the same time, foster a gradual delegation of judgment. The problem is therefore not whether to accept or reject them, but rather maintaining epistemic and pedagogical control over the decision. Even scientific representations of the brain must be understood within the networks of practices, institutions, and interests in which they are produced and interpreted (Williamson et al., 2025); no evidence can therefore, on its own, be transformed into an educational prescription. Understanding a cognitive



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mechanism does not yet equate to knowing which pedagogical decision should be made.

Experiential-Inductive Learning can provide opportunities to exercise this competence precisely because it continually brings knowledge back into relation with the situation. A scientifically grounded recommendation must be evaluated in light of the context, the objectives, the characteristics of the individuals involved, and the educational implications of the decision. The evidence does not lose its value, but it becomes part of a judgmental process. Professional autonomy, therefore, does not stem from rejecting science, but from the ability to use it without attributing to it a prescriptive function it cannot sustain.

Within this broader epistemic competence, brain science literacy takes on meaning. Understanding certain cognitive processes can broaden an educator's interpretive repertoire; however, for this to contribute to professional freedom, one must be able to evaluate the quality of the evidence, recognize the limits of its generalizability, and compare it with the concrete situation. The positive but limited effects observed when neuroscientific knowledge is considered in isolation (Peng et al., 2025) precisely reinforce the need to integrate it with pedagogical knowledge, contextual interpretation, and decision-making skills.

Professional freedom also includes the ability to review one's actions in light of their effects. It is therefore not limited to the choice made before intervention. A rigidly prescriptive model tends to interpret failure as the imperfect application of a procedure considered correct from the outset; an agency-oriented approach, on the other hand, can view the outcome as information about the appropriateness of the choice made in that specific context. Adjusting one's approach in light of the consequences of one's actions constitutes, in this sense, a component of professional freedom.

This also allows us to distinguish freedom from fidelity to a model: being trained within a specific pedagogical orientation does not necessarily imply dependence on it. The question is whether theories are learned as interpretive tools open to comparison and revision, or as systems to which practice must conform. For the sake of consistency, Experiential-Inductive Learning itself cannot escape this principle. If it were transformed into a mandatory sequence to be applied regardless of objectives, students, and contexts, it would reproduce precisely the heteronomy it seeks to counteract. Its consistency with a pedagogy of freedom also depends on the possibility of using it critically, adapting it, or abandoning it when a different instructional framework proves more appropriate.

This point prevents inductiveness itself from becoming an absolute principle, since an inductive approach may be appropriate when it is



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educationally useful to bring a problem or a need for knowledge to the surface before presenting systematic content, whereas more direct approaches may, conversely, be preferable when they are better suited to the level of expertise, the nature of the content, or the available conditions. The educator's professional freedom can manifest itself precisely in the ability to navigate this balance.

Professional choice also has an ethical dimension, since freedom does not coincide with pure self-determination; every educational decision is made within shared practices and has consequences for others' possibilities. Educational agency must therefore be understood in relation to responsibility (Biesta, 2022): to choose means shaping learning opportunities, distributing opportunities for voice, selecting what is considered meaningful, and helping to shape the conditions under which other individuals can, in turn, exercise autonomy.

Experiential-Inductive Learning makes this responsibility particularly evident because it requires the teacher to make decisions about the very configuration of the learning environment: choosing which problem to present means determining which aspect of reality to highlight; deciding how much support to provide means regulating the student's space for autonomy; selecting the moment for explanation means determining how much space to leave for exploration; and organizing discussion means influencing which voices can participate in the construction of meaning. Professional freedom, therefore, does not eliminate pedagogical power: it requires that this power become more conscious, reasoned, and justifiable.

Precisely because freedom does not equate to self-referentiality, engagement with others can contribute to the development of autonomy by broadening the range of possibilities through the exposure of individual decisions to diverse interpretations; dissent, when supported by reasoned arguments, can bring to light alternatives an individual might not have considered and reduce the risk that a particular course of action will be assumed to be the only possible one, while the possibility that different solutions may both be pedagogically sound when grounded in consistent and adequately justified criteria allows theoretical freedom to be understood as the ability to navigate plurality without turning it into relativism.

This ability takes on greater significance in environments marked by a proliferation of information sources and competition among interpretations, where critically examining what appears self-evident, comparing competing explanations, assessing the reliability of information, and temporarily tolerating uncertainty become components of epistemic autonomy; UNESCO (2023) similarly highlights the need to preserve human agency in evaluation and decision-making within complex informational and



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technological environments. For educators, this means keeping multiple hypotheses open until sufficient evidence is available to distinguish among them, thereby preventing the first plausible answer from prematurely narrowing the range of alternatives.

The category of "adaptive expertise" fits within this framework: a competent professional is not only capable of efficiently carrying out known procedures but also knows when they are insufficient and when the situation requires reorganizing knowledge. Experiential-Inductive Learning can provide opportunities in which the educator must select, combine, or modify available models. Adaptive expertise can therefore be regarded as one of the operational dimensions associated with professional freedom, without being equated with it.

The most significant educational outcome, then, does not consist in the acquisition of an additional method, since, if the program were aimed simply at teaching educators to apply the Experiential-Inductive Learning framework correctly, the gain in terms of freedom would be limited; rather, its function is to create opportunities to practise a mode of engagement with knowledge and action - one in which no solution is assumed to be automatically valid before it is tested against the situation.

Training that multiplies opportunities for choice, comparison, problematization, and revision can help expand the scope within which the educator can make decisions. This does not mean that Experiential-Inductive Learning directly produces professional freedom; rather, it can establish certain conditions consistent with a form of training that progressively makes visible, open to questioning, and modifiable the constraints within which action is constructed. The educator does not become free by freeing themselves from theory, professional culture, scientific evidence, or institutional conditions; they can become freer to the extent that they learn to recognize these determinants, use them critically, and construct more than one possibility for action within them.

It is in this transition that freedom takes on a truly pedagogical meaning, neither as an abstract starting point attributed to the educator nor as a definitive result attainable once and for all, but as a dimension of professionalism that is continually constructed and continually exposed to the risk of becoming rigid; it therefore requires training contexts in which it is possible to encounter new situations, compare alternatives, subject one's own interpretations to the scrutiny of others, and critically review the categories through which one acts. The Experiential-Inductive Learning framework finds its broadest meaning here: not as a methodology intended to replace others, but as a possible framework for exercising and sustaining an open, reasoned, and responsible relationship among knowledge, judgment, and professional action.



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# 4. Experiential-Inductive Learning in Practice

## 4.1. Methodological Introduction

As part of the activities of the Laboratory of Epistemology and Educational Practices-renamed the Laboratory of Experimental Pedagogy-numerous Experiential-Inductive Learning programs have been conducted for teachers and educators, and these programs have been the subject of various publications (Strollo, 2018a, 2018b, 2019).

The teaching intervention presented here involved 27 participants, including male and female students enrolled in the Master's Degree Program in *Coordination of Educational Services for Early Childhood and Social Disadvantage* at the University of Naples Federico II, as part of the course on *Theories and Models of Educational Planning* during the 2023–2024 and 2024–2025 academic years.

The analysis is not intended to causally verify the effectiveness of the intervention, but rather to explore how participants described and interpreted the learning experience and which reflective, metacognitive, interpretive, and affective processes are discernible in their narratives. In particular, attention is focused on the ways in which the proposed activities appear to make observable some of the functions of the experiential-inductive architecture outlined in the previous chapters.

The collection, processing, and analysis of the materials were conducted in accordance with the ethical principles of educational research and the protection of participants' confidentiality. The data were processed in anonymized form, avoiding the inclusion of any information that could allow for the identification of individual subjects.

The educational intervention was developed through a workshop-based program structured around three learning activities: the writing mechanism, hypertext, and sound dramatization. Students actively implemented the proposed approaches, experiencing their educational potential firsthand. The



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entire program was accompanied by the completion of a metacognitive journal, designed as an integral part of the learning process and aimed at fostering ongoing reflection on the activities carried out, the strategies adopted, the emotions experienced, the difficulties encountered, and the changes that took place during the experience. These reflections developed in parallel with the workshop activities, through a continuous dialogue between action, thought, and personal processing. Only at the end of the experiential program did the students delve deeper into the theoretical content by reading the reference text.

The narratives collected through the metacognitive notebook formed the research corpus. They were subsequently imported into NVivo and organized into nodes corresponding to the individual questions in the metacognitive grid.

The teaching experiences presented in this chapter should be considered on two distinct but interrelated levels. Each activity is structured around a specific learning objective and has its own content, theoretical references, and educational goals. Writing, hypertext, and audio dramatization are therefore not simply variations of the same exercise, but distinct situations designed to activate specific cognitive, reflective, relational, and affective processes.

Beyond the specific nature of individual content, however, these activities share a cross-cutting educational function, as they are organized not only to enable students to learn through experience but also to gradually make them aware of the process through which an experience can become a learning opportunity, so that the function of experience becomes, at least in part, an object of experience in its own right.

This principle takes on particular significance in the training of education professionals, since theoretical knowledge of experiential and reflective learning models does not, in itself, guarantee that individuals will be able to recognize the processes described by these models in their own experience or subsequently apply them intentionally in professional practice; reflexivity, when considered a component of educational professionalism, cannot therefore remain merely a concept to be learned but must be practiced within the training experience itself.

It is from this perspective that the structure of the activities outlined in the following pages should be interpreted. Students are initially placed in direct contact with a situation and are called upon to act, choose, interpret, produce, or take a stance. The experience is subsequently revisited through metacognitive tools and opportunities for discussion, so as to make strategies, difficulties, emotions, interpretations, and perceived transformations at least partially observable. Only at a later stage does the learning path systematically engage with the relevant theoretical knowledge,



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which can enable students to reinterpret their experiences through additional categories.

This approach does not grant experience epistemological primacy over theory, since individual experience neither constitutes a criterion for validating scientific knowledge nor is treated as a space in which students must independently "discover" theory. Formalized knowledge retains an irreducible and even critical function: it can confirm certain interpretations that have emerged, but it can also clarify, differentiate, or challenge them. What changes is the relationship through which the student encounters this knowledge: theory can intervene in a situation that has already been experienced and examined, becoming a tool for reorganizing understanding of it.

In this sense, the activities serve a metadidactic function: while specific content is being learned, a particular relationship between action, reflection, discussion, and formalization is simultaneously made tangible. The overarching goal, therefore, is not simply to teach through experience, but to create conditions through which students can recognize what makes an experience educationally meaningful and what work is necessary for it to be transformed into knowledge.

The program can thus be understood as an attempt to translate into educational practice an issue developed in the first part of this volume: there is no automatic continuity between experiencing a situation and learning from it. Mediations are needed that allow the experience to be slowed down, made observable, questioned, and related to further forms of knowledge.

It is on this dual level that the experiences presented in the chapter must be interpreted: on the one hand, as pathways oriented toward the learning of specific content; on the other, as opportunities through which trainees can experience the very process by which an experience can become an object of reflection and knowledge.

The collective brainstorming session held at the end of the entire program also addresses this dual level. After engaging in the activities, engaging in metacognitive reflection, and subsequently comparing their experiences with formalized knowledge, participants were invited to take another look at the training experience as a whole. The purpose of this concluding discussion was not to re-examine the content learned, but to make the process itself-through which experience, discussion, and formalization had contributed to the construction of knowledge-the subject of reflection. The brainstorming session also introduced an explicitly intersubjective dimension, allowing individual interpretations to be compared, integrated, and further refined through the contributions of the other participants.



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It is in this second function that the most direct link lies between the instructional framework described in the previous chapters and the activities analyzed in the following pages.

### *4.1.1. Methodology for Conducting the Programs*

Consistent with what was outlined in the previous chapters, each session began with an experiential activity, which will be described in detail prior to the analysis of the results for each instructional unit.

After the activity, participants completed a metacognitive grid by hand. They then discussed the knowledge "induced" by the activity, co-constructing a body of knowledge that, starting from an implicit state, became increasingly explicit and defensible. Only in the final phase did participants engage with the literature on the topic, allowing them to compare, refine, and reorganize the interpretations that had emerged from their experience. Against this background, the relationship between metacognition and handwriting deserves further consideration, particularly insofar as handwriting may support reflective processing after the experience.

Metacognition is one of the most relevant theoretical frameworks for understanding learning processes from an experiential-inductive perspective, as it shifts the focus from the accumulation of knowledge to the individual's ability to critically reflect on how it is constructed (Strollo, 2019). Learning is no longer seen as a simple process of acquiring information but as an intentional activity in which planning, control, monitoring, and evaluation constantly accompany cognitive action. The quality of the educational experience thus depends not only on what is learned but also on the gradual development of awareness of the processes through which learning occurs. From this perspective, the goal of teaching is not solely to convey subject-specific content but to foster the development of cognitive and metacognitive skills that enable students to independently tackle new situations, complex problems, and constantly evolving professional contexts.

The metacognitive perspective therefore implies a profound shift in the educational paradigm. The emphasis shifts from reproducing knowledge to constructing transferable cognitive tools that guide individuals throughout their lives. It becomes essential to educate not so much the memory as the mind, since "it is no longer a matter of educating memories or teaching content and knowledge, but of educating minds" (Perkins & Salomon, 1989, p. 24). Reflection on one's own cognitive processes enables individuals to identify the most effective strategies, recognize errors as learning



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opportunities, and continually adapt their behavior to the demands of the context.

Self-regulation is the operational core of metacognition. Planning one's work, setting goals, monitoring the effectiveness of adopted strategies, adjusting course when necessary, and critically evaluating the results achieved are stages of a unified process in which the individual progressively takes control of their own learning. Reflection does not occur only at the end of an activity. Rather, it accompanies every phase of the cognitive process, transforming learning into a recursive process of continuous re-elaboration of experience. It is precisely this ability to observe one's own thinking as it unfolds that enables the development of truly transferable skills and the acquisition of greater intellectual autonomy.

Within this theoretical framework, writing assumes a role that extends far beyond the traditional function attributed to it-that of documenting or assessing learning. It constitutes the primary arena in which metacognitive reflection takes shape, making otherwise implicit cognitive processes observable. Thinking and writing are not, in fact, two distinct and successive activities but two closely intertwined dimensions of knowledge construction (Striano, 2010). When thought is translated into written language, its flow slows; it becomes an object of observation and can be reread, corrected, explored in greater depth, and reorganized. Writing thus introduces a reflective distance that is indispensable to the exercise of metacognition.

Its effectiveness stems from its ability to transform an internal activity into an external object subject to critical judgment. Writing involves organizing ideas, making relationships explicit, verifying inferences, recognizing inconsistencies, and constructing new conceptual connections. In this sense, writing activates processes "of externalization, mediation, translation, and distribution of thought," allowing the individual to move "between proximity and distance, between the internal and the external, between the subjective and the objective" (Ibid., p. 145). Reflection does not follow writing but develops through it, making textual production a primary mechanism for knowledge construction.

The epistemic function of writing becomes particularly clear when it takes a narrative or autobiographical form. The learning journal, the reflective portfolio, and the metacognitive report, in fact, allow for the reconstruction of the cognitive path followed during task performance, bringing to light the strategies, beliefs, doubts, emotions, and changes that accompanied the experience. Narration thus fosters a sense of detachment from the action, allowing one to attribute meaning to the processes experienced and to develop a deeper understanding of one's own way of



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learning. The experience is not simply recalled but interpreted and reconstructed in light of new insights.

This perspective is systematically articulated in the concept of *metacognitive writing*, which comprises three closely integrated dimensions: the representation of one's own knowledge and identity as a student; the articulation of the strategies used during the task; and the awareness that unifies these elements into an interpretive framework. It is precisely this last dimension that marks the decisive step, as it enables students to understand the meaning of their cognitive actions and to transform them into a stable repertoire of skills. In other words, "metacognitive writing has three dimensions: the first (declarative) [...] the second (procedural) [...] the third [...] is awareness, which creates connections between the first two" (Formenti, 2010, p. 81).

Writing also promotes self-explanation, which supports deeper, more lasting learning. In fact, articulating one's reasoning requires continuously integrating new information with prior knowledge, leading to a gradual reorganization of cognitive structures. Every attempt to explain to oneself what one is learning is an interpretive activity that strengthens understanding, consolidates conceptual memory, and facilitates the transfer of knowledge to different situations. Knowledge is not simply accumulated but continuously reconstructed through a reflective process in which writing plays a generative role.

The metacognitive dimension of writing also encompasses the motivational sphere. Systematic reflection on one's learning journey helps learners recognize progress, make sense of mistakes, identify the most effective strategies, and build a growing sense of self-efficacy. Belief in one's ability to tackle complex cognitive tasks fuels motivation to learn and strengthens the willingness to persevere even in the face of difficulties. Writing thus contributes to the development of an internal *locus of control*, in which outcomes are perceived as the result of one's own choices and strategies rather than external factors (Strollo, 2019).

Metacognitive reflection also has transformative value, as it enables one to question the implicit assumptions that guide one's interpretation of reality. Every learning experience, in fact, modifies-at least in part-the cognitive and cultural structures through which the individual attributes meaning to the world. It then becomes possible to "become critically aware of how and why the structure of our psychocultural assumptions has come to condition our way of perceiving the world" (Mezirow, 2004, p. 13), initiating a process of critical review that leads to the construction of more nuanced, inclusive, and conscious interpretive perspectives. Writing serves as the primary venue for



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documenting, analyzing, and progressively consolidating this transformation.

The pedagogical implications of this relationship are particularly significant. If writing is used exclusively to assess knowledge acquisition, it fails to realize much of its educational potential. When, on the other hand, it accompanies the entire learning process, it becomes a permanent space for reflection in which students learn to observe their own thinking, justify their choices, compare different strategies, and progressively build self-regulatory competence that can be transferred to different contexts. Writing thus takes on the character of an epistemic practice, as it contributes directly to the production of knowledge rather than merely representing it.

The connection between metacognition and writing ultimately highlights how both contribute to the development of deep, reflective, and transformative learning. Metacognition enables conscious control over cognitive processes, while writing provides a means to exercise, document, and continually refine that control. It does not merely record the outcomes of learning but contributes to their construction, transforming experience into knowledge and reflection into competence. From this perspective, writing becomes the space where thought takes shape, reorganizes, and develops, enabling the continuous negotiation of meaning that forms the foundation of every authentic learning process.

Adopting writing as a metacognitive tool has practical applications in designing instruments that support reflection throughout the learning process. In inductive experiential teaching, reflection is not merely a concluding moment of verbalizing the experience but a cross-cutting dimension that accompanies the transition from action to knowledge construction. If experience is the starting point of learning, then metacognitive reflection enables its progressive elaboration, while writing makes this reflection observable, documentable, and shareable. Along this path, students are called upon not only to describe what they have done but also to reconstruct the cognitive strategies they employed, recognize the connections between prior and emerging knowledge, interpret the emotional dimensions of the experience, and transfer what they have learned to new contexts of action. The sequence of experience–reflection–writing–conceptualization thus represents the epistemological core of inductive experiential teaching, as it allows knowledge to emerge from the critical interpretation of experience rather than from the mere transmission of content.

