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Article abstract

The first part of this article describes in brief the Six Steps methodology for designing educational environments—be they K-12 schools, tertiary institutions, community centers, youth movements, or the like—as set forth in my book Educational Design in Six Steps: A Strategic and Practical Scaffold (Routledge 2020). The second part of the article illustrates application of the Six Steps method in designing an educational environment the aims of which are teaching for understanding and the motivation for understanding.

Designing an Educational Environment in Six Steps: Teaching for Understanding and the Motivation for Understanding

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Abstract

The first part of this article describes in brief the Six Steps methodology for designing educational environments—be they K-12 schools, tertiary institutions, community centers, youth movements, or the like—as set forth in my book *Educational Design in Six Steps: A Strategic and Practical Scaffold (*Routledge 2020). The second part of the article illustrates application of the Six Steps method in designing an educational environment the aims of which are teaching for understanding and the motivation for understanding.

Keywords: The six steps method; The three educational meta-narratives; The six educational means; Teaching for understanding and motivation for understanding (U&M); The relational concept of understanding; The performance concept of understanding; Big ideas; Self-determination theory; Realm of understanding; Education for wisdom.

Part 1: The Six Steps Method

The Six Steps method is needed today more than ever, as never before so many organizations and individuals been engaged in designing so many new or renewed educational environments. Schools—the most common educational environment—which only a few decades ago were considered one of the world's wonders (Perkins, 1992, p. 1), nowadays seem to evoke more embarrassment than wonder. Many people question whether schools resonate the values and challenges of the twenty-first century, whether they equip students with necessary competencies.

Two principal reasons account for this deterioration of the public image of the school. The modern school emerged and expanded in the nineteenth century because it supported two interrelated historical developments and, in turn, was supported by them—the consolidation of the nation-state and the expansion of the industrial revolution. Zvi Lamm wrote: "Schools were to nation-states what houses of prayer were to religions: they served to disseminate the national ideology. In many instances, that ideology actually was fashioned by them" (quoted in Harpaz, 2020, p. 38). And Edward Fiske wrote: "By and large the factory-model school accomplished the mission it was given […]. It helped stabilize the new urban culture and turned out the kind of workers needed by the industry of the day" (1991, p. 33). The enervation of these two historical processes diminished significantly the tailwind of the school and rendered its original function redundant. With the firm entrenchment of the nation-state over the course of the last two centuries, we no longer need schools to generate and sustain national consciousness. Rather, in today's world the purpose of school should be to cultivate cosmopolitan consciousness and global citizenship (not in place of, but in addition to, national consciousness and state citizenship) to cope with the challenges threatening human lives on our planet that no nation can address on its own—the climate crisis, pandemics, nuclear weapons proliferation, dangers implicit in artificial intelligence, to name only a few (Harari, 2019). And in the post-factory economy or the knowledge economy in which knowledge is the raw material, energy and product of industry and services, the purpose of the school should be to cultivate sophisticated and flexible competencies such as higher order thinking,

inventing new and useful ideas, effective collaboration and communication, etc.

Absent from many of the educational initiatives that have proliferated in response to these challenges in recent years is educational design thinking, a method, a scaffold. Educational initiators become infatuated with an idea and are driven to establish a new/ alternative/ innovative educational environment. The idea might be a good start, but it's not anchored in a systematic and holistic design. The design presented here is in no way intended to dampen the initiators' enthusiasm but, rather, offer a scaffold that will impose discipline on their designs and aid in actualizing its potential. The gist of the design process is presented in the following chart and clarifications.

