

THE CONDITIONS OF DEEP LEARNING

MIRA Notebooks

NOTEBOOK 1 · HOW THE BRAIN LEARNS

MIRA and the Power of the Senses

The more doors that open, the more solid what enters

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MIRA model

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Ask any adult about something they learnt and still remember vividly decades later. It will almost never be a page from a textbook. It will be the experiment they smelled and touched, the field trip they walked, the play they acted in, the conversation that moved them. This is no accident: what entered through several doors at once, and stirred something inside, was etched deep. What entered through a single door, and without emotion, was almost always erased.

All the information the brain turns into knowledge enters first through the senses. They are the only gateway: there is no learning that has not first passed through sight, hearing, touch, smell or taste. And it turns out that the number of doors opened at the same time is not indifferent — it changes the solidity of what enters.

More doors, a firmer trace

When the same information arrives through several coordinated sensory channels, learning and later memory improve. It is one of the most consistent findings of research on learning, observed from the classroom to the laboratory: using several senses at once helps learning and reinforces later recall.¹

The reason lies in how the brain stores what it learns. An experience lived through several senses leaves not a single trace but a network of interconnected traces — the image, the sound, the physical sensation, the context. That network is more robust than an isolated mark: it has more anchor points, and therefore more routes to be retrieved later. A single detail — a smell, an image — can later be enough to bring back the whole experience.

A fact read once leaves a thread. The same fact seen, heard, handled and discussed leaves a mesh. Threads break; meshes hold. That, in a single image, is the power of the senses.

A necessary caveat: senses are not the same as 'styles'

It is worth dispelling a very widespread misunderstanding here, because confusing it would weaken everything above. The power of the multisensory is *not* the theory of 'learning styles' — the idea that each student is 'visual', 'auditory' or 'kinaesthetic' and must be taught through their preferred channel. That theory has no scientific backing: there is no consistent evidence that classifying a student by a style and teaching them only through that channel improves their results.²

The multisensory proposal is exactly the opposite. It is not about finding each student's single channel, but about opening *several channels for everyone*. It is not 'this child learns better by ear'; it is 'everyone learns more solidly when information arrives through several routes at once and is integrated'. The aim is not to segment, but to enrich the learning experience for the whole group.

The door that fixes most: emotion

There is one door that deserves separate attention, because it multiplies the effect of all the others: emotion. Information that arrives charged with emotion consolidates better in memory. The agent is a well-studied brain circuit: the amygdala, which, faced with an emotionally significant experience, modulates and reinforces the consolidation of the memory in the hippocampus and the cortex.³ That is why we vividly remember what moved us and forget what left us indifferent.

Emotion also acts on attention: it orients the focus towards what matters and increases the depth with which information is processed.⁴ Content that touches something personal is not only felt more: it is attended to more, elaborated more and, consequently, remembered more. Emotion is not an ornament of learning — it is one of its most powerful fixing mechanisms.

But the senses are not enough: depth is needed

Here is the nuance that separates serious multisensory learning from mere flashy stimulation. Opening many

senses at once, if there is no deep processing of what enters, produces entertaining experiences that leave no knowledge — sensory fireworks that go out without a trace. Sensory information becomes knowledge when the student elaborates it: when they relate it to what they already know, question it, explain it, use it to produce something.

Put another way: the senses open the doors, but it is thinking that turns what has entered into knowledge. An intense multisensory experience followed by shallow reflection is wasted; a multisensory experience followed by deep elaboration is etched forever.

How MIRA harnesses the power of the senses

MIRA does not propose filling the classroom with stimuli as a fad. Its way of working naturally activates the three factors we have just seen — multisensoriality, emotion and depth — and integrates them through its conditions.

Agency opens the sensory doors. Authentic-production projects — building, recording, handling, going out into the environment, presenting to an audience — are multisensory by nature. The student does not read about something: they do it, touch it, see it work, defend it aloud. Each project is an experience of several doors open at once, etching a mesh and not a thread.

Inner life provides the emotion that fixes. When learning connects with what truly matters to the student — when there is personal meaning, not just a task — that emotional door that consolidates memory is activated. Inner life is not an affective luxury: in neuroscientific terms, it is the mechanism that turns an experience into a lasting memory.

Metacognition provides the depth that transforms. An experience rich in senses and emotion would be of no use if it stayed on the surface. Metacognition is what forces elaboration: relating what was lived to what was already known, reflecting on the process, drawing the knowledge out of the experience. It is the step that turns what entered through the senses into something understood and usable.

Senses to open the doors, emotion to fix what enters, thinking to turn it into knowledge. MIRA does not add neuroscience as decoration: its architecture matches, condition by condition, the way the brain truly learns.

In summary

The senses are the gateway for all information, and the more doors that open in a coordinated way, the more solid the trace that remains — provided it is not confused with the myth of learning styles. Emotion multiplies that fixing, and only deep processing turns experience into knowledge. MIRA harnesses all three mechanisms at once: Agency opens the senses through authentic production, Inner life provides the emotion that consolidates, and Metacognition the depth that transforms. It is not that MIRA draws inspiration from neuroscience: it is that it teaches the way the brain learns.

Notes

1. The benefit of multisensory learning for memory is widely documented, from classroom studies to experimental research. It is attributed to the interaction between sensory cortices co-activated during learning, such that a single sense can later reactivate the whole experience.
2. The theory of 'learning styles' (visual, auditory, kinaesthetic) lacks empirical support: there is no consistent evidence that teaching according to each student's supposed style improves outcomes. Recent literature recommends abandoning this neuromyth and focusing on multimodal strategies and deep processing. It should not be confused with multisensory learning, which is supported.
3. The amygdala modulates the consolidation of emotional memory, reinforcing storage in the hippocampus and cortex. There is a correlation between the degree of amygdala activation and the intensity with which an emotional event is remembered (LaBar & Cabeza, 2006; reviews in *Frontiers in Psychology*, 2017).
4. Emotion modulates attention —orienting the focus towards what is relevant— and favours deeper encoding of information, which improves its later retrieval. The effect can be positive or, under high stress and anxiety, harmful: the emotion that helps is the one that gives meaning, not the one that overwhelms.