In this light, the metacognitive grid was developed in the years following the pilot study, drawing on the literature on metacognition, self-regulation, and self-efficacy. The grid was conceived as a reflective writing tool to help



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students articulate the cognitive processes involved in their experience, thereby transforming individual reflection into a genuine learning tool.

| |
|---|
| *Metacognitive Framework* |
| *In constructing …, I followed these steps; first, I…* |
| *because…* |
| *The common thread that ties together and runs through all my experiences (how I connected my knowledge)…* |
| *During the process, I found myself…* |
| *For me, the construction process was an experience…* |
| *The most emotionally significant moments were…* |
| *I believe it is a type of task… It requires the ability to…* |
| *If I were to repeat this experience, I would change…* |
| *I would advise a colleague of mine to…* |
| *A metaphor for my experience is… because…* |
| *As a student, I learned from this journey that…* |
| *This is how I would apply what I have learned to my professional work* |

*Figure 1: Metacognitive Grid.*

The grid's structure aligns with the principles of inductive experiential learning. The initial questions guide students in reconstructing the path taken during the activity, fostering awareness of the cognitive strategies used and the decisions made. Subsequently, the focus shifts to identifying connections between personal experiences and prior knowledge, promoting the conceptualization that allows one to attribute meaning to the experience. Particular emphasis is placed on the emotional dimension, as reflecting on the most significant moments helps students understand how emotions, memory, and learning are deeply interconnected processes. Finally, the concluding section of the grid guides students toward forward-looking reflection, inviting them to identify possible improvements, offer suggestions to colleagues, and, above all, apply what they have learned to their future professional practice.

From this perspective, the grid does not merely collect data on the training experience but becomes an integral part of the learning process. Each item corresponds to a specific metacognitive operation (planning, monitoring, awareness, self-assessment, and transfer), allowing students to critically retrace their entire cognitive journey. Writing thus takes on an epistemic function: it does not simply document what has been learned. Rather, it contributes to the construction of knowledge by making visible the processes through which experience is transformed into knowledge.

A final reflection is warranted on the "handwritten" nature of the grid. Why does writing by hand confer a metacognitive advantage?



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The gradual spread of digital technologies has reignited the debate over the role of handwriting in learning. The issue is not so much a contrast between pen and keyboard as it is an understanding of the distinct cognitive modes each tool engages and their educational implications. From a biopedagogical and embodied cognition perspective, writing is not merely a means of recording information but a complex cognitive activity in which gesture, perception, language, and reflection simultaneously contribute to the construction of knowledge. The advantage of handwriting, therefore, does not lie in the technical superiority of the pen over the keyboard, but rather in the distinct quality of cognitive processing it enables. Writing by hand involves continuously transforming experience into thought and thought into knowledge, thereby activating self-regulatory processes that form the core of metacognitive competence (Strollo, 2026).

Neuroscientific research shows that handwriting engages broader brain networks than typing, simultaneously activating motor, perceptual, and linguistic areas. During handwriting, hand movement, the visual perception of the stroke, and the formation of the written character develop as a unified whole, promoting deep encoding of information. It is no coincidence that "the processes of typing and handwriting differ considerably" (Pérez Alonso, 2015, p. 263), since writing is itself an integral part of cognitive activity. Similarly, "during handwriting, visual attention and sensorimotor action are temporally and spatially unified and contiguous," whereas "typing contributes to making the relationship between embodied input and the produced text more abstract and detached" (Mangen et al., 2015, p. 302). Handwriting thus maintains continuity between body and thought, fostering the construction of more stable and elaborate mental representations.

Experimental evidence supports this interpretation. Handwriting improves letter recognition, promotes memory consolidation, and results in more accurate recall than typing in both children and adults. The sensorimotor traces generated by writing, in fact, constitute an additional form of memory that facilitates information retrieval even after a considerable amount of time has passed (Longcamp et al., 2005; Longcamp et al., 2006). Similarly, electroencephalography studies show that handwriting engages more extensive brain connectivity, consistent with the processes of encoding and consolidation of learning (Van der Weel & Van der Meer, 2024). However, the pedagogical value of handwriting cannot be attributed exclusively to such neurophysiological evidence. If that were the case, the benefit of handwriting would depend simply on greater brain activation. In reality, its most significant contribution lies in the quality of reflection it fosters during the learning process.



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From a metacognitive perspective, handwriting may support the monitoring of one's own thought processes by slowing down text production and requiring the writer to select, organize, and reformulate information. The relatively slow pace of writing prevents the automatic transcription of information and compels the individual to continually select, summarize, rephrase, and organize the content. What might appear to be an operational limitation actually becomes a cognitive resource: the time spent writing coincides with the time spent reflecting. While typing allows for the rapid reproduction of large amounts of text, handwriting compels the writer to make continuous decisions about what is essential, the best way to express it, and how it relates to prior knowledge. Writing thus becomes a space for self-regulation in which the writer observes their own thoughts as they take shape.

It is precisely this continuous monitoring that makes writing one of the primary metacognitive tools. Every written word, in fact, represents the result of a series of cognitive operations: retrieval of prior knowledge, selection of relevant information, text planning, checking for coherence, and evaluation of communicative effectiveness. Arnold and colleagues effectively distinguish these processes as retrieval, reorganization, and reworking, highlighting how these operations constitute the core of meaningful learning (Arnold et al., 2017). Writing, therefore, means much more than simply recording information: it means actively constructing new conceptual connections and continually transforming knowledge through reflective thinking.

This function is particularly evident in note-taking, a context in which handwriting demonstrates its metacognitive advantage. During a lecture, students cannot simply transcribe what they hear verbatim; rather, they must identify key concepts, organize them into a logical structure, and rephrase them in their own words. Note-taking thus becomes an interpretive activity that requires continuous cognitive and metacognitive decision-making. Research shows that students who take notes by hand perform better on tests requiring conceptual understanding and knowledge transfer. In contrast, typing tends to favor near-verbatim transcription, with less depth of processing during the encoding phase (Mueller & Oppenheimer, 2014, pp. 1159–1166). Even when students are explicitly asked to avoid verbatim transcription, the keyboard's greater speed continues to steer them toward a mechanical recording of information, reducing opportunities for critical reflection.

The difference between handwriting and typing, however, cannot be reduced to a mere technical alternative. The central point concerns the distinct ways the two modes support knowledge-building processes. Handwriting promotes learning not only because it engages more extensive



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brain networks, but also because it prompts the individual to engage in a continuous process of selecting, interpreting, and reorganizing information. Every lexical choice, every synthesis, and every connection between concepts represents an opportunity to reflect on one's own way of understanding, transforming the act of writing into a continuous exercise in self-regulation.

From this perspective, the metacognitive advantage of handwriting appears closely linked to the quality of cognitive processing. The act of writing slows the flow of information, but it is precisely this apparent limitation that fosters deeper processing. The slowness of handwriting, in fact, leaves room for the so-called "inner voice," allowing students to verify the coherence of their reasoning, identify any gaps, and adjust their cognitive processes as they unfold. Writing does not simply accompany thought; rather, it makes thought progressively more conscious, organized, and controllable.

This interpretation is particularly consistent with the Experiential-Inductive Learning perspective. Experience, in fact, does not automatically possess educational value; it can remain a mere succession of events unless it undergoes reflection that reconstructs its meaning. Learning arises precisely from the transition from action to its critical interpretation. Handwriting supports this transition by enabling the reconstruction of experience, prompting the individual to articulate the strategies adopted, the difficulties encountered, the connections made, and the changes that occurred along the way. The act of writing thus becomes a space of mediation between experience and conceptualization.

The metacognitive function of writing, therefore, is to make thought observable. As long as reasoning remains exclusively mental, many cognitive processes continue to operate implicitly. When these processes are translated into written language, they become the subject of analysis and can be reread, compared, modified, and reorganized. Writing involves stepping back from one's own thoughts to observe them critically. It is precisely this reflective distance that fosters metacognitive awareness and allows students to gradually transform their cognitive strategies into stable and transferable skills.

Handwriting also fosters a unique integration of memory, attention, and emotion. Several studies show that it is associated not only with better performance in free recall but also with emotional states more conducive to learning (Ihara et al., 2021). The construction of knowledge is not, in fact, an exclusively rational process but involves the emotional dimension that accompanies experience. The continuity between gesture, perception, and text production helps make learning more personal and meaningful,



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reinforcing a sense of self-efficacy and the motivation to persevere even when faced with complex tasks.

This does not imply an ideological opposition between handwriting and digital technologies. The same evidence suggests an integrative approach in which each tool is used according to the cognitive objectives at hand. Typing offers undeniable advantages when it is necessary to quickly produce large amounts of text, collaborate remotely, continuously review and revise work, or ensure accessibility for students with specific educational needs. Handwriting, on the other hand, remains particularly effective in situations where learning requires analysis, reflection, the construction of meaning, and the consolidation of memory. For this reason, the biopedagogical perspective calls for coordinating tools and gestures, preventing one technology from completely replacing the other and instead valuing the specific cognitive strengths of each (Van der Weel & Van der Meer, 2024; Mangen et al., 2015).

The pedagogical implications of this approach are particularly significant. If the goal is to promote meaningful learning, it is not enough to simply ask students to take notes or complete written assignments; it is necessary to design -based activities that use writing as a tool for reflection. In fact, learning journals, portfolios, metacognitive reports, annotated concept maps, and autobiographical writing allow us to track the entire experiential process, transforming the written text into a space for monitoring cognitive processes. Writing thus becomes the space in which experience is progressively interpreted, conceptualized, and transferred to new contexts of application.

Ultimately, the metacognitive advantage of handwriting does not stem solely from the activation of broader brain networks or from the greater sensorimotor integration documented by neuroscience. Its educational value lies above all in its ability to foster continuous reflection on learning processes. Handwriting slows thought without interrupting it, forces learners to select essential information, promotes the reorganization of knowledge, and makes the cognitive strategies employed visible. From this perspective, writing by hand means learning to observe one's own thoughts as they take shape. It is precisely this continuous oscillation between action, reflection, and conceptualization that makes writing one of the primary metacognitive tools of inductive experiential teaching. The sequence of experience-writing-reflection-metacognition-conceptualization, in fact, describes one possible process through which lived experience can be progressively re-examined, conceptualized, and connected with further knowledge. Handwriting is therefore not considered here a practice to be preserved for nostalgic reasons, nor a universally superior alternative to digital writing, but a pedagogical tool that may offer favorable conditions for reflective processing, self-regulation, and the metacognitive re-examination of experience.



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### 4.1.2. Methodology for Analyzing the Intervention

The qualitative data generated during the intervention were analyzed using NVivo, a Computer-Assisted Qualitative Data Analysis Software (CAQDAS). The software was used as a tool for organizing, exploring, and systematically retrieving the textual corpus rather than as a means of automating interpretation or ensuring objectivity. NVivo supported the traceability of the analytical process by maintaining a direct connection between emerging patterns and the original textual sources, while interpretive decisions remained the responsibility of the researchers.

After transcription and import into NVivo, the corpus was organized according to the structure of the research protocol, with a node created for each question and the responses of all 27 participants to the same question grouped within the corresponding node; this organization made it possible to examine responses to a common prompt across the entire group while preserving access to each participant's original account and enabling comparisons among individual perspectives. The purpose of this initial organization was therefore not to establish interpretive categories in advance, but to structure the corpus according to the questions through which the data had been generated.

To enhance the consistency and transparency of the analytical process, the corpus was analyzed independently in NVivo by two researchers. The two analyses were initially conducted separately and were subsequently compared. Differences in coding and interpretation were discussed and resolved through comparison and consensus between the researchers. This procedure was intended to reduce the analysis's reliance on a single interpretive perspective and to make the construction of analytical interpretations more explicit and open to critical scrutiny. No statistical measure of inter-coder agreement was calculated; the comparison served as a qualitative procedure for analytical triangulation and consensus building.

The analysis proceeded through successive and complementary stages. First, word frequency queries were conducted within each node to identify recurring terms in participants' responses. These frequencies were treated as exploratory indicators rather than as evidence of the relative importance of particular concepts. Their function was to identify recurring lexical patterns and to guide the subsequent examination of the contexts in which the terms occurred. Word clouds were used as visual representations of this preliminary lexical exploration and were not interpreted as independent analytical findings.

Cluster analysis was subsequently used to explore patterns of proximity among recurring terms within the corpus. The resulting clusters were treated



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as heuristic representations of lexical associations rather than as self-evident semantic structures. Proximity between terms was therefore not assumed to demonstrate a conceptual relationship in and of itself; instead, the patterns identified through the software were used to formulate interpretive questions that were then examined against the participants' complete responses.

For this reason, the central stage of the analytical process consisted of systematically revisiting the original transcripts. Recurrent terms and lexical associations identified through the queries were examined in the contexts in which they appeared in order to determine the meanings attributed to them by participants and to avoid interpreting frequency or proximity independently of the narratives from which they derived. The analytical process thus moved iteratively between software-assisted exploration, comparison of the two researchers' analyses, and contextual rereading of the corpus. Interpretations were retained when they could be grounded in the participants' accounts and supported by comparing the independently conducted analyses.

The quotations reported in the analysis were selected to make this interpretive grounding visible. As participants produced their reflective narratives in Italian, the qualitative analysis was conducted on the original Italian-language corpus. Coding, lexical exploration, contextual rereading, and interpretive comparison were therefore carried out before translation. The excerpts reproduced in the volume were translated into English only after their selection for presentation. Translation was intended to preserve the semantic meaning of participants' statements, and the English rendering was checked against the original Italian text to ensure consistency with the interpretation developed during the analysis. They are not intended to demonstrate the representativeness or prevalence of a given position across the entire group, nor are they treated as independent proof of the proposed interpretations. Rather, they provide direct access to the textual material on which those interpretations are based and allow the reader to evaluate the relationship between the analytical claims and the participants' accounts.

In a subsequent interpretive stage, the patterns emerging from the corpus were examined in relation to the theoretical framework of metacognition adopted in the study. This framework was not used to predetermine the initial organization of the data or to mechanically assign participants' responses to predefined categories. Instead, it provided a conceptual lens through which patterns identified during the analysis could be further interpreted. Three complementary dimensions were considered: the declarative dimension, concerning what participants recognized and articulated about their own ways of learning; the procedural dimension, concerning the strategies and processes they reported using when engaging with the proposed activities;



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and self-awareness, concerning changes or reconsiderations that participants described in relation to themselves, others, and their lived experiences.

The resulting analysis should therefore be understood as interpretive and exploratory. It does not aim to establish causal effects of the intervention or to measure changes in metacognitive competence. Rather, it examines how participants described, interpreted, and reflected upon their experience and whether recurring patterns in their accounts could be meaningfully understood through the metacognitive framework adopted in the study. The combination of independent analysis by two researchers, comparison and discussion of interpretations, lexical exploration, contextual rereading, and theoretically informed interpretation was intended to strengthen the transparency and credibility of the analytical process while preserving the connection between participants' narratives and the conceptual claims developed from them.

With regard to transfer, the present study allows only a limited form of empirical observation. Participants' accounts include prospective reflections on how what they had learned might be used in future educational or professional contexts; these statements can therefore be interpreted as indications of intended or anticipated transfer rather than as evidence of transfer actually enacted in a subsequent situation. Observing transfer in the stronger sense defined within the Experiential-Inductive Learning framework would require participants to encounter a new situation and to examine whether, and how, previously constructed knowledge is mobilized, adapted, questioned, or reorganized in response to changed conditions. The present analysis does not include such a longitudinal or subsequent-situation assessment and therefore does not claim to document enacted transfer.

## 4.2. Formal, Non-Formal, and Informal Education: The Complexity of Learning Processes and the Reflective Role of Educators and Teachers

Understanding contemporary educational processes requires moving beyond a conception of learning limited to the places and times of formally organized instruction. Knowledge, skills, identity, and professional practices are, in fact, constructed through experiences spread across the entire lifespan and situated in different environments, where intentionally educational dimensions intertwine with relationships, social practices, work activities, cultural participation, and everyday experiences. The distinction between formal, non-formal, and informal learning therefore retains an analytical function but acquires full pedagogical significance especially when it allows



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us to examine the relationships through which these different modes contribute to the construction of knowledge.

Moreover, the boundaries among these forms of learning are not rigid, as the very difficulty of defining non-formal learning - "non-formal learning is less clearly understood" (Johnson & Majewska, 2022, p. 4) - points to the fluidity of the contexts in which learning actually takes place, particularly in contemporary settings where school experiences, independent activities, social participation, and the use of technology continually overlap; the issue, therefore, is not merely to classify an experience as formal, non-formal, or informal, but to understand what forms of intentionality, organization, participation, and awareness are present and how they interact within the individual's educational trajectory.

Formal learning represents the most structured end of this continuum. It is organized within institutions, curricula, explicit objectives, and intentional systems of instruction and assessment; in this sense, it can be described as "institutionalized, chronologically graded, and hierarchically structured" (Johnson & Majewska, 2022, p. 9) and as "compulsory, steered by the curricula, and highly orchestrated by the teacher" (Nygren et al., 2019, p. 1761). This characterization identifies an essential component of the educational experience, but it does not exhaust what is learned even within formal institutions themselves. In fact, the stated curriculum does not encompass "everything that teachers do, teach, or create in classrooms" (Johnson & Majewska, 2022, p. 12): relationships, modes of communication, collaborative practices, and implicit processes all contribute to learning even when they are not part of the explicitly planned objectives.

Non-formal education occupies precisely a space where educational structure and personal experience can combine in less rigidly institutionalized ways. Its hybrid nature-"non-formal learning is a hybrid of the other forms of learning" (Johnson & Majewska, 2022, p. 4)-allows us to understand it not merely as an intermediate or residual territory, but as a set of experiences in which pedagogical intent, subjective participation, and the experiential dimension can take on different relationships. It "usually takes place outside the institutional context" (Nygren et al., 2019, p. 1761), while retaining elements of organization and educational intent, as is the case in workshops, community programs, artistic practices, volunteer work, and numerous vocational training experiences. In such contexts, the participant's involvement can take on greater significance, in part because non-formal education is frequently "self-directed, involves a degree of student choice in engagement, and relies on some element of intrinsic motivation" (Johnson & Majewska, 2022, p. 13).



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The nature of informal learning is yet another matter; it can arise from everyday activities without any prior educational planning. Its "spontaneous, unplanned, and unstructured" nature (Nygren et al., 2019, p. 1761) does not diminish its relevance: a substantial portion of what an individual learns over the course of a lifetime stems precisely from work experiences, social relationships, cultural practices, the use of technology, and participation in daily life, to the extent that informal learning can represent "the great bulk of any person's total lifetime learning" (Johnson & Majewska, 2022, p. 17). From this perspective, learning "takes place not only in formal educational or training institutions but also in the workplace and in non-formal and informal activities" (Singh, 2015, p. 1).

What is of pedagogical interest, however, is not merely recognizing the existence of these three dimensions, but understanding their interdependence. Formality can be considered fluid, and different levels of formalization can coexist in some learning environments (Johnson & Majewska, 2024). The actual learning experience thus takes the form of a network in which different forms of knowledge meet, reinforce one another, change, or come into conflict. Digitalization makes this condition even more evident, "blurring the lines between formal and informal learning" (Nygren et al., 2019, p. 1760): social media, collaborative environments, mobile devices, and independent information-seeking continually introduce content and practices from outside institutional spaces into the processes through which learners construct knowledge.

For educators, recognizing this network constitutes a professional competency. It is not enough to manage the formal curriculum: one must be able to identify the knowledge, experiences, and interpretive frameworks that learners bring with them and that continue to influence their learning even when they are not immediately visible. Making non-formal learning recognizable means providing professionals with "the language around non-formal learning and the tools to capture it" (Johnson & Majewska, 2024, p. 15). The educator thus assumes an interpretive role: they must be able to recognize knowledge constructed through different experiences without considering it either irrelevant to formalized knowledge or automatically equivalent to it.

The diversity of learning contexts, in fact, implies a diversity of forms of knowledge. Considering them "partial and complementary" (Singh, 2015, p. 4) does not mean abandoning validation criteria, but rather recognizing that the knowledge with which an individual enters an educational situation has a history. Personal experiences, cultural affiliations, social participation, institutional education, and professional practices all contribute to the construction of the categories through which events are interpreted. The



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concept of *"learning ecology*" makes this networked structure particularly evident: "learning ecologies combine different spaces and contexts simultaneously throughout the life course" (Nygren et al., 2019, p. 1760).

For the training of educators, the challenge then becomes not only possessing knowledge drawn from different contexts, but also recognizing the connections through which this knowledge contributes to the construction of their own models of action. It is at this stage that reflexivity and metacognition take on a central role. Making the network of one's own formative experiences observable allows the individual to examine what, while contributing to the way they interpret and act, may otherwise remain implicit.

Hypertextual construction can serve precisely this function. Its networked structure makes it possible to represent relationships among texts encountered during training, everyday experiences, relational practices, and internalized cultural models, thereby making visible a construction of knowledge that is difficult to convey through an exclusively linear sequence. The value of hypertext therefore lies not only in the digital form of the tool, but in the possibility of externalizing a network of relationships and making it available for reflection.

Reflexivity comes into play here as the possibility of taking a stance regarding the processes that have contributed to the construction of one's own interpretations. Consciousness can in fact be conceived, in Morin's (2001) formulation, as capable of "consciousness of consciousness," assuming a meta-perspective while remaining implicated in the process it observes (pp. 95–97). In educational terms, this means being able to revisit one's own learning paths not simply to recall them, but to examine how they have contributed to the construction of the criteria through which educational action is interpreted.

This process also concerns what occurs implicitly within formal education, where tone of voice, gestures, and relational styles can function as Indirect Teaching Behaviors (Johnson & Majewska, 2022, p. 13), while the hidden curriculum encompasses what "is not explicitly stated in the formal curriculum but influences students' lives and embodies the norms and values of society" (Johnson & Majewska, 2022, p. 19); educator training therefore requires learning to observe not only what is intentionally taught, but also the ways in which environments, relationships, and practices implicitly convey meanings, expectations, and values.

This interpretive ability takes on further significance in digital environments. Independent information seeking, online participation, virtual collaboration, and the use of social media are now commonplace contexts in which learning occurs that can intersect with learning in schools and



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universities. Ignoring them would mean not only excluding a significant part of individuals' experiences but also failing to understand some of the sources through which their interpretive repertoires are constructed.

Recognizing the plurality of learning settings also has an inclusive dimension. Valuing skills developed in different contexts can expand individuals' "social opportunities" (Singh, 2015, p. 8), making visible resources developed through life experiences that formal systems might not capture. From this perspective, the validation of non-formal and informal learning serves to recognize skills acquired outside traditional pathways and can contribute to the development of more inclusive educational systems (Souto-Otero, 2021; European Commission, 2024).

Experience and formalized knowledge should therefore not be viewed as alternative dimensions. Non-formal learning can "consciously link ideas to student experience" (Johnson & Majewska, 2024, p. 14), making experience a medium through which knowledge can engage. From an embodied and situated perspective, after all, knowing cannot be separated from the dynamic relationship between the subject, the body, action, and the environment (Strollo, 2019); similarly, a complexity-based perspective allows us to view learning as the product of interactions among cognitive, emotional, relational, and cultural levels (Morin, 2001). Learning environments can thus be conceived as "multimedia, synesthetic, and multifactorial" contexts (Frauenfelder, 2006), capable of making different modes of engagement with knowledge accessible.

For educators, this entails a shift in perspective: not merely transmitting knowledge, but designing conditions in which formalized knowledge and experiences can interact, become mutually interrogable, and contribute to the construction of meaning. The value attributed to non-formal education for transversal competencies such as critical thinking, empathy, collaboration, and argumentation (Johnson & Majewska, 2024) takes on meaning precisely within this framework, in which learning requires participation, discussion, and evaluation of information.

The distinction between formal, non-formal, and informal education thus leads to a conception of learning as a continuous, distributed, and multidimensional process. For educational professionals, the crucial issue lies in making this complexity observable and open to inquiry: recognizing where one's knowledge originates, what connections have been established among these sources, and to what extent these connections continue to shape the interpretation of educational situations.

The proposed activity is built around this need. Participants are asked to compile, in three folders, sources of formal knowledge that have left a significant mark, particularly engaging sources of non-formal knowledge,



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and several episodes from their own educational journey, narrated using the sequence "context,characters,event," and "on that occasion, I learned that." The materials are then linked through the creation of a hypertext, so that the relationships between formal, non-formal, and informal learning are not merely stated theoretically but can emerge from the reconstruction of one's own experience.

The hypertext thus serves a dual function. On the one hand, it externalizes the network, making connections that may have operated implicitly perceptually accessible; on the other hand, it allows participants to reflect metacognitively on the processes through which different sources of knowledge have contributed to the construction of their own models of educational action. The overall perception of the network and the analysis of its individual elements allow one to move between the global configuration and specific relationships, transforming the graphical representation into material for reflection. Only at the end of the experience is the theoretical formalization regarding the different forms of learning introduced.

### *4.2.1. Results of the Analysis*

The graphical representation of the hypertext construction experience highlights the centrality of terms such as "reflection, thoughts, awareness, knowledge," and "experience," suggesting that participants associated the process with critical reflection and the personal reworking of knowledge (Figure 2).




*Figure 2: Word Cloud-Hypertext.*



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The word cloud suggests that participants viewed the activity as an opportunity to critically examine how they process, organize, and attribute meaning to knowledge, rather than as a simple content-production exercise. Alongside these terms, "translation, expression, creative," and "creativity" also appear, referring to the ability to transform ideas, experiences, and reflections into articulate representations by integrating different languages and modes of communication. The design of hypertext, in fact, involves selecting, connecting, and organizing information within a networked structure, consistent with the multimodal nature of digital environments (Kress, 2010). At the same time, the presence of "different, meaningful, implicit," and "mechanism" draws attention to the processes through which knowledge is made explicit, linked to other knowledge, and progressively reorganized.

The cluster analysis reveals a complex semantic structure, from which various conceptual nuclei emerge, reflecting the main interpretive dimensions associated with the construction of hypertext:

- *The Reflective-Interpretive Dimension*

Within the first cluster (reflection, thoughts, meaning, understanding), participants' accounts suggest a critical re-examination of their experiences and knowledge, characterized by a process of reorganization centered on seeking connections and the gradual integration of different perspectives. Hypertext thus emerges as an open space for processing, in which knowledge is structured through relationships and references rather than a linear sequence.

- *The Metacognitive Dimension*

The second cluster (knowledge, awareness, implicit, experience) suggests that participants associated the hypertext's design with reflection on how knowledge is organized, including the recognition of aspects of their cognitive processes that they described as initially implicit.

- *The Creative-Design Dimension*

The third cluster (creativity, metacognition, rewiring) highlights the generative dimension attributed to the activity: participants' accounts associate hypertext design with the exploration of new connections and the creative reinterpretation of prior knowledge and experiences, suggesting flexible and progressively more complex ways of organizing and reconsidering their own thought processes.

- *The Operational Dimension*

The final cluster (translation, exercise, testing) conveys the idea of a design process characterized by continuous stages of elaboration, verification, and revision; a progressive journey in which every choice is refined through successive phases of experimentation and adaptation. Rather than



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focusing exclusively on the final product, the workshop emphasizes the design process, promoting a dynamic approach grounded in the continuous reworking of ideas.

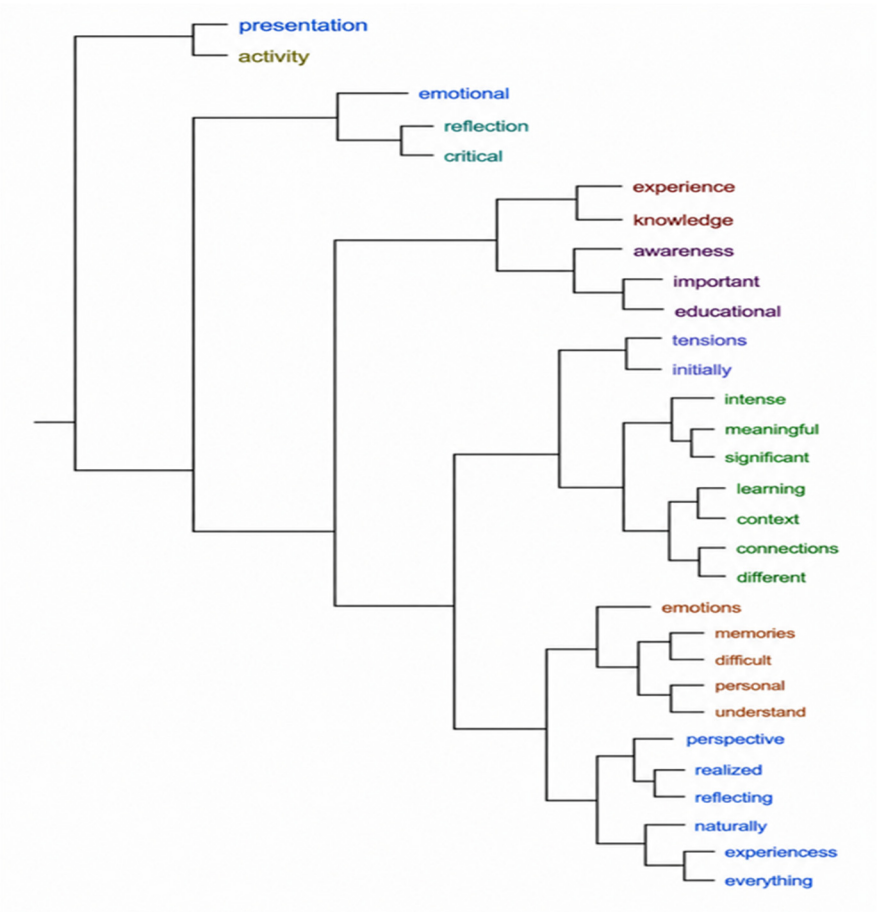



*Figure 3: Cluster-Hypertext.*

Table 1 presents the lexical frequencies of the main terms that emerged from the narratives: emotions (28), experience (22), and listening (21). Other frequently recurring terms include different (17), activity (15), thoughts (14), and awareness, creative, emotional, and reflection (13).



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*Table 1: Lexical frequencies of the main lemmas – Hypertext.*

| Word | Length | Count |
|---|---|---|
| emotions | 8 | 28 |
| Experience | 10 | 22 |
| listening | 9 | 21 |
| different | 9 | 17 |
| activity | 8 | 15 |
| thoughts | 8 | 14 |
| awareness | 9 | 13 |
| creative | 8 | 13 |
| emotional | 9 | 13 |
| reflection | 10 | 13 |
| translation | 11 | 12 |
| creativity | 10 | 11 |
| spontaneous | 11 | 11 |
| mechanism | 9 | 9 |
| personal | 8 | 9 |
| sensations | 10 | 9 |
| allowing | 8 | 8 |
| exercise | 8 | 8 |
| movement | 8 | 8 |
| implicit | 8 | 7 |
| meaningful | 10 | 7 |
| expression | 10 | 6 |
| knowledge | 9 | 6 |
| childhood | 9 | 5 |
| emotionally | 11 | 5 |
| feelings | 8 | 5 |
| meanings | 8 | 5 |
| powerful | 8 | 5 |
| understand | 10 | 5 |
| understanding | 13 | 5 |
| compared | 8 | 4 |



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| | | |
|---|---|---|
| composition | 11 | 4 |
| compositions | 12 | 4 |
| connected | 9 | 4 |
| creating | 8 | 4 |
| encouraging | 11 | 4 |
| experiences | 11 | 4 |
| experiencing | 12 | 4 |
| educational | 9 | 4 |
| influence | 9 | 4 |
| involved | 8 | 4 |
| liberating | 10 | 4 |
| memories | 8 | 4 |
| metacognitive | 13 | 4 |
| relaxing | 8 | 4 |
| spontaneously | 13 | 4 |
| surprised | 9 | 4 |
| trusting | 8 | 4 |
| accompanied | 11 | 3 |
| according | 9 | 3 |

The overall analysis of the data suggests that the construction of the hypertext was not merely an activity of organizing information but provided participants with an opportunity to reflect on aspects of their knowledge construction that they described as previously implicit. The frequency of lemmas related to reflection, awareness, experience, and the construction of meaning, together with the articulation of semantic clusters, highlights how participants progressively moved away from a linear representation of learning toward a networked vision in which formal knowledge, non-formal experiences, and informal learning are deeply interconnected.

Participants' accounts suggest a process of metacognitive explicitation, in which they reflected on the mechanisms involved in the construction of their own knowledge and on the role attributed to personal experiences in the selection, organization, and retention of knowledge.

The hypertextual representation made the network of connections constructed by participants perceptible, turning it into an object of shared observation and reflection. In this sense, hypertext is not merely a



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technological tool but an epistemological mediator that allows for the simulation, at both the perceptual and operational levels, of the complex nature of learning processes.

The results therefore appear consistent with the theoretical framework outlined, suggesting that the experiential construction of connections among formal, non-formal, and informal learning can support participants in developing a more integrated understanding of these dimensions.

Participants' accounts suggest that the experience of constructing connections was associated with a reconsideration of their interpretive models and with the process of relating theoretical concepts to personal knowledge.

Learning thus takes on an inductively organized character: in this activity, theoretical formalization follows the initial experience and reflection, providing conceptual resources through which participants can reconsider, differentiate, and reorganize the interpretations that emerged from their experience.

Taken together, the evidence gathered suggests that participants experienced hypertext as a metacognitive tool associated with forms of reflective learning consistent with a complex conception of education.

Rather than being described primarily in terms of the acquisition of new content, the activity was associated in participants' accounts with a different awareness of knowledge as the dynamic result of interactions among experiences, contexts, and interpretive processes. From this perspective, education is conceived not as a linear transmission of knowledge but as a process of guiding participants toward a progressive awareness of the networks of meaning through which each individual constructs their own learning experience.

As for *the procedural dimension* of the metacognition cycle, the cluster analysis highlights four aspects that characterize the construction of hypertext as a process of knowledge organization.

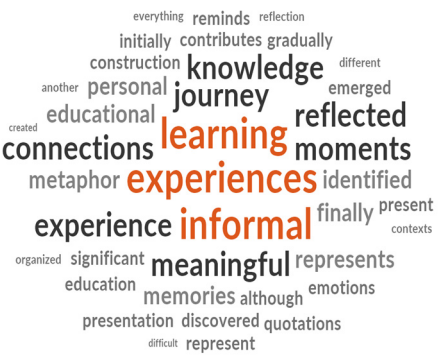



*Figure 4: Word Cloud – Procedural Metacognition (Hypertext).*



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The first dimension emerging from the procedural analysis concerns the construction of an organizational structure that progressively relates heterogeneous materials. The association between "organized, created, experiences, learning, informal" and "meaningful" suggests that hypertext construction begins with the search for an organizational criterion that brings order to heterogeneous materials. The structure is not fixed once and for all but serves as a reference that progressively guides subsequent choices, allowing the complexity of the collected information to be managed. Alongside this, the need to define connection criteria emerges. The cluster comprising "identified, significant contexts" and "different" highlights an ongoing process of comparing contexts and experiences to identify relationships that go beyond simple classification. The focus is on finding common elements that link formal, non-formal, and informal learning within a shared structure. The association between "journey, knowledge, education, metaphor, memories," and "personal," on the other hand, conveys the image of knowledge taking shape through a network of relationships. The hypertext is not structured as a linear sequence of content but as a dynamic system in which each new connection alters the meaning of the whole. The process therefore consists of continuously designing and reorganizing links between experiences, memories, and knowledge, so that each element finds a coherent place within the network. The final cluster-comprising "represents, reflection, construction, contributed," and "discovered"-highlights the evolutionary nature of the process. The connections are not immediately apparent but emerge during construction and require constant revision of the initial structure. Design, therefore, takes the form of an open-ended activity, in which every new relationship can alter the overall organization of the work. This interpretation, as already noted, is also supported by the metaphors used by participants (mosaic, fabric, bridge, and puzzle), which evoke the idea of knowledge being constructed through the interweaving of different elements.

Regarding the declarative dimension of metacognition, participants' accounts suggest that constructing hypertext was associated with a more nuanced understanding of how knowledge is organized. The recurrence of terms such as "reflection, learning, analysis, knowledge, presentation," and "connections" indicates the ability to build meaningful relationships among different types of information, experiences, and languages. This interpretation is supported by the transcripts, which describe hypertext as an activity that "requires the ability to establish meaningful connections while synthesizing information without omitting essential details" and "organize information clearly while creatively integrating texts, images, and hyperlinks".



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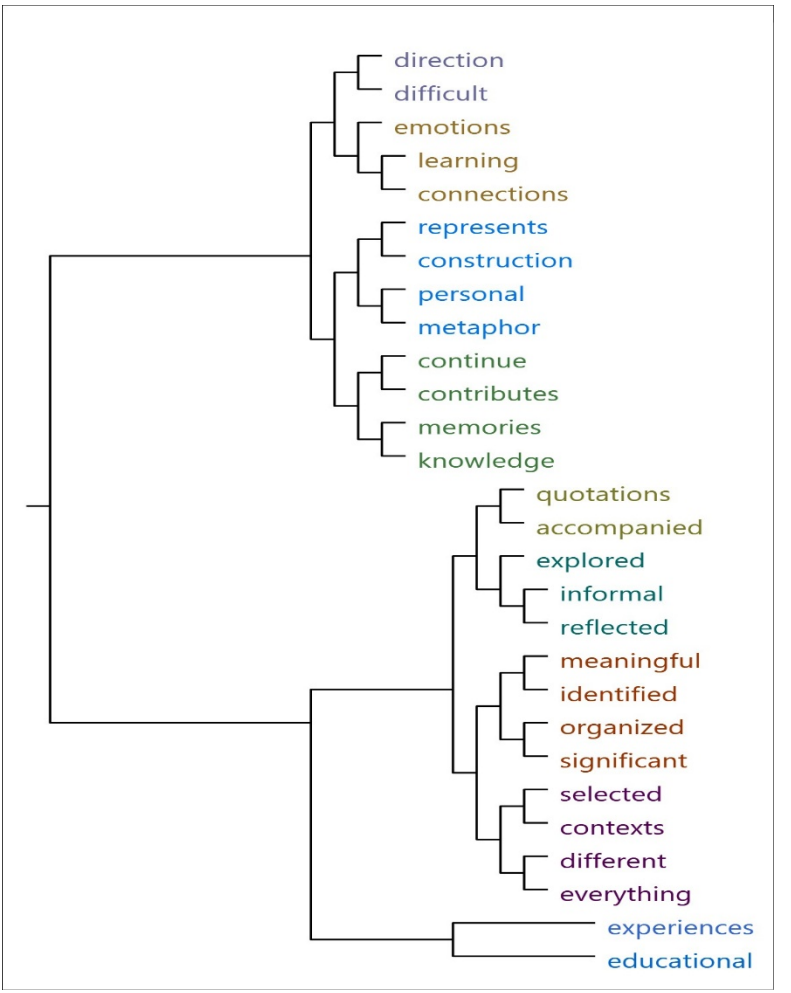



*Figure 5: Cluster – Procedural Metacognition (Hypertext).*



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*Figure 6: Word Cloud – Declarative Metacognition (Hypertext).*

The cluster analysis suggests that participants associated the construction of hypertext with a more nuanced understanding of how knowledge is organized. The association among "knowledge, organization, reinterpret, coherent," and "communication" highlights that content gains value when embedded within a coherent structure. The focus thus shifts from gathering information to the ability to connect and organize it, recognizing that the quality of processing depends above all on the relationships established among the various elements. This perspective is reinforced by the cluster comprising "reflection, critical, analysis," and "comment," which underscores the role of critical thinking in the construction of hypertext; reflecting means continually questioning the content, comparing it, and redefining its position until a clearer and more coherent representation of one's own journey is constructed. Finally, the cluster comprising "activity, presentation, experiences," and "learning" suggests that the presentation phase also serves as a moment of verification: presenting one's hypertext allows one to assess the strength of the connections made and, in many cases, to recognize relationships that had remained implicit during the work process.



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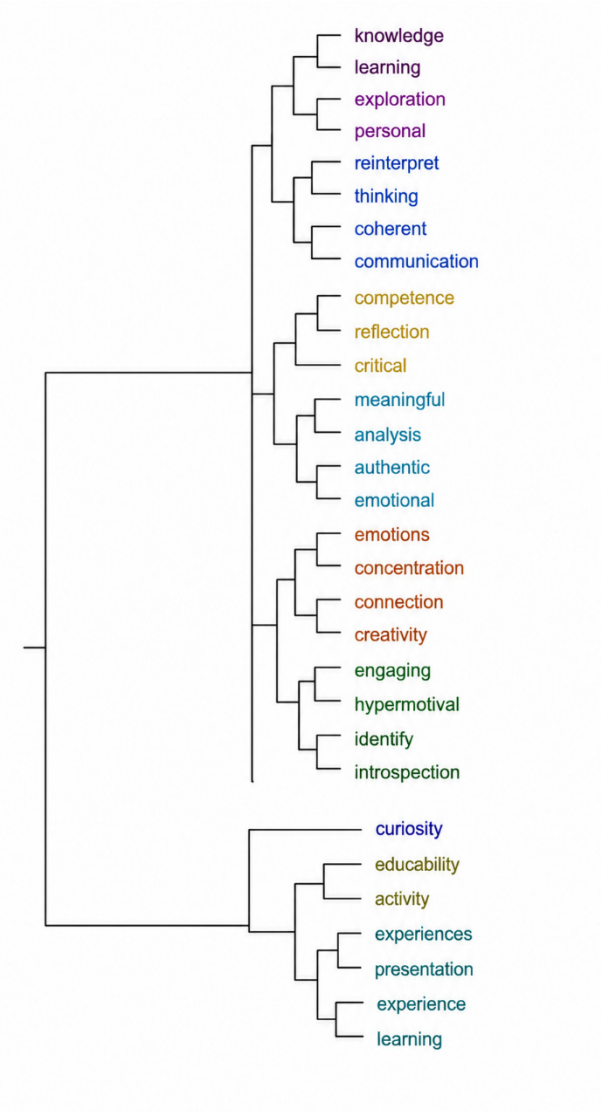



*Figure 7: Cluster – Declarative Metacognition (Hypertext).*

Finally, with regard to the dimension of awareness, the word cloud analysis suggests that participants associated the creation of the hypertext with a new interpretation of their educational journey.

The recurrence of terms such as "personal, learning, meaningful, realized, connections, journey," and "moments" shows that the change does not concern individual experiences, but rather the way in which they are



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reinterpreted once linked together. Experiences that appeared isolated gradually take on continuity, allowing participants to recognize a common thread that becomes visible only through this process of construction. The transcripts confirm this perspective. For example, the account of someone who states that they have "discovered connections among learning experiences that I had never noticed before" is significant, as is that of someone who acknowledges that "everything I have experienced has played a role in making me the person I am today." In both cases, the transformation does not concern the experiences themselves, but rather the meaning they take on when considered as parts of a single journey.

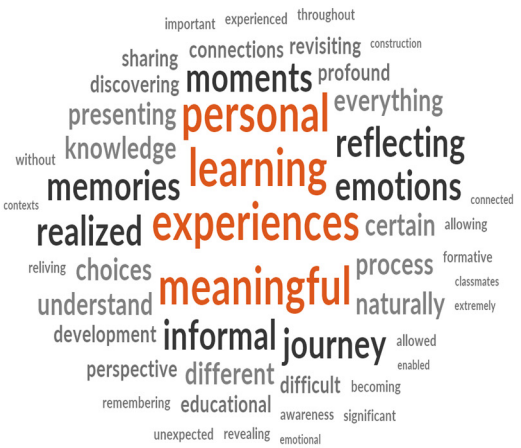



*Figure 8: Word Cloud – Awareness.*

Analysis of the word cloud suggests that, in participants' accounts, the construction of the hypertext was associated with a new interpretation of one's educational journey. The recurrence of terms such as "personal, learning, meaningful, realized, connections, journey," and "moments" indicates that the change does not concern individual experiences themselves, but rather how they are reinterpreted once linked together.



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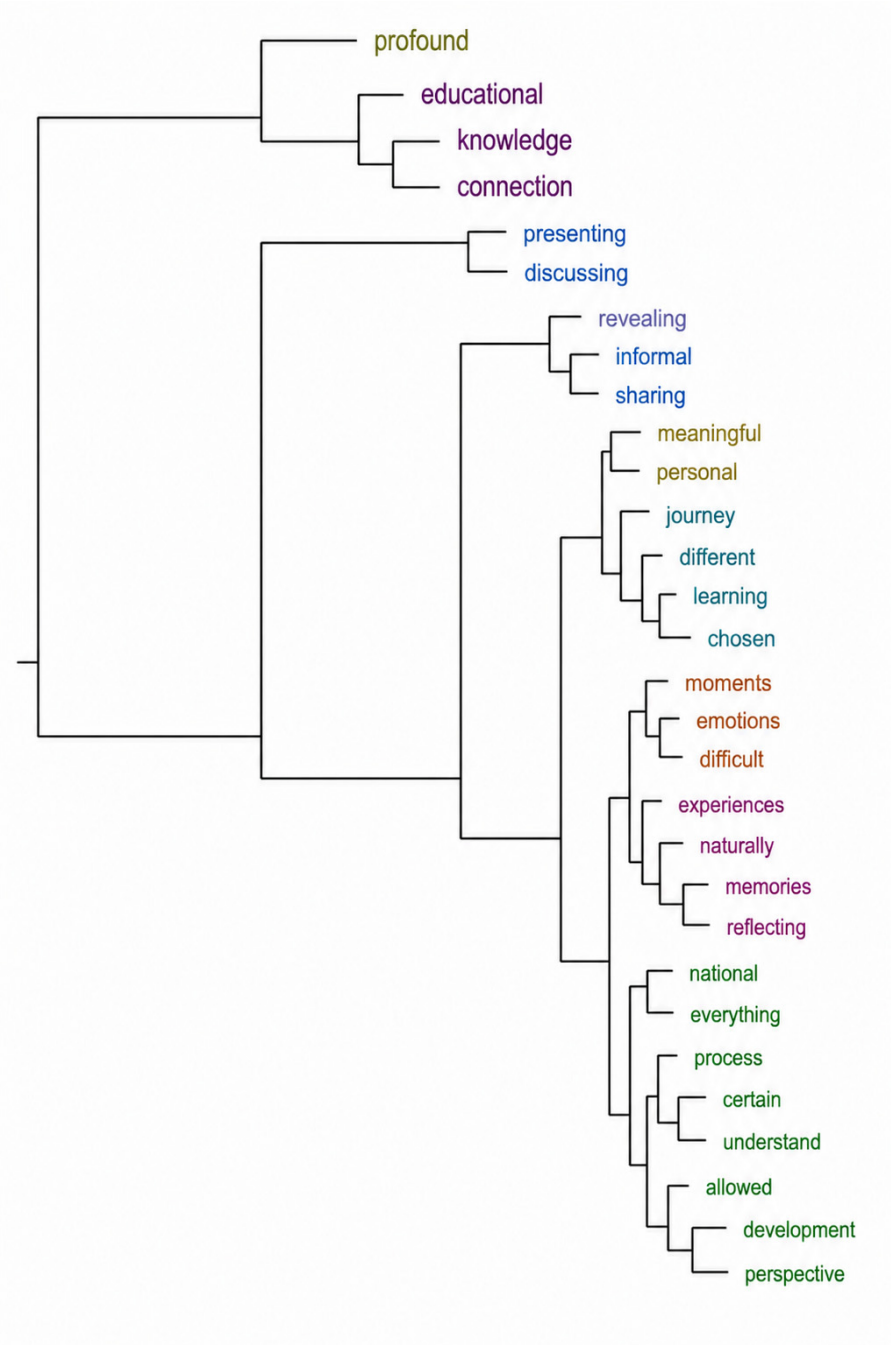



*Figure 9: Cluster.*



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Analysis of the cluster helps us understand how this new perspective develops. The association among "connections, knowledge, presenting," and "discovering" highlights the moment when relationships-previously invisible-become recognizable. Discovering these connections changes how one interprets one's own journey, which no longer appears as a succession of separate experiences but as a narrative in which each episode contributes to an understanding of the whole. The cluster comprising "revisiting, memories, reflecting, critical," and "perspective" suggests that participants associated revisiting experiences with a critical reinterpretation of the past.

Events already known are observed from a different perspective and take on new meaning when placed within a broader interpretive framework. The association among "journey, learning, choices, personal," and "informal" highlights a further shift: the boundaries between formal, non-formal, and informal experiences tend to dissolve, giving way to a more integrated view of one's own development. What was previously perceived as fragmented is gradually recognized as part of a single path of growth. Finally, the cluster comprising "presenting, sharing, profound," and "knowledge" suggests that this awareness is consolidated through interaction with others.

## 4.3. Empathy and Sound Dramatization

Empathy is a central competency in educational relationships and, more generally, in the processes through which an individual engages with the experience of another. The term *Einfühlung*, originally introduced in 19th-century German aesthetics to denote the ability to "feel into" a work of art or an object (Vischer, 1873; Lipps, 1903), has gradually taken on a broader meaning. Empathy can now be considered a complex process in which cognitive, emotional, bodily, and relational dimensions contribute to the construction of intersubjective understanding.

Empathetic understanding, however, does not mean simply sharing another person's emotion or identifying with them to the point of erasing the distance between the two experiences. On the contrary, empathy presupposes the recognition of the other as a subject bearing an experience that remains irreducibly their own, while maintaining the distinction between self and other.

It is precisely this irreducibility that makes the problem posed by Thomas Nagel in *What Is It Like to Be a Bat?* (1974) particularly significant. The example of the bat illustrates the limitation of an exclusively objective description of experience: even an extremely accurate understanding of an organism's perceptual system, behavior, and neurophysiological mechanisms does not provide full access to "what it is like" to be that



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organism. Conscious experience, in fact, retains an irreducible phenomenal character: "an organism has conscious mental states if and only if there is something it is like to be that organism" (Nagel, 1974, p. 442).

This issue does not imply a denial of scientific knowledge, but it does limit its ability to fully convey lived experience. Applied to the realm of empathy, this distinction prevents us from equating empathy with the claim that we can feel exactly what another person feels. Understanding, rather, means attempting to approach another's perspective while recognizing, at the same time, that part of their experience will inevitably remain beyond our representational capabilities. Otherness, therefore, is not an obstacle that a successful empathetic relationship should eliminate; it is a condition for it.

The pedagogical implication is significant, since educating for empathy does not mean teaching students to identify completely with another person, but rather developing the ability to shift their own point of view, construct interpretive hypotheses, listen, compare these hypotheses with what the other person communicates, and recognize the limits of their own representations; in this sense, empathy also acquires a metacognitive dimension, insofar as understanding the other requires the ability to observe and monitor the processes through which we attribute meaning to their actions, words, and emotions.

The distinction between the affective and cognitive components of empathy (Hoffman, 2000), the centrality of empathic understanding in the relationship (Rogers, 1957), and the involvement of bodily and perceptual processes in understanding others' actions-as highlighted by perspectives *on embodied simulation* (Gallese, 2003)-can all be traced back to this same multidimensional structure. Empathy, therefore, is not merely an emotional response: it involves the body and perception, the ability to construct representations, affective processing, cognitive decentring, and social interaction.

It is precisely this structure that makes sound dramatization pedagogically interesting, since its function is not simply to stage a story through a channel other than the visual one, but to use voice, silence, noise, rhythm, music, and soundscape to compel participants to ask themselves which elements can make a situation perceptible and, above all, which sound choices can represent the emotional and relational experience of the individuals involved.

In this sense, the absence of images takes on a design function, since what is not shown must be mentally constructed using the available acoustic cues, requiring the listener, rather than receiving a scene that is already visually organized, to formulate hypotheses regarding the events, intentions, emotional states, and relationships among the characters; listening thus becomes an interpretive process rather than the mere reception of a sound stimulus.

Sound dramatization also makes it particularly clear that interpretation is not an individually self-sufficient process. Collectively constructing a



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soundscape means discussing which elements are significant, attributing symbolic and emotional value to them, comparing different representations, and negotiating a shared configuration. The empathic process is thus exercised on two levels: in reconstructing the characters' perspectives and in engaging with the different interpretations produced by other group members.

In this context, experience and metacognition can be directly linked. The participant is not merely called upon to "be empathetic," but is placed in a situation in which certain operations that contribute to understanding the other can become observable: selecting a clue, attributing meaning to it, imagining an emotional state, formulating a hypothesis, comparing it with those of others, and modifying it when additional elements emerge. Sound dramatization can thus transform a process that is normally implicit into material available for reflection.

The reference to Nagel takes on an additional function here, since the plurality of representations generated by the same soundscape concretely demonstrates that understanding another person does not amount to a perfect reproduction of their experience: different interpretations can emerge from the same signals because each individual encounters them through their own history, expectations, and mental frameworks, so that the educational goal is not to eliminate this distance but to make it recognizable and to develop tools for negotiating it through listening, discussion, and revising one's own hypotheses.

The proposed activity is built on these premises. Participants are presented with a short narrative text, an autobiographical episode, or a problematic situation without any visual aids. Divided into small groups, they must reconstruct its soundscape by identifying voices, noises, silences, rhythms, acoustic effects, and any musical elements. The goal is not to realistically reproduce the sequence of events, but to represent the characters' emotional experience and the relational atmosphere of the situation. Every choice must be discussed, justified, and agreed upon, so that the final sound piece is the result of an interpretive negotiation rather than a simple reproduction.

In the next phase, the groups create the dramatization using their voices, bodies, sound objects, musical instruments, or digital media, without resorting to images or traditional stage performance. The other participants listen and attempt to reconstruct the meaning of the narrative, the characters' emotions, and the relationships involved in the events; their interpretations are then compared with the intentions stated by the group that constructed the soundscape.

It is precisely this comparison between intention and interpretation that constitutes one of the most significant steps in the process. The same soundscape can generate different interpretations, thereby making it evident



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that understanding others stems from a process of inference, decentering, and negotiation of meaning. The soundscape construction externalizes operations that normally remain implicit: the selection of elements considered relevant, the attribution of emotional value to signals, the reconstruction of the characters' perspectives, the interpretation of communicative intentions, and the monitoring of one's own hypotheses.

The experiential-inductive function of the activity lies precisely in this organization. Empathy is not initially presented as a set of definitions that participants must subsequently apply. Instead, they first encounter a situation in which they are compelled to use-and make at least partially observable-their own ways of interpreting others' experiences. Comparing these representations can reveal discrepancies and limitations, raising a question that subsequent theoretical formalization allows us to clarify.

Only at the end of the process, after the reworking supported by the metacognitive framework and writing, are the theoretical references regarding the nature of empathy, the role of listening in intersubjective understanding, and the pedagogical function of sound dramatization systematically introduced. Theory can thus engage with an experience that has already been lived and examined, offering categories through which participants can revisit their own interpretations, differentiate among them, and, when necessary, revise them.

### *4.3.1. Results of the Analysis*

Analysis of the word cloud generated from the participants' narratives identifies several recurring semantic areas that provide an initial indication of the meanings participants attributed to the sound dramatization experience. The distribution and frequency of the terms indicate the simultaneous presence of cognitive, emotional, relational, autobiographical, and transformative dimensions in participants' accounts of the experience.

The most frequently occurring words-such as "memories, emotions, response," and "provided"-suggest that the experience served as a unique opportunity to bring personal experiences to the surface and to initiate processes of emotional recollection and self-reflection. The centrality of these terms also highlights the methodology's potential to support the construction of new meanings for the experience, positioning it as an educational space that promotes the reinterpretation and reworking of lived experiences (Figure 10).



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*Figure 10 – Word Cloud-Sound Dramatization.*

Particularly significant is the presence of the term "memories," which represents the most recurrent conceptual core of the entire corpus: memory, in this perspective, does not serve merely an evocative function but becomes a generative device for reinterpreting one's personal history and recovering memories, past experiences, and emotionally significant life events. The activation of the autobiographical dimension appears closely linked to the reflective processes that characterize adult learning. As highlighted by the theoretical perspective of transformative learning (Mezirow, 2000), the ability to critically reexamine one's own experiences is a fundamental element in constructing new interpretive perspectives. In this sense, participants' accounts associate the sound dramatization experience with processes of critical reflection and with greater attention to self-awareness and to their own educational journeys.

Alongside the autobiographical dimension, the emotional sphere emerges strongly, as evidenced by the high frequency of terms such as *"emotions*, *emotional*, *empathy*," and *"expression*." These results highlight the relevance of the emotional dimension in participants' accounts of their learning experience, particularly in relation to the construction of meaning and the interpretation of personal experience.

Another semantic cluster concerns the relational dimension of the experience: the recurrence of terms such as *"listening*, *sharing*, *others*, *colleagues*, *collective*, *cohesion*," and *"relationships" highlights* the participatory and collaborative nature of the process, in which the group is recognized as a resource for the co-construction of meanings through interaction and mutual exchange. Also significant are terms such as



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"imagination, creativity," and "expression," which evoke the creative dimension of the experience and suggest that participants associated it with openness to new possibilities for interpreting and reworking lived experience, as well as with imaginative and expressive processes.

Sound dramatization, in fact, offered participants the opportunity to experiment with alternative languages and new ways of representing themselves and reality; their accounts associated this experience with exploration, reworking, and the attribution of meaning to lived experience.

Finally, the presence of terms such as "awareness, understanding, meaningful, learning," and "transformative" suggests that participants associated the workshop with processes of reflection and reinterpretation that are consistent with certain dimensions of transformative learning. In particular, the recurring use of the concept of "awareness" suggests that participants attributed particular importance to self-awareness, emotions, relational dynamics, and the meanings associated with their lived experiences.

From this perspective, the themes of the narratives echo the characteristics of "meaningful learning" (Ausubel, 1968), in which new knowledge intertwines with prior knowledge, fostering a reorganization that is not only cognitive but also personal. At the same time, references to the transformative dimension suggest that participants associated the experience with a critical reinterpretation of lived experiences and with the emergence of new interpretive perspectives on themselves and the surrounding reality.

Overall, the word cloud analysis indicates that participants' accounts of sound dramatization encompassed autobiographical, emotional, relational, creative, and reflective dimensions. These accounts suggest that the experience was associated with expressive and communicative processes, the reworking of lived experience, and reflection on the meanings attributed to one's personal history.

These results suggest that, within the context examined, narrative and expressive activities can provide opportunities for participatory learning and for the reflective reinterpretation of personal experience.

Cluster analysis enables a deeper exploration of the emerging representations by highlighting the semantic relationships among the most frequent terms and identifying specific areas of meaning associated with the study. Through the hierarchical representation of lexical co-occurrences, the cluster shows how the concepts expressed tend to cluster around interconnected thematic nuclei, outlining a multidimensional view of the educational experience (Figure 11).



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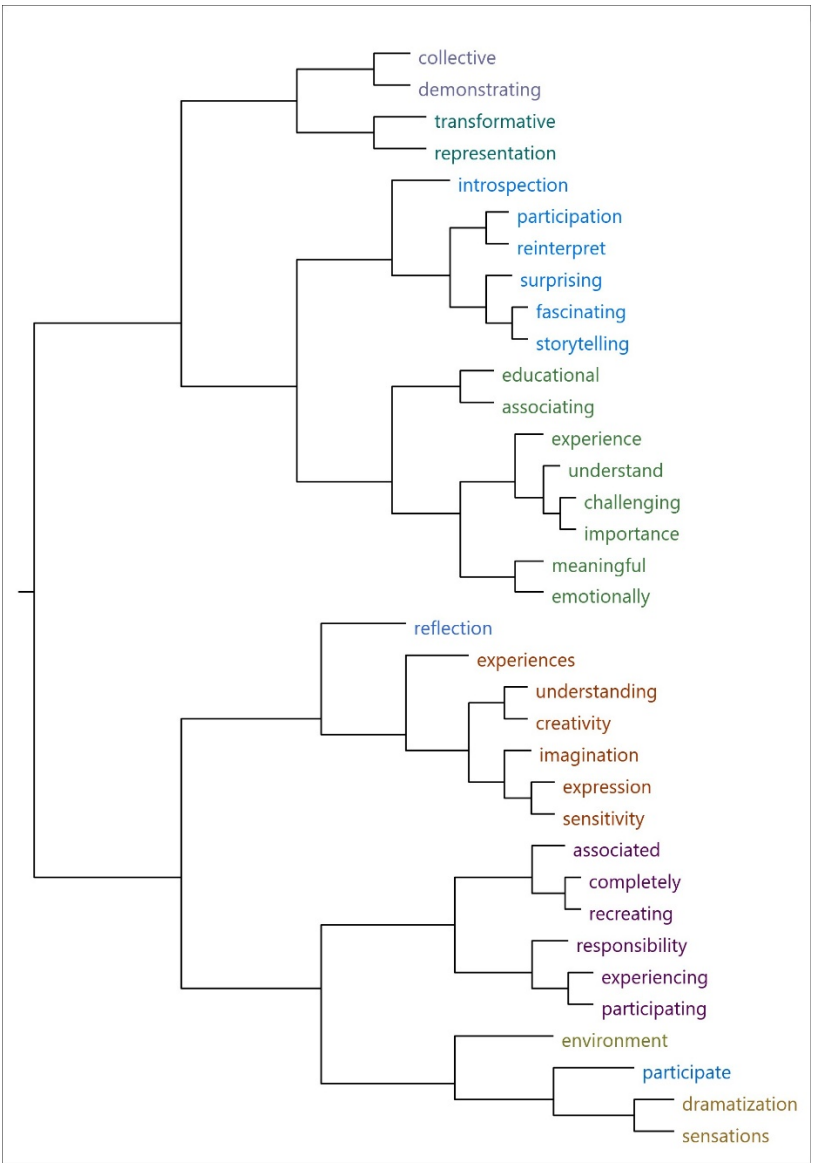



*Figure 11: Cluster-Sound Dramatization.*



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Observation of the hierarchical structure reveals at least five main semantic configurations:

– *The Reflective-Autobiographical Dimension*
  The first cluster (listening, creativity, expression, development, imagination, musicality, emotion, understanding, narrative, awareness, reflection) evokes a dimension in which sound dramatization serves as a privileged space for self-exploration. The interplay among listening, storytelling, and imagination outlines a journey in which autobiographical narrative becomes an opportunity for reflection and the reworking of one's life experiences. From this perspective, listening is not merely a communicative practice but a means of attributing new meanings to personal experiences and recognizing previously implicit connections. Participants' accounts also suggest a more explicit reflection on emotions, relational dynamics, and experiences accumulated over time, outlining a path oriented not only toward personal expression but also toward a gradual redefinition of how one interprets oneself.
– *The Cognitive-Transformative Dimension*
  The second cluster (document, meaning, essential, relationships, learning, dramatization) outlines a dynamic conception of learning in which cognitive, relational, and experiential aspects are mutually integrated and associated with a progressive attribution of meaning to experiences and acquired knowledge. Participants' accounts suggest a level of engagement that extended beyond the mere acquisition of content, encompassing the critical re-examination of knowledge and the recognition of relationships as an important resource for processing and understanding.
– *The Relational Dimension*
  The third cluster (personal, meaningful, cohesion, collective, points, educational, transformative) highlights that relationships with others are not merely contextual but structural components of the entire experience, capable of fostering a sense of belonging, reciprocity, and participation. Sharing experiences broadens interpretive perspectives and offers participants the opportunity to reinterpret their experiences from different points of view.
– *The Experiential and Emotional Dimension*
  The fourth cluster (emotions, difficult, fostering, demonstrating, memories, especially, emotionally, participation) highlights the central role of the emotional component in the workshop process. The participants' narratives reveal genuine engagement, in which even the most complex memories find space to be acknowledged, expressed, and reworked. The opportunity to share one's lived experiences in a welcoming setting appears to have fostered conscious participation,



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supported by mutual listening and the appreciation of diverse individual stories. What emerges is a perspective in which the affective dimension and reflection proceed in close integration.

– *The Dialogic Dimension*
  The final cluster (provided, response, orchestra, connected, colleague, associated, experiencing, childhood, particularly, activity, colleagues, experience, different, experiences, participant) suggests interpreting the workshop as a space in which participants connected experiences from different times and contexts and associated these connections with new meanings attributed to their personal journeys. From this perspective, participants' accounts suggest that sound dramatization was associated with a process of recomposing experience through connections and reinterpretations in which past experiences were reconsidered in light of the present and of the insights emerging during the workshop.

The following table presents the lexical frequencies of the main terms that emerged from the narratives: emotions (34 occurrences), memories (34), experience (31), and experiences (26). Other frequent lemmas include emotional (21), listening (19), awareness (17), dramatization (17), understanding (16), expression (13), imagination (11), meaningful (11), and learning (10) (Table 2).

An overall analysis of the data suggests that participants experienced sound dramatization not merely as an expressive or creative activity but as a pedagogical tool through which cognitive, emotional, and relational processes that are normally implicit could become more explicit and available for reflection. The recurrence of terms such as "memories, emotions, experience, listening, awareness," and "understanding," together with the formation of semantic clusters, suggests that participants associated the workshop with a process in which listening, imagination, reflection, and relationship-building progressively intertwined in the shared construction of meaning.

Particularly significant is the role played by autobiographical memory, which emerges not merely as a recollection of past experiences but as a dynamic process of reinterpreting one's lived experience. Participants' accounts suggest that the creation of the sound dramatization was associated with a gradual shift away from their immediate experience, as they reconsidered emotions, memories, and relationships through engagement with the representations developed by others. In this way, the workshop was experienced as a dialogic space for the negotiation of meanings, in which individual reflection was related to mutual listening and a plurality of perspectives.



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*Table 2: Lexical frequencies of the main lemmas - Sound dramatization.*

| Word | Length | Count |
|---|---|---|
| provided | 8 | 53 |
| response | 8 | 53 |
| emotions | 8 | 34 |
| memories | 8 | 34 |
| experience | 10 | 31 |
| experiences | 11 | 26 |
| emotional | 9 | 21 |
| listening | 9 | 19 |
| awareness | 9 | 17 |
| dramatization | 13 | 17 |
| understanding | 13 | 16 |
| learning | 8 | 10 |
| personal | 8 | 10 |
| document | 8 | 9 |
| expression | 10 | 9 |
| imagination | 11 | 9 |
| meaningful | 10 | 9 |
| different | 9 | 7 |
| difficult | 9 | 7 |
| orchestra | 9 | 7 |
| reflection | 10 | 6 |
| activity | 8 | 5 |
| associated | 10 | 5 |
| childhood | 9 | 5 |
| cohesion | 8 | 5 |
| collective | 10 | 5 |
| connected | 9 | 5 |
| creativity | 10 | 5 |
| educational | 11 | 5 |
| especially | 10 | 5 |
| fostering | 9 | 5 |



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| | | |
|---|---|---|
| meanings | 8 | 5 |
| openness | 8 | 5 |
| participation | 13 | 5 |
| relationships | 13 | 5 |
| sensitivity | 11 | 5 |
| transformative | 14 | 5 |
| colleagues | 9 | 4 |
| colleagues | 10 | 4 |
| demonstrating | 13 | 4 |
| development | 11 | 4 |
| emotionally | 11 | 4 |
| essential | 9 | 4 |
| experiencing | 12 | 4 |
| feelings | 8 | 4 |
| narrative | 9 | 4 |
| participate | 11 | 4 |
| particularly | 12 | 4 |
| powerful | 8 | 4 |
| promotes | 8 | 4 |

The results are fully consistent with the theoretical framework outlined in the introduction. As Nagel (1974) suggests, the subjectivity of the other always remains, at least in part, inaccessible to direct knowledge; understanding, therefore, does not mean appropriating another's experience but rather approaching it through a continuous exercise of imagination, interpretation, and listening. It is precisely this process that seems to emerge from the experience of sound dramatization: the absence of images compels participants to construct mental representations based exclusively on acoustic signals, making it evident that every interpretation results from the inter encounter between one's personal history and the clues offered by the soundscape.

The importance attributed to listening, the collective dimension, and the shared construction of representations is consistent with a multidimensional understanding of empathy, involving perceptual, cognitive, affective, and metacognitive processes.



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Participants' accounts suggest that sound dramatization provided an opportunity to reflect simultaneously on their own ways of perceiving, interpreting, and attributing meaning to others' experiences, bringing greater attention to the processes through which intersubjective understanding is constructed.

Taken together, the evidence gathered suggests that, within the context examined, sound-based dramatization was associated with metacognitive and experiential dimensions and with opportunities for reflection and the reinterpretation of participants' experiences.

Rather than being associated merely with communicative or narrative skills, participants' accounts suggest that the workshop was also related to a reconsideration of how they interpreted themselves, others, and the relationships that bind them. From this perspective, the sound experience emerges as a space in which processes involved in empathic understanding can be explored through listening, the negotiation of meanings, and the recognition of the other's irreducible otherness, bringing a theoretical concept into relation with lived experience. This outcome is consistent with the inductive approach adopted: rather than being presented solely as abstract content, theoretical perspectives on empathy are introduced in relation to participants' reflective experience, allowing them to reconsider and refine their initial interpretations through engagement with formalized knowledge.

Regarding the procedural dimension of metacognition, the most frequently recurring words (response, memories, emotional, personal, openness, empathy, dramatization) point to a product that takes shape during the activity. Participants describe a sense of engagement that arises from a willingness to let themselves be guided by emotions, gradually coming into harmony with the group through the language of sound. The narratives clearly convey this idea. Rather than describing what to do, many participants explain that it is necessary to let the experience guide them: some invite participants to "immerse themselves in the situation and allow emotions and memories to emerge through sound"; others suggest "letting go, trusting the group, and accepting every emotion without shame or fear"; and still others emphasize the importance of creating an atmosphere in which everyone can feel free to express themselves.



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*Figure 12: Word Cloud - Procedural Metacognition (Sound Dramatization).*

The cluster can be interpreted as reflecting a progression whose initial is organized around trust, understood as the relational condition within which participants describe the possibility of sharing personal experiences without fear of judgment. The associations among "authenticity,approach," and "openness" highlight the need to create a space where one can share one's story without fear of judgment. Participants' accounts suggest that the perceived authenticity of this relational condition may constitute an important premise for the sharing of memories and emotions. Within this relational configuration, a further dimension emerges concerning immersion in lived experience, particularly through the connections participants establish among empathy, emotional sharing, and openness to what arises during the activity. The associations among "empathy, emotional sharing" and "allowed" show that engagement deepens as one allows oneself to inhabit the memory without trying to control it. It is no coincidence that one of the most common suggestions is to let sounds naturally accompany the emergence of emotions, rather than forcing their expression. The representation subsequently acquires a more explicitly collective dimension, as the association among "classmates," "experience," "memories," and "personal" suggests that individual contributions were understood in relation to, and potentially reconsidered through, the contributions of others. There is no predetermined way to participate: each person gradually finds their own balance, adjusting the timing, intensity, and modes of expression in relation to the context and the group dynamics.



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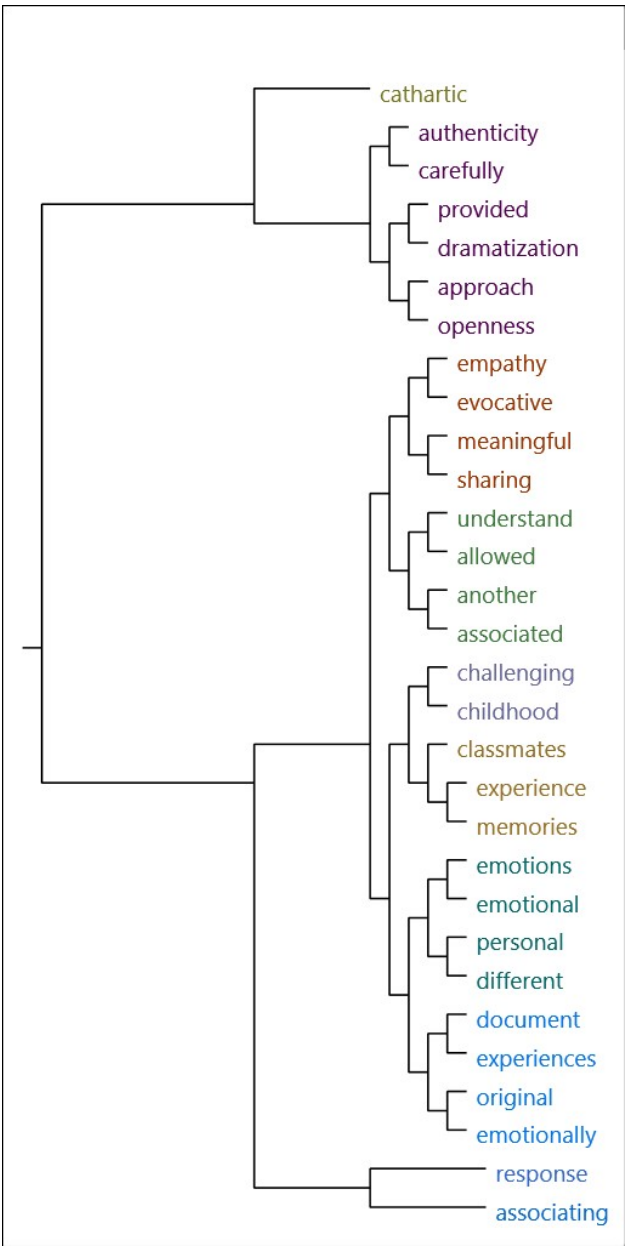



*Figure 13: Clusters-Procedural Metacognition (Sound Dramatization).*



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When analyzing the declarative dimension of metacognition, the most frequently recurring words-such as “awareness, listening, understanding, emotional, sensitivity, imagination, creativity,” and “expression”-point to resources participants consider essential for participating in the sound dramatization. Rather than merely describing the activity, the vocabulary reflects an increasingly explicit understanding of what it requires: knowing how to listen, embracing the emotional dimension of the experience, imagining expressive possibilities, and using sound as a form of communication and a means of constructing shared meanings. This interpretation is also evident in participants’ narratives. Some students describe the dramatization as an experience that requires “active listening, creativity, emotional sensitivity, and awareness of sound as a narrative device,” highlighting the role of listening and emotional sensitivity in shaping the performance. Others, however, emphasize the importance of “self-reflection, emotional intelligence, empathy, self-awareness, sharing, and the ability to welcome others’ experiences,” recognizing that sound-based work involves cognitive, emotional, and relational aspects. The testimonials thus indicate that participants were able to identify some of the resources supporting this type of experience and to reflect on their relevance within the educational process.




*Figure 14: Word Cloud – Declarative Metacognition (sound dramatization).*

A closer examination of this cluster further specifies the representation emerging from the data, particularly by bringing into focus the value participants attribute to listening. The association among understanding, emotion, sound, and connection conveys a concept of listening that goes



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beyond the simple perception of sounds: to understand means recognizing in sound a language capable of conveying experiences and emotions. Alongside the centrality attributed to listening, the lexical associations also bring into view the role of imagination as a mediating dimension between lived experience and its expressive representation. The cluster linking imagination, expression, creativity, and translation highlights that sound-based representation requires transforming emotions and memories into shareable forms of expression; sound thus becomes the medium for giving shape to what would otherwise struggle to find expression in verbal language. Another element concerns the relational dimension; the association among collective, emotional, shareable, and reflection shows that interaction with the group is integral to the experience. This perspective emerges clearly in the participants' narratives, in which they acknowledge that sound dramatization requires establishing a relationship with others. Frequent references to "empathy and collaboration" and to greater "sensitivity toward others' experiences" suggest that these dispositions are recognized as indispensable conditions for sound representation to develop through the group's contribution. Finally, the cluster comprising "colleagues, collaboration, participation, collectively, interactive" and "experience" draws attention to the conditions that foster this type of work. The participants' narratives frequently mention the need for more welcoming spaces, more relaxed schedules, and a more shared sense of participation, confirming that the context also contributes to the quality of the experience.

The most frequent terms in the analysis of the awareness dimension point to a reflection shaped by lived experience: "experience, emotional, childhood, listening, connected, representation," and "experiencing" suggest that sound dramatization does not merely evoke memories and emotions but facilitates their reworking through the language of sound and interaction with the group. Some describe the activity as "emotionally intense and transformative, helping me observe a difficult personal situation more clearly and constructively," while others report being able to "revisit childhood memories and reinterpret them through group sound expression." There are also those who speak of "an experience of recognition and meaning-making, revealing unexpected feelings associated with familiar songs," highlighting how the sound work brought to the surface meanings that had previously remained in the background.



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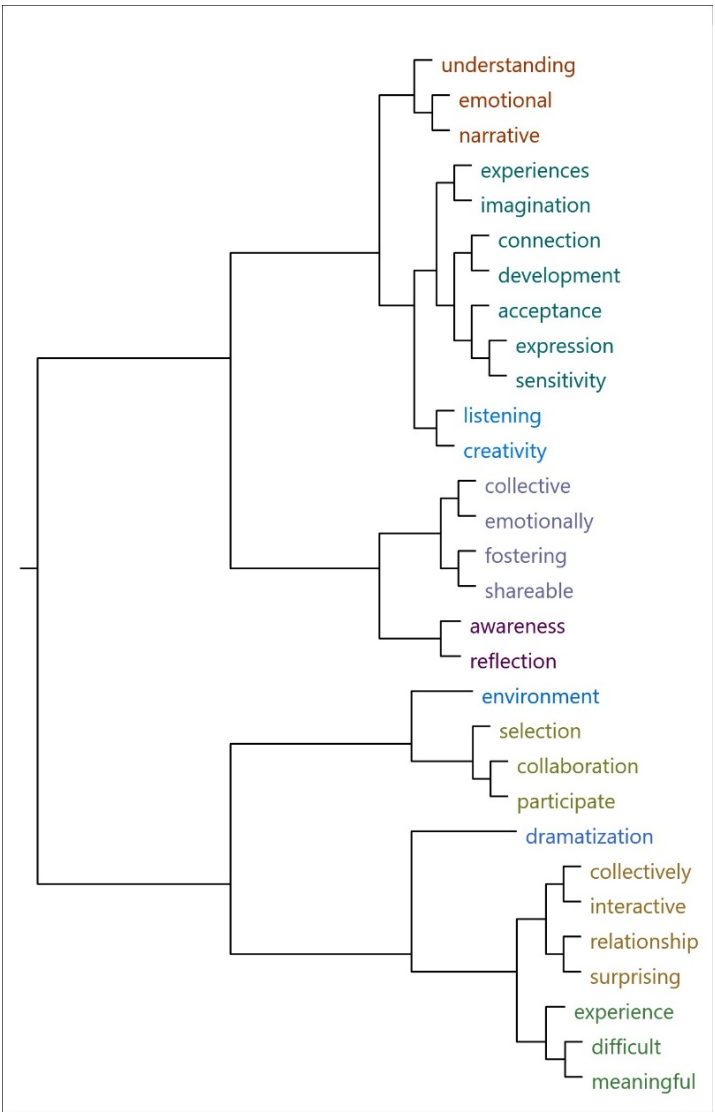



*Figure 15 Cluster – Declarative Metacognition (Sound Dramatization).*



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*Figure 16: Word Cloud – Awareness (sound dramatization).*

The cluster analysis identifies four ways in which awareness develops. The reinterpretation of one's own experiences emerges from the association among "listening, childhood, awareness," and "meaningful."

Although sound may evoke past experiences, participants' accounts suggest that the metacognitively relevant aspect lies less in their recollection than in the interpretive distance through which those experiences can be reconsidered and invested with meanings that had not previously been recognized. One participant describes this , stating that he relived certain experiences "with greater awareness and relief," highlighting how the reenactment transformed his understanding of them. Recognizing others as an opportunity for self-knowledge characterizes the cluster formed by experiences, emotions, connections, and collaboration. Encountering the group's emotions and stories fosters reflection that transcends one's own point of view. Significant in this regard is the account of someone who states having "felt her emotions as if they were my own," showing how recognizing others also becomes a new form of self-awareness. The attribution of new meanings to the experience also emerges from the association between representation, difference, and dramatization. Sound-based representation creates a space for reflection that allows participants to observe their lived experience from different perspectives. The experience itself is not altered in content, but rather in the way participants interpret it, revealing connections and meanings that had previously remained implicit.



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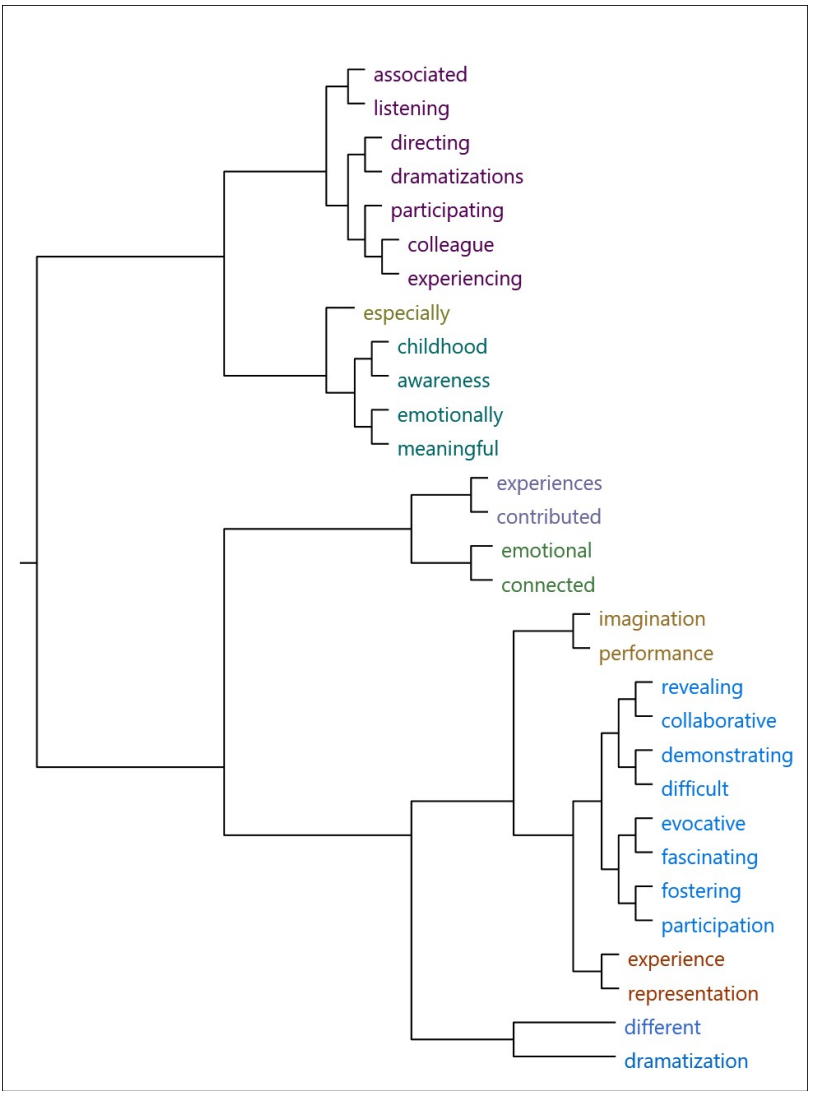



*Figure 17: Cluster – Awareness (sound dramatization).*

## 4.4. Music, Emotions, and Affective Regulation

The relationship between music and emotions can be considered a particularly significant case for observing how perceptual experience, memory, personal meaning, and affective regulation interact. Listening to music does not, in fact, produce a purely aesthetic response or an isolated



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emotional reaction: it involves physiological, cognitive, imaginative, and autobiographical processes that contribute to the construction of subjective experience. Tempo, rhythm, intensity, tonal mode, timbre, dynamics, and melodic progression all help shape the quality of the emotional response, though they do not determine it in a one-to-one manner (Juslin & Laukka, 2004; Koelsch, 2014).

The relationship between musical characteristics and emotion must therefore be interpreted in probabilistic and situated terms. Configurations characterized by fast tempos, major keys, and marked rhythms tend to be associated with states such as joy, energy, and enthusiasm, while slower tempos, minor keys, and softer dynamics may be more strongly associated with melancholy, introspection, nostalgia, or calm (Juslin & Laukka, 2004; Koelsch, 2014). The listener's actual response, however, emerges from the interplay between these characteristics, the listener's personal history, the cultural context, and the autobiographical experiences that the piece may evoke.

The emotional experience of music cannot, therefore, be reduced to a single mechanism. Emotional contagion, episodic memory, visual imagination, evaluative conditioning, and musical anticipation may all contribute simultaneously to the construction of what is perceived and felt (Juslin & Västfjäll, 2008). Music thus acquires meaning within a dynamic relationship between the properties of the stimulus and the subject's affective and autobiographical repertoires. What is heard does not encounter a neutral system, but rather a history of experiences, associations, expectations, and habits that help select and organize the emotional meaning of the listening experience.

This relationship takes on particular significance when listening is considered not merely an occasional event, but a repeated practice. In fact, musical choice constitutes one of the strategies through which people may seek to maintain, intensify, or modify their emotional state (Saarikallio & Erkkilä, 2007). In this sense, selecting a particular repertoire does not simply mean expressing an already established taste: it can become a form of regulation through which the individual intervenes, more or less consciously, on their own affective environment.

However, this very function can take on a recursive structure: if certain songs are systematically associated with specific emotional states, listening to them can contribute not only to reflecting those states but also to maintaining, amplifying, or transforming them. The everyday musical environment thus gradually becomes part of the subject's affective ecology, contributing to the construction of the ways in which the subject interprets themselves and the situations they experience (Juslin & Sloboda, 2010). The relationship therefore does not proceed linearly from music to emotion: the



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subject's state guides the choice of music, the choice modifies the affective experience, and that experience can influence subsequent selections.

It is precisely this recursiveness that makes the relationship between music and emotions pedagogically relevant. An education in listening limited to historical knowledge or the formal analysis of musical pieces would overlook an important component of the musical experience: the way in which the individual uses, interprets, and incorporates what they hear into the construction of their own affective balance. Making the relationships between musical characteristics, emotional states, and modes of self-regulation observable, on the other hand, allows us to transform a habitual experience-one that is often experienced implicitly-into a potential subject of reflection.

From this perspective, music can take on a metacognitive function. Recognizing the emotion evoked by a piece, comparing it with that produced by different musical configurations, and examining the transformations that occur during listening means directing one's attention not only to the musical object but also to the processes through which it is experienced. Learning thus concerns both music and the listener simultaneously: what the listener perceives, the images they construct, the associations they form, and the way in which these processes contribute to the regulation of their emotional world.

The proposed activity is built upon this possibility. The program does not initially introduce a theoretical explanation of the relationship between music and emotion, but rather places participants in a position to observe the transformations that different sound configurations produce in their own mental representations. The auditory experience is progressively translated into graphic gestures, verbal language, poetic composition, and metacognitive reflection, so that the transition from perceptual-emotional immediacy to the construction of a more explicit meaning becomes observable in itself. Only subsequently is scientific knowledge introduced as a tool for interpreting processes that participants have already encountered in their own experience.

The first phase involves listening to a piece of music belonging to the participants' cultural heritage and invites them to spontaneously translate into graphic signs what emerges during the experience. Here, the gesture does not serve an illustrative function: it constitutes an initial externalization of aspects of the experience that are not yet necessarily organized in conceptual form. In the second phase, words are associated with the symbols, bridging the gap between nonverbal modes of expression and verbalization. In the third phase, the words are used to compose a poetic text, through which images, emotions, and metaphors are further organized and made communicable.

The sequence is then repeated with a second piece characterized by different rhythms, atmospheres, and expressive qualities. Comparing the two



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pieces makes it possible to observe what may remain implicit in the ordinary experience of listening: variations in the musical stimulus are accompanied by transformations in graphic forms, vocabulary, images, metaphors, and recognized emotional states. The educational value lies not in assuming these differences to be deterministic effects of the music, but in allowing the participant to explore the relationship between the sound configuration and the ways in which they construct their own experience.

The concluding metacognitive phase allows participants to revisit the entire process and connect the various outputs. What was initially experienced as a perceptual and emotional experience can be reconsidered from a more detached perspective: *What differences emerged between the two listening sessions? Which images and associations have changed? Which emotional states were recognized? To what extent can one's own listening habits contribute to maintaining or altering certain affective configurations?*

The inductive function of the method lies precisely in this step. Participants are not asked to "discover" theoretical knowledge independently based on their own experience, nor is individual experience used as proof of the validity of scientific findings. Rather, it produces perceptual, symbolic, and reflective material that makes certain issues cognitively accessible; the subsequent theoretical formalization can then introduce categories and research findings through which what has been experienced is clarified, differentiated, and, when necessary, questioned.

The activity therefore does not simply aim to show that music "produces emotions." The educational challenge is broader: to enable participants to observe how their own affective responses are constructed through the interaction between characteristics of the sound environment, memory, expectations, cultural repertoires, and personal history. Making this relationship at least partially observable means opening up a space of awareness regarding everyday listening practices and the ways in which they can contribute to affective regulation.

From this perspective, music becomes a case study through which to exercise a more general skill: moving from immediate experience to the ability to question its processes, compare different configurations, and use formalized knowledge to reorganize its interpretation. The specificity of the musical content therefore remains central, but the training structure follows the experiential-inductive logic outlined in the previous chapters: experiencing, externalizing, comparing, problematizing, formalizing, and returning to the experience with additional interpretive tools.



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### 4.4.1. Results of the Analysis

The word cloud related to the Writing Mechanism, understood here as the process through which participants progressively translated the musical experience into graphic, verbal, and poetic forms, highlights several recurring lexical clusters that outline the main characteristics participants attribute to the activity (Figure 18). Among the most frequently represented terms are "creativity, experience," and "reflection," which convey writing as an opportunity to explore one's own experiences and reorganize one's thoughts, and as a tool for mediating between experience and representation, as evidenced by terms such as "expression, translation, composition," and "compositions." The transformation of lived experience into symbolic and verbal form, in fact, involves a continuous process of selecting, connecting, and reworking ideas, through which thoughts and experiences take on a coherent and communicable structure. The frequent occurrence of "understand, understanding, metacognitive," and "consciousness" also points to a marked focus on the metacognitive dimension: writing becomes an opportunity to observe one's own cognitive processes, recognize how ideas develop, and gain greater awareness of the strategies employed in their elaboration. Another lexical cluster-comprising "spontaneous, spontaneously, imagination, possibility," and "perspectives"-points to writing that is open to exploration and creative production, through which participants experimented with flexible modes of expression capable of accommodating different points of view and new interpretive possibilities. Finally, the presence of "sensations, emotionally, meaningful," and "experiences" highlights the strong link between symbolic-verbal production and the autobiographical dimension. Writing thus becomes a space in which emotions, memories, and perceptions are progressively reworked into a form capable of giving greater intelligibility to one's experience.




*Figure 18: Word Cloud-Writing Mechanism.*



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The hierarchical analysis of lexical co-occurrences enables a deeper exploration of the corpus's semantic structure by highlighting the main interpretive clusters that emerged from participants' narratives. The clusters delineate complementary dimensions that reflect the complexity of the writing mechanism as a practice of reflection, reworking, creativity, and organization of thought.

- *The Experiential Dimension*
  The first cluster (experience, perspectives, associated, transformed) outlines a dimension in which experiences are progressively reorganized through new interpretive frameworks. Rather than reconstructing events chronologically, participants seem to have developed a more nuanced view of their journey, identifying connections that help redefine the meaning of experiences gained over time.
- *The Personal Dimension*
  The second cluster (experiences, relationships, unconscious, spontaneous, sensations) reflects a dimension strongly centered on individual experience: the writing mechanism seems to have facilitated the emergence of memories, perceptions, and implicit content, fostering greater attention to one's inner world.
- *The Symbolic-Verbal Dimension*
  The third cluster (meaningful, constructing, consciousness, composition, emotional, significant) highlights writing as a practice of symbolic and verbal construction. The composition of the text appears to have required a continuous process of selecting, organizing, and linking ideas. From this perspective, the written composition represents not only one of the products of the activity but also a medium through which participants organized and made aspects of their reflective process intelligible.
- *The Contextual Dimension*
  The fourth cluster (production, environment, personally, possibility, predetermined) highlights the relevance of context within participants' accounts of the writing mechanism, suggesting that written production was experienced as situated and responsive to the conditions in which it took place.
- *The Metacognitive Dimension*
  The final cluster (translation, metacognitive, creativity, concentration) highlights the cognitive and metacognitive strategies that accompanied the production of the texts. The construction of written compositions involves constant planning, monitoring, and revision, along with the ability to manage the writing mechanism and to seek modes of expression that authentically represent one's own thoughts.



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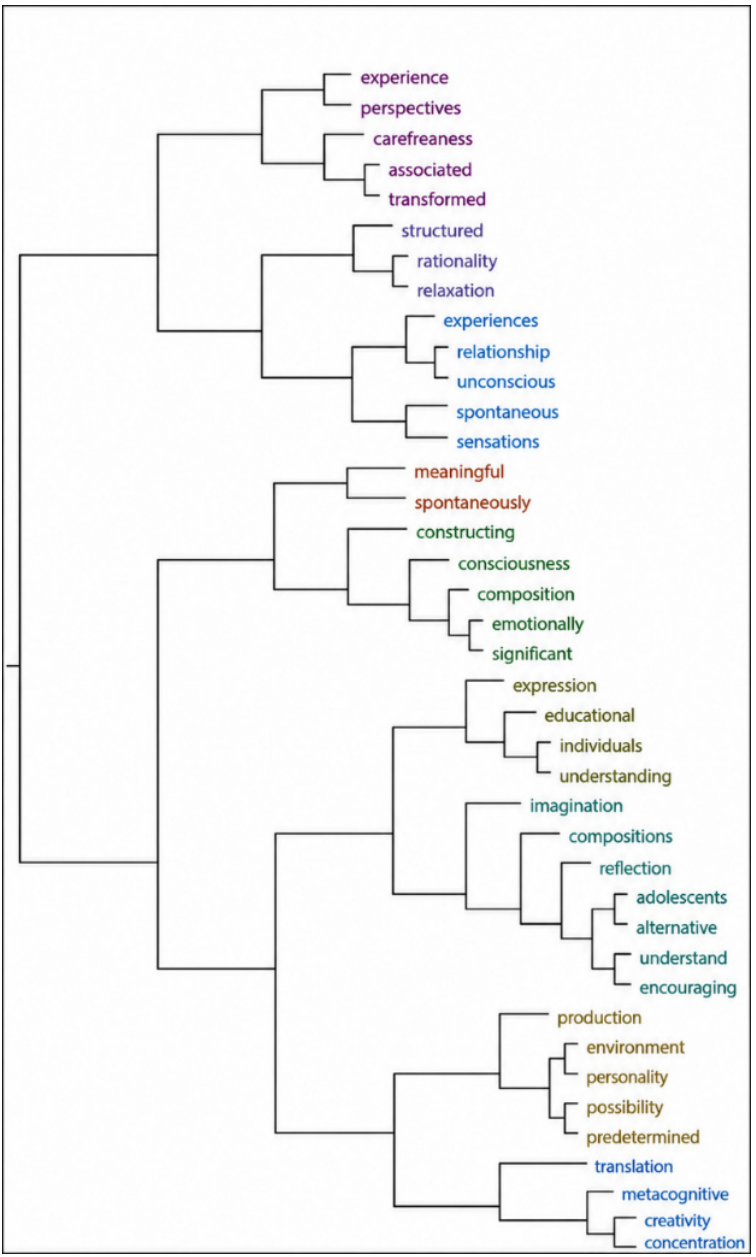



*Figure 19: Writing Mechanism Clusters.*



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Table 3 presents the lexical frequencies of the main lemmas that emerged from the corpus regarding the writing mechanism. The most frequent terms are reflection (26), creativity (22), experience (22), and translation (20) followed by expression, spontaneous, metacognitive, meaningful, sensations, and experiences.

*Table 3: Frequencies of the Main Lemmas – Writing Mechanism.*

| Word | Length | Count |
|---|---|---|
| reflection | 10 | 26 |
| creativity | 10 | 22 |
| experience | 10 | 22 |
| translation | 11 | 20 |
| spontaneous | 11 | 16 |
| expression | 10 | 12 |
| meaningful | 10 | 12 |
| sensations | 10 | 10 |
| understand | 10 | 10 |
| composition | 11 | 8 |
| compositions | 12 | 8 |
| emotionally | 11 | 8 |
| encouraging | 11 | 8 |
| experiences | 11 | 8 |
| metacognitive | 13 | 8 |
| adolescents | 11 | 6 |
| individuals | 11 | 6 |
| production | 10 | 6 |
| spontaneously | 13 | 6 |
| understanding | 13 | 6 |
| alternatives | 11 | 4 |
| associated | 10 | 4 |
| carefreeness | 12 | 4 |



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| | | |
|---|---|---|
| concentration | 13 | 4 |
| consciousness | 13 | 4 |
| constructing | 12 | 4 |
| educational | 11 | 4 |
| environment | 11 | 4 |
| imagination | 11 | 4 |
| personally | 10 | 4 |
| perspectives | 12 | 4 |
| possibility | 11 | 4 |
| predetermined | 13 | 4 |
| rationality | 11 | 4 |
| relationship | 12 | 4 |
| relaxation | 10 | 4 |
| significant | 11 | 4 |
| structured | 10 | 4 |
| transformed | 11 | 4 |
| unconscious | 11 | 4 |

The overall analysis of the data suggests that the writing mechanism was not merely experienced as an act of creative production but as a device through which participants explored the relationship among musical stimulus, emotional activation, and the construction of meaning. The recurrence of the lemmas "reflection, creativity, experience, translation, expression," and "metacognitive," together with the structure of the semantic clusters, suggests that participants experienced writing not so much as a compositional exercise but as a process of exploring the internal processes they associated with the experience of listening to music.

Particularly significant is the presence of terms related to spontaneity, sensation, consciousness, and transformation, which suggest that participants associated the process with a transition from an initially implicit emotional response to a more gradual and reflective elaboration of the experience. Participants' accounts suggest that, across the sequence of graphic gestures, verbal associations, poetic composition, and metacognitive reflection, emotions associated with the musical experience were progressively



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recognized, organized, and expressed through increasingly conscious symbolic representations.

The results appear consistent with the theoretical framework outlined in the introduction. The literature highlights that different musical characteristics tend to be associated with distinct emotional states and that listening is one of the primary ways individuals regulate their affective state. Although the emotional experience retains a subjective component tied to the listener's personal history, the participants' writings show differences in the images, metaphors, vocabulary, and meanings associated with the two musical pieces with contrasting expressive structures. These differences suggest an association between changes in the musical configuration and the ways in which participants represented and processed the experience.

Taken together, the evidence gathered suggests that the act of writing can serve as an inductive tool for making the relationship between music and emotions more explicit and open to reflection.

Rather than addressing this relationship exclusively at a theoretical level, the activity engages participants in an experiential exploration of how different sound configurations may be associated with distinct symbolic, verbal, and emotional responses. From this perspective, participants' accounts suggest that writing served a function extending beyond personal expression, providing a means through which aspects of the musical experience could be made more explicit and available for metacognitive reflection. The most significant aspect emerging from participants' accounts, therefore, does not lie in the poetic production itself, but in the attention they devoted to the non-neutral nature of musical listening and to the role that listening habits may play in the construction, maintenance, and regulation of one's emotional world. These findings are consistent with the theoretical assumptions underlying the activity and provide exploratory empirical material through which those assumptions can be examined within the context studied.

Furthermore, the role of writing as a metacognitive mediator is particularly significant. Participants' accounts suggest that the process extended beyond the immediate experience of different emotions, as their reflections addressed the relationships among musical characteristics, mental images, symbolic associations, and emotional states. The concluding reflection thus provides an opportunity to make a predominantly intuitive experience more explicit and available for conscious examination, while participants' accounts indicate a reconsideration of their musical preferences and of the perceived effects of listening on their emotional states.

Regarding the procedural dimension of metacognition, the word cloud analysis suggests that participants experienced writing as a space in which thoughts could be progressively processed and reorganized. The recurrence



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of terms such as “learning, meaningful, identified, selected, reflected,” and “naturally” suggests that, in participants’ accounts, ideas were not represented as fully formed before writing but as taking shape through ongoing choices, reformulations, and revisions. Within these accounts, writing emerges as a process through which initially intuitive content could be progressively clarified. The transcripts confirm this perspective: “I gradually selected the experiences I considered most meaningful, revising the original list multiple times.”

Several participants report that they began by jotting down ideas that were still somewhat vague, recognizing their meaning only during the writing mechanism. Their accounts describe the text as taking shape through successive approximations, with rereading associated with the clarification of content, the elimination of secondary elements, and a progressively sharper focus on what they intended to communicate, in some cases leading to the identification of a central theme only in the final stages of writing.

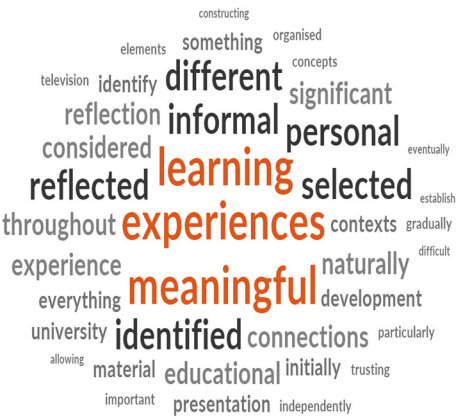



*Figure 20: Word Cloud – Procedural Metacognition (Writing Mechanism).*

The cluster analysis provides further insight into how participants represented this process. The association among gradualness, importance, experiences, learning, and meaning suggests that writing was associated with a progressive definition of ideas. In participants’ accounts, meaning was not represented as fully established before the text was written but as taking shape during its construction through processes of refinement and reformulation. The cluster consisting of “identified, selected, different, personal, connected,” and “educational,” on the other hand, refers to the progressive focusing of thought through the selection of relevant elements and the identification of relationships among them. The association among “reflection, significance, contexts, development,” and “identity” suggests that



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participants connected revision with changes in their understanding of what they were writing. Similarly, their accounts associate rereading not only with modifications to the form of the text but also with reconsideration of the experiences being represented. Finally, the cluster comprising "presentation, university, concepts," and "something" suggests that participants associated verbalization with the possibility of making aspects of their thinking more explicit and available for examination. Overall, participants' accounts suggest that the value they attributed to the writing mechanism extended beyond the text produced to include the processes of selection, reformulation, revision, and progressive clarification involved in its construction.

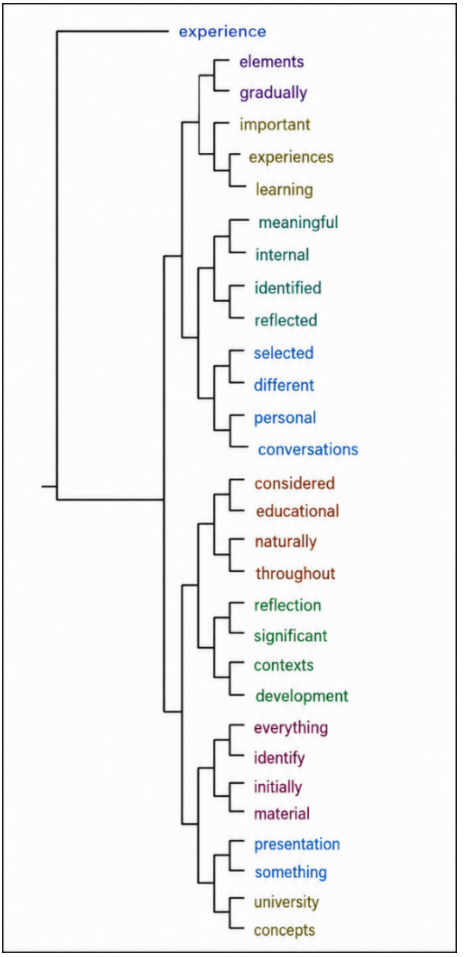



*Figure 21: Cluster – Procedural Metacognition (Writing mechanism).*



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Regarding the declarative dimension of metacognition, the word cloud analysis highlights the recurrence of terms associated with participants' understanding of how thought takes shape during the writing mechanism.

The recurrence of terms such as "listening, creativity, emotional, awareness, reflection, knowledge," and "translation" reinforces this dimension. Participants' accounts suggest that writing was experienced not merely as a means of translating already defined ideas, but as a process in which those ideas could be reconsidered as they were formulated. In this regard, several participants describe writing as an opportunity to give voice to content that was initially difficult to recognize or express: "Exploratory, because through listening to music we can access parts of ourselves and our implicit knowledge." References to greater "self-understanding" further suggest that participants associated writing with the emergence of emotions, images, and sensations that they perceived as having previously remained in the background. The focus of their accounts therefore extends beyond the text produced to include what they perceived as becoming more explicit about their own ways of processing experience.




*Figure 22: Word Cloud – Declarative Metacognition.*

Cluster analysis allows us to explore this perspective in greater depth. The association between "meaningful, approached, different, environment, personally," and "possibility" suggests that participants recognized certain conditions as relevant to reflective work. Their accounts refer to the environment, the time devoted to the activity, and the willingness to engage as factors associated with the ways in which ideas emerged during the process. The cluster consisting of "translation, experience, understanding,



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influence," and "production," on the other hand, suggests that participants attributed a role to language in organizing, interpreting, and communicating experience, rather than perceiving words as a mere transcription of it. Within these accounts, writing emerges as a space in which initially indistinct content could progressively take on a clearer form. The association between "structure, abilities, activities, awareness, knowledge," and "spontaneous" further suggests that participants represented written thought as involving multiple dimensions, including creativity, listening, attention, emotional engagement, and reflection. Finally, the cluster linking creativity, metacognitive processes, association, communication, emotional expression, listening, and reflection suggests that participants related the writing process to an increased attention to their own ways of thinking. Associations emerging during writing were described as expressions of personal ways of interpreting and organizing experience. In this sense, the observation that "free association reveals much about our knowledge, internal models, and metacognitive processes" is significant because it illustrates how one participant interpreted the relationship between writing and cognitive processes that would otherwise remain implicit.

Finally, regarding the dimension of awareness, analysis of the word cloud shows that the recurrence of terms such as "realized, personal, meaningful, journey, emotions, awareness," and "discovery" points to a process in which participants associated writing with pausing to reconsider what they had experienced and with attributing new meaning to it. Rather than simply recounting their own stories, participants' accounts suggest that the writing process was associated with a reconsideration of those experiences.



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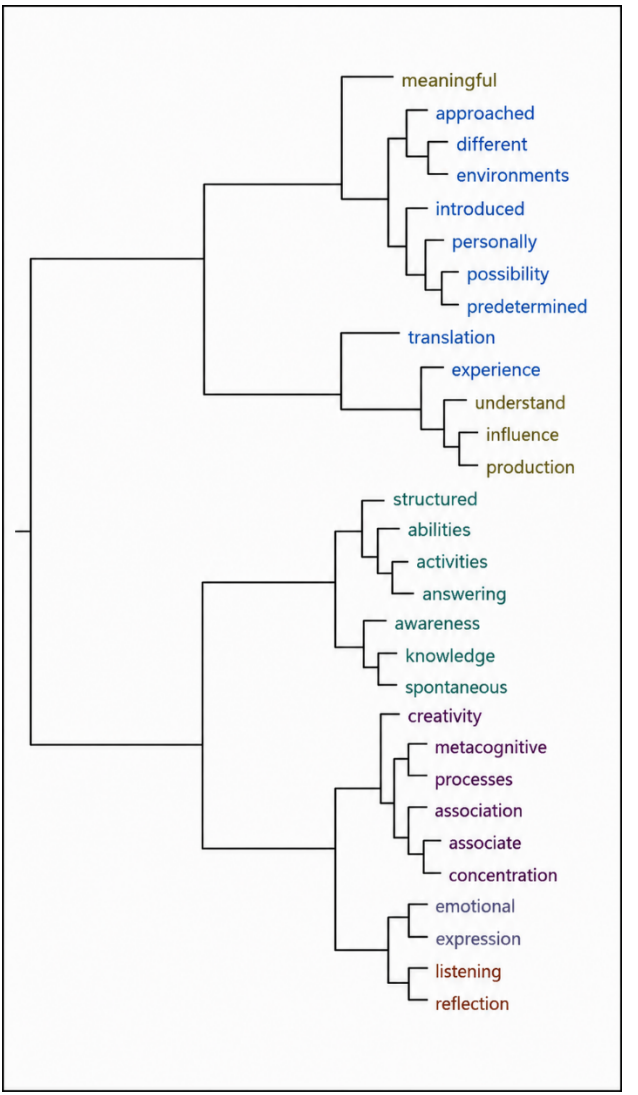



*Figure 23: Cluster-Declarative Metacognition.*



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*Figure 24: Word Cloud – Awareness (Writing Mechanism).*

The transcripts provide further support for this interpretation. One student recounts, during the writing mechanism, "I repeatedly reshaped my work, removing certain passages and adding others that I considered more meaningful, ultimately reconstructing my perspective more sincerely and authentically," suggesting an association between revision of the text and a gradual reworking of the participant's point of view. Cluster analysis allows us to explore this transformation in greater depth.

A first aspect involves recognizing connections that were not initially apparent. Participants' accounts suggest that writing can foster a more cohesive understanding of one's own story by making connections between previously unrelated experiences more explicit.

It is telling when participants state that "events that initially seemed isolated were actually connected by a common thread," recognizing only at the end of the process the continuity in their personal history. A second aspect concerns a shift in perspective. Participants' accounts indicate that revisiting their own words provided an opportunity to reconsider past experiences from different perspectives and, in some cases, to attribute new meanings to experiences they had previously perceived as difficult or fragmented.



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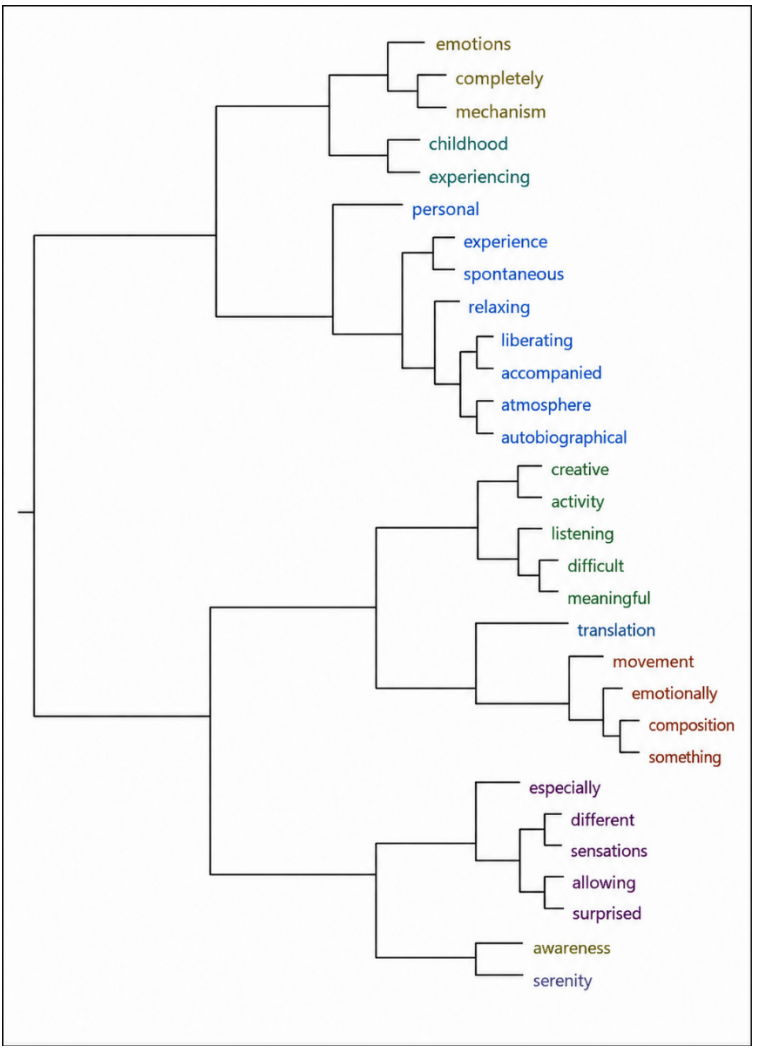



*Figure 25: Cluster – Awareness.*

This emerges clearly in the words of those who recount that, once put into writing, they were able to "re-examine their experiences critically rather than simply viewing them as fragmented or unpleasant events," realizing that even the most complex moments contributed to their personal growth. A further element involves the reconstruction of one's life journey. Participants' accounts suggest that, during the writing mechanism, experiences from different contexts can be reconsidered as interconnected elements of a broader personal narrative rather than as isolated episodes.



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As one participant states, “putting what I have experienced into words proved to be extremely important because… I was able to recount a fundamental part of who I am,” highlighting how verbalization also clarifies self-understanding. Finally, participants’ accounts suggest that sharing their texts can provide an additional opportunity for reinterpretation. Presenting one’s work to others may enable participants to compare their own perspectives with those of the group, creating further opportunities for reflection: “Sharing my work could become an opportunity to get to know myself better and see my experiences from a different perspective.” This account associates the sharing of the text with the possibility of gaining a different perspective on one’s own experience and self-understanding.

## 4.5. The Final Brainstorming Session: Awareness of the Relationship Between Experience and Learning

At the end of the programme, a collective brainstorming session was conducted to explore how participants, after engaging in the activities, reflecting individually on their experiences, and encountering the relevant theoretical frameworks, represented the relationship between experience and learning. Compared with the metacognitive grids used at the end of the individual activities, the brainstorming session introduced a different level of reflection: the object of reflection was no longer a specific task or what had been learned through it, but the overall process and the ways in which experience, reflection, dialogue, and formalization had contributed to the construction of knowledge. In line with the recursive logic of Experiential-Inductive Learning, a further layer of metacognitive reflection was also introduced by involving participants in the management of the brainstorming methodology itself. Participants were therefore not only called upon to reflect on the relationship between experience and learning, but also to engage with the process through which their contributions were generated, organized, compared, categorized, and progressively transformed into shared propositions. The methodology of the brainstorming session thus became, to some extent, an additional object of experience and reflection.

The brainstorming session was organized into successive phases comprising free generation and collection of ideas, followed by participatory inductive categorization, interpretation, evaluation and prioritization, and the identification of final propositions. In the initial phase, participants were asked to freely express the aspects they considered most significant in relation to the role that experience had played in their learning process. Contributions were collected without being simultaneously evaluated or



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classified, so as to keep the field of possible interpretations open and avoid assigning participants' observations to predefined categories.

Once the idea-generation phase had been completed, the contributions were treated as units of analysis and examined through a participatory inductive categorization process. Identical or semantically overlapping contributions were collectively identified and consolidated, while differences in meaning were preserved. Participants were then invited to assign descriptive labels to the resulting units and to compare and group them according to their semantic and conceptual proximity. Through collective discussion, these groupings were progressively refined into broader thematic categories. The emerging categories were subsequently checked against the original contributions in order to verify their coherence and correspondence with the meanings expressed during the brainstorming session. Only after this inductive and participatory phase were the resulting categories related, at the analytical level, to the theoretical framework developed in the volume.

This procedure led to the identification of four main categories: the role of experience in the learning process; the transformation of participants' relationship with previously acquired theoretical knowledge; the intersubjective function of dialogue and knowledge co-construction; and the element of surprise generated by the encounter between experience and theoretical formalization. Participants subsequently evaluated and prioritized these thematic clusters through collective discussion, elaborating on them through successive contributions and identifying those considered most representative of the overall meaning attributed to the learning process. The participatory management of this process also constituted a further experiential basis for metacognitive reflection: through the progression from the initial plurality of ideas to their comparison, categorization, and synthesis, participants were able to reflect on some of the processes involved in the construction of shared knowledge.

**A. The Role of Experience in the Learning Process**

The first category encompasses the observations through which participants addressed the role of experience in the construction of learning. What emerged was neither a generic appreciation of direct involvement nor an attribution of intrinsic educational effectiveness to experience itself. Rather, participants' observations progressively highlighted that the relevance of the activities derived from the opportunity to have a lived point of reference that could subsequently be revisited.

Experience was recognized as the moment in which knowledge, interpretations, expectations, strategies, and emotional reactions had been mobilized, without all of these components necessarily being recognizable during the action itself.



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Subsequent reflective return made some of them more observable. From this perspective, participants implicitly distinguished between simply being involved in a situation and being able to transform what had been experienced into material for further inquiry and knowledge construction.
During the discussion, this awareness was progressively refined through successive contributions. The value of experience was associated not only with the concreteness of the situation, but also with the possibility of using it as a point of reference from which to question knowledge and interpretations that might otherwise have remained largely abstract. Experience therefore acquired meaning within a broader sequence: it made something available for observation; reflection enabled some of its features to be made explicit; dialogue introduced additional perspectives; and theory provided categories through which what had initially been understood could be reconsidered.
The collective evaluation therefore led to the recognition that the central issue was not simply the value of experience, but the relationship between experience and the possibility of learning from experience. The latter was not regarded as an automatic process: it required operations through which what had been experienced could be revisited, questioned, and progressively reorganized. This cluster is particularly relevant to the metacognitive dimension of the programme, since attention shifts from what was learned to the conditions through which participants considered that learning to have become possible.

**B. The Transformation of the Relationship with Previously Acquired Theoretical Knowledge**

The second category concerns one of the aspects most extensively explored during the brainstorming session: the perceived difference between having previously encountered a theory and having points of reference through which to understand, use, and discuss it in reasoned terms. Several participants related the final discussion to theoretical knowledge that was not new to them. References to Schön, Mezirow, and Kolb had already been encountered during their previous education and were therefore, at least to some extent, available prior to the activities.
The emerging cluster therefore does not concern the acquisition of previously unknown theoretical knowledge. Rather, the discussion highlighted a transformation in participants' relationship with that knowledge. Participants indicated that prior familiarity with authors, models, and concepts had not necessarily provided them with implicit or experiential points of reference through which they could concretely recognize the processes being



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described. The activities and the subsequent return to them instead provided situations to which this theoretical knowledge could be related.
From this perspective, participants' accounts suggest a perceived shift from predominantly declarative knowledge towards knowledge experienced as more explicit, meaningful, and open to reasoned argument. Theory became meaningful not because it had been inferred from experience, but because it could be related to something that had previously been experienced, observed, and problematized. At the same time, experience could be reinterpreted through conceptual distinctions that had not been fully available at the time it was lived.
This category therefore helps clarify the relationship between induction and formalization proposed in the volume. Formalized knowledge does not intervene simply to provide a theoretical label for something the learner has already fully understood through experience. Rather, it introduces distinctions and categories that may alter the very intelligibility of what has been experienced. The significant element emerging from the brainstorming session is that participants retrospectively recognized this difference: their previous knowledge was not negated, but was described as becoming differently accessible once it had been connected to an experiential point of reference.

### C. The Intersubjective Function of Dialogue and Knowledge Co-construction

The third category concerns the role played by the intersubjective dimension, which emerged both from the content produced and from the dynamics of the brainstorming session itself. Contributions did not take the form of an independent succession of individual opinions: each participant could build on what had been expressed by those who spoke before them, adding clarifications, further insights, connections, or additional perspectives.
The progressive articulation of contributions was consistent with a process of co-construction. An observation concerning the value of experience could be taken up to clarify the role of reflection; a reference to prior knowledge of a theory could be developed by distinguishing between knowing a definition and recognizing its meaning in experience; a contribution concerning emotions could orient the discussion towards the role of individual differences in interpreting the same situation. Meanings were therefore not simply placed alongside one another but were progressively expanded through the relationships between contributions.
The intersubjective dimension also performed a function of interpretive decentring. Encountering different interpretations enabled participants to recognize that some aspects of their own experience, initially perceived as self-evident, could be understood differently. The observations of others thus



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became a resource for revisiting one's own experience: what had not been recognized in the initial individual elaboration could become visible through another participant's contribution.
This element broadens the meaning of the metacognitive component itself, since awareness of one's own learning process does not emerge exclusively through introspection: making an interpretation explicit renders it available for comparison, which introduces differences that can, in turn, foster renewed observation of one's own way of understanding. The intersubjective level therefore appears not merely as the communicative context of the brainstorming session, but as one of the mediations through which awareness can be constructed.
In this sense, co-construction has a specific meaning: it does not necessarily imply reaching a uniform interpretation, but rather the possibility that each contribution modifies the field of meanings available to subsequent contributions. The shared understanding emerging at the end of the process can therefore be understood as more articulated than the simple sum of the initial individual interpretations.

**D. The Element of Surprise in the Encounter Between Experience and Theoretical Formalization**

The fourth category encompasses an element that emerged across the different activities: the element of surprise generated by the comparison between what had been experienced during the activities and the theoretical categories subsequently introduced. Surprise was associated not only with encountering new knowledge, but above all with the possibility of recognizing, through theoretical formalization, aspects that had already appeared in experience without initially being distinguished or conceptualized in the same way.
This process was particularly evident in participants' reflection on the categories of formal, non-formal, and informal learning. The activities had initially prompted participants to reconstruct and organize their learning experiences using the categories available to them. The subsequent encounter with theoretical distinctions enabled them to return to these representations and question boundaries that had initially appeared more immediate or self-evident. The element of surprise therefore arose from the distance between intuitive classification and the greater differentiation made possible through formalization.
A second area concerned the relationship between music and emotions. The listening experience had made emotional responses immediately accessible, and these could initially be attributed primarily to characteristics of the stimulus itself. Comparison between participants' different responses and the



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subsequent theoretical elaboration instead made the role of personal associations, previous experiences, memory, and context more visible. In this case, surprise arose from recognizing the complexity of a process that, in immediate experience, could initially appear more linear.
A similar dynamic emerged in relation to the meaning of empathy. The plurality of interpretations produced during the activities highlighted that attempting to understand another person does not eliminate the mediation of one's own perspective. Subsequent discussion enabled participants to problematize an initially more immediate conception of empathy, making the distance between understanding another person's experience and projecting one's own interpretive frames onto it more recognizable.
The category of surprise therefore cuts across the different contents and assumes a significant function within the overall framework. It signals the emergence of a discrepancy between what initially appeared self-evident and what subsequently became recognizable. It does not, of course, constitute a measure of learning, nor does it allow a stable transformation in participants' representations to be inferred. It does, however, indicate that, in participants' final reconstruction, the encounter with theory was perceived not only as an opportunity to confirm previous interpretations but also to revise and differentiate them.

**E. Evaluation, Prioritization, and Final Propositions**

In the final phases of the brainstorming session, the emerging clusters were evaluated and prioritized according to their capacity to represent the aspects of the programme considered most significant. This stage made it possible to bring the plurality of contributions together into a number of synthetic propositions without eliminating the differences that had emerged during the discussion.
The first proposition holds that experience does not, in itself, constitute learning, but can become a condition for learning when it is made the object of explication, reflection, and reinterpretation. The second addresses the relationship with formalized knowledge: theoretical knowledge previously encountered may gain greater meaning and become more open to reasoned argument when it is related to processes for which the learner also has experiential points of reference. A third proposition addresses the intersubjective dimension: engagement with different interpretations can expand what learners recognize in their own experience and contribute to the co-construction of meanings that were not fully available in their initial individual elaborations. Finally, the encounter between experience and formalization can generate a discrepancy capable of reopening what initially



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appeared self-evident to inquiry, thereby fostering processes of differentiation and problematization.

Taken together, these findings allow a specific function to be attributed to the final brainstorming session in relation to the programme's earlier stages. The metacognitive grids had enabled participants to revisit individual activities and make explicit the strategies, knowledge, emotions, and interpretations mobilized within them. The brainstorming session, by contrast, shifted the level of analysis to the learning process as a whole, making the relationship between experience, individual reflection, intersubjective dialogue, and formalization itself an object of reflection. At the same time, participants' involvement in the organization, categorization, comparison, and prioritization of the ideas generated during the brainstorming session introduced a further layer of metacognitive reflection. Consistent with the recursive logic of Experiential-Inductive Learning, the methodology through which collective knowledge was being constructed became itself available for observation and reflection: participants were able not only to contribute meanings, but also to observe how those meanings were progressively differentiated, related, reorganized, and synthesized through interaction.

It is precisely this shift that connects the brainstorming session to the second level of Experiential-Inductive Learning. Participants were not asked merely to state what they had learned, but to retrospectively reconstruct some of the conditions through which they considered that learning to have become possible and, through their participation in the management of the brainstorming process, to engage with some of the operations through which shared knowledge was being constructed. The findings do not allow the conclusion that the programme produced a stable increase in participants' metacognitive competence; they do, however, indicate that, during the final phase, both the process of learning from experience and, at a further layer, the process through which experience was collectively interpreted and organized became explicit objects of discussion and reflection. The function of the brainstorming session therefore lies precisely in this recursive metacognitive return: it makes at least partially observable not only the outcomes of learning, but also the ways in which participants attribute meaning to the relationship between experience, intersubjectivity, formalized knowledge, and the processes through which such meanings are collectively constructed.



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# Conclusions

The approach developed in this volume has addressed the educational experience from different yet complementary perspectives, with the aim of connecting contributions drawn from experiential learning, *inductive teaching and learning*, professional reflexivity, and metacognition. The proposal for Experiential-Inductive Learning is situated within this framework of integration and pedagogical translatability: it does not introduce a new theory of learning nor an alternative methodology to explicit teaching, but rather a possible design framework through which experience, interpretation, reflection, and formalized knowledge can be intentionally interconnected.

The specificity of this approach does not lie in its individual components-which belong to well-established traditions-but in their configuration. The central point is to design conditions in which what the learner experiences, interprets, and produces can gradually become observable and open to inquiry, thereby enabling a connection with further knowledge capable of clarifying, differentiating, or modifying that understanding.

From this perspective, experience does not possess an automatic educational value. It may remain episodic, reinforce existing routines, or confirm prior interpretations. Instead, it gains significance when mediated through processes that allow the individual to revisit what has happened, articulate their own interpretations, compare them with different perspectives, and use formalized knowledge to reorganize them. Reflection is therefore not merely a phase following action, but a function through which experience can become material for the construction of knowledge.

Similarly, theory is not regarded as an alternative to experience. Formalized knowledge introduces categories, relationships, and research findings that cannot be derived from individual experience alone and that can alter the very interpretability of what has been experienced. The relationship between theory and practice should therefore not be conceived as a rigid sequence, but as a recursive relationship in which experience can generate



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questions and knowledge can return to experience, thereby altering the conditions of its interpretation.

It is within this relationship that the issue of didactic translatability takes on significance. Knowing a theory of experiential learning, reflexivity, or metacognition does not equate to being able to recognize these processes in one's own experience. If education aims to develop professionals capable of questioning situations, making their own criteria explicit, and revising them in light of further knowledge, then these processes must also be practiced within educational contexts.

The experiences presented in this volume should be read from this perspective. They are not procedures to be replicated independently of their contexts, but rather situated configurations through which certain functions of experiential-inductive architecture can become observable. Their value lies less in the activities themselves than in the possibility of making explicit interpretive, reflective, and metacognitive processes that, in ordinary experience, may remain implicit.

The applied section also suggests a further possibility: students can not only learn through experience but also experience the process through which an experience becomes something from which learning can occur. Reflecting on what has been experienced, verbalizing it, discussing it, and subsequently relating it to theoretical knowledge makes it possible to observe-at least in part-how experience is transformed into knowledge. Thus, teaching does not occur solely through experience; the very possibility of learning from experience can itself become the object of learning.

The concluding brainstorming session allows us to further clarify this aspect. The collective review of the entire process shifted the focus of reflection from individual content and activities to the relationship itself between experience and learning. What emerges is not only a greater awareness of what has been learned, but also of how theoretical knowledge already encountered can take on a different meaning when related to experiences on which the learner has had the opportunity to reflect. From this perspective, formalization does not simply represent the moment when knowledge is added to experience, but can help make interpretations-previously available in a less articulated form-more explicit, defensible, and revisable. The collective nature of the discussion adds a further dimension to this process: understanding one's own learning can be supported by the opportunity to compare one's own interpretation with that of others, integrating elements not initially considered and participating in the progressive co-construction of shared meanings. Brainstorming thus takes on the value of a metacognitive reflection on the entire training sequence, in which not only what has been learned is reexamined, but also the role played



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by experience, discussion, and formalized knowledge in the construction of that understanding.

This step also helps clarify the recursive nature of the process. Formalization does not necessarily mark the end of learning: categories, criteria, and relationships constructed through the comparison of experience and knowledge can alter the way subsequent situations are approached. The individual does not return to the experience under the same conditions from which they started, because what they have learned can transform what they are able to recognize, distinguish, and problematize. New experiences can, in turn, reveal the limits of existing knowledge and reopen the process.

In this context, the relational dimension takes on an equally significant role. Engaging with different interpretations allows one to move beyond taking one's own interpretations for granted and to transform what has been experienced individually into something that can be shared, discussed, and subjected to the critical scrutiny of others. Professional learning thus arises not only from personal practice but also from the opportunity to discuss the reasons behind how a given situation is interpreted and a decision is made.

At the same time, this approach requires avoiding oversimplified interpretations of experiential learning. Participation, emotional engagement, and practical activity are not, on their own, sufficient to produce meaningful learning. Experience requires mediation, guidance, conceptualization, and discussion. The issue is not choosing between experiential teaching and explicit instruction, but understanding how different forms of mediation can be organized in relation to objectives, content, prior knowledge, and the characteristics of the learners.

The relationship between Experiential-Inductive Learning and professional autonomy must also be viewed through this same lens of caution. This approach does not directly foster autonomy, nor can it be considered a privileged methodology for training "free" professionals; it can, however, create situations in which certain conditions consistent with greater judgment are exercised: postponing the immediate application of a response, comparing alternative interpretations, recognizing the limits of an available repertoire, using knowledge as a tool for reorganization, and revising one's decisions in light of the effects produced.

Professional freedom can be understood, in this sense, not as the absence of constraints or theoretical frameworks, but as the ability to construct a relationship with them that is not rigidly prescriptive. Possessing greater knowledge does not automatically make one freer; what becomes decisive is the ability to assess its relevance, recognize its limitations, compare it with the conditions of the situation, and use it in the construction of a reasoned judgment.



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For the sake of consistency, Experiential-Inductive Learning itself must remain open to revision. If it were transformed into a sequence to be applied regardless of content, participants, and educational conditions, it would reproduce the very rigidity it seeks to avoid. Its contribution lies rather in offering criteria for modulating experience, guidance, formalization, explicit instruction, and autonomy within different contexts.

The empirical section of this volume must be interpreted within precise limits. The study involved 27 students from a specific university setting and was not designed to produce generalizable results or to causally verify the effectiveness of Experiential-Inductive Learning. The data are derived from the participants' reflective narratives and document how they described and interpreted their learning experiences. The concluding brainstorming session also provides retrospective accounts of the learning process and does not allow for inferring a stable transformation of metacognitive skills. The absence of a control group and pre-post measures therefore does not allow us to attribute the perceived transformations to the intervention or to determine their extent. The results must therefore be considered as exploratory evidence useful for understanding how certain features of the intervention may become recognizable in the participants' narratives and reflections. For the same reason, participants' prospective statements concerning the possible use of what they had learned should be interpreted as indications of intended transfer rather than as evidence of transfer enacted in subsequent professional situations. Questions therefore remain open that require further empirical verification. Subsequent studies may explore the transferability of the framework to different educational and professional contexts, examine longitudinally the relationship between reflective practices and professional development, and distinguish more precisely between what depends on the general configuration of the framework and what is linked to content, participants, and specific mediation methods.

The thread running through this volume can ultimately be traced back to the relationship between experience and understanding. Professional knowledge does not emerge exclusively from theory or from practice, but from the dynamic through which each can interrogate and transform the other. The issue is not to determine which must always come first, but to create learning conditions in which experience can be examined through knowledge, and knowledge can in turn be put to the test in experience. In this recursive relationship, what is learned not only expands the professional's existing knowledge but can also alter what they become capable of recognizing, questioning, and choosing in subsequent situations. It is within this space that learning, reflexivity, and professional freedom can come into play.



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Experiential-Inductive Learning explores a central challenge in professional education: how can experience become a genuine source of knowledge rather than remain simply something that happens to the learner?
Drawing on experiential learning, inductive teaching, reflective practice, and metacognition, the volume develops a pedagogical framework in which experience, reflection, problematization, and formalized knowledge are deliberately interconnected. Its distinctive contribution lies not in proposing a new general theory of learning, but in configuring these dimensions within a recursive educational architecture that enables learners to examine how knowledge reshapes their interpretation of experience.
The book moves from the theoretical contributions of Kolb, Schön, and Mezirow to the formulation of Experiential-Inductive Learning, examining its relationship with professional reflexivity, educational action, and the modifiability of interpretive repertoires. A critical dialogue with neuroscience further explores the conditions that make such repertoires open to revision while avoiding biological reductionism. The framework is then examined through educational experiences in which learners engage with formal, non-formal, and informal learning, empathy, sound dramatization, music and emotion, writing, and metacognitive reflection.
Rather than opposing experience to theory, or inductive learning to explicit instruction, this volume asks how their relationship can be intentionally designed. It offers researchers, teacher educators, and professionals in education a framework for understanding how experience can become an object of inquiry and how formalized knowledge can return to experience to transform the ways in which it is interpreted.

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