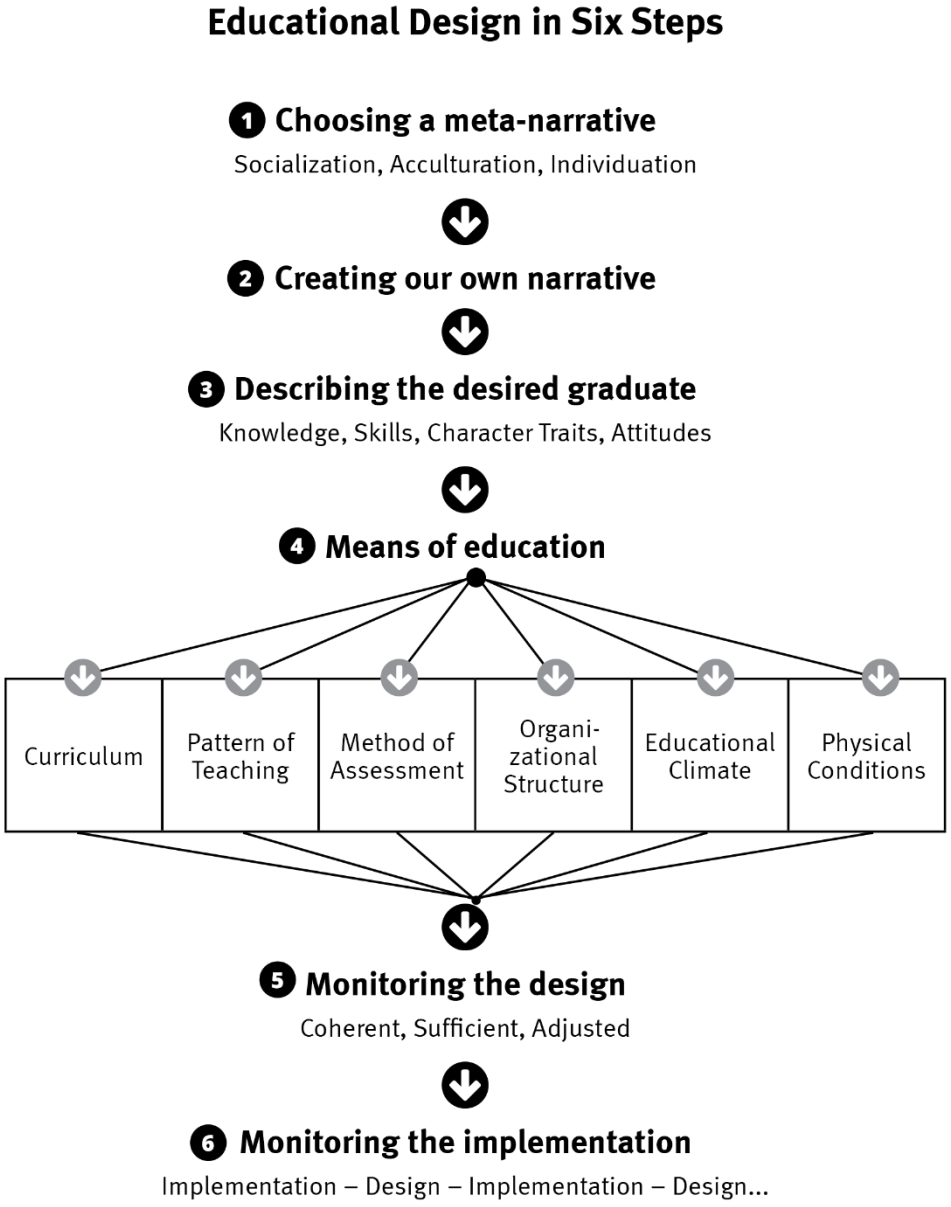


Figure 1: Educational design in six steps.

Step 1: Choosing a meta-narrative

The point of departure of the Six Steps is recognition that there is no one correct or good education but three "correct" or "good" educations, or three educational paradigms—each one of

which imparts its distinct meaning on the design steps. Quite a few thinkers and researchers have espoused this view and expressed it in various formulations (cf. Dewey, 1938; Kohlberg & Mayer, 1972; Adler, 1982; Fenstermacher & Soltis, 1986; Schubert, 1986; Scheffler, 1989; Egan, 1997; Rorty, 1999). Our designing method adopts Zvi Lamm's version (1976; 2000). In his view "education serves three masters": the society, the culture and the individual. For the first master, society, the aim of education is to impart tools (practical knowledge, skills, codes of behavior) that graduates need in order to integrate into the society and to work. For the second master, culture, the aim of education is to mold students' personalities in the light of the values and truths of the preferred culture. For the third master, the individual, the aim of education is to enable each student to fulfill him or herself, to realize his or her unique personality.

These three educational aims are supported by three meta-narratives that justify them and motivate educators. We may speak in terms of three "educations": education as socialization, education as acculturation, and education as individuation.

In Step 1 designers need to choose one educational meta-aim and meta-narrative that will serve as the framework for their overall design. It's a "tragic choice" since it entails a sacrifice of the advantages offered by the other two, unchosen educations.

Why must designers choose?! Why not impart tools, influence values and enable self-fulfillment together in the same educational environment!? Because each education is directed by a particular set of convictions and beliefs, and the corresponding educational means of each (see Step 4) convey different and contradictory messages. The messages implicit in the educational means of the three educations contradict and negate one another; each education abrogates the pedagogical impact of the other educations. An affective educational environment is guided by one consistent education.

How does one go about choosing an educational meta-narrative? There is no empirical way to choose an education—for instance, to diagnose the students and then provide them a suitable education. That's a medical, not an educational, model. Rather, the choice is made by reference to a "pedagogical sentiment"; one meta-narrative appeals to the designer, resonates with his or her beliefs and yearnings. The educational choice starts with the educators' "sentimental" preference, their pedagogical identity. To be sure, the characteristics of the students imposes some constraints, sometimes severe, but they do not compel the choice of one education over the others. In principle, each education suits (almost) all students. Education is condemned to freedom. Recognition of the pedagogical sentiment does not necessarily occur at the beginning of the design process, in Step 1; it may reveal itself or be generated gradually through the design process.

The choice made in Step 1 marks the boundaries of the design arena. Every subsequent step will take place within these boundaries and will be generated by them.

Step 2: Creating Our Own Narrative

In Step 2 designers create their own interpretation of the educational meta-narrative they chose in Step 1—their unique version of it, their own narrative. In Step 1 they chose the scheme; in Step 2 they vest it with substance.

In *The End of Education* Neil Postman posited that education came to its end because it lost its end—a meaningful narrative. Without such narratives "schools are houses of detention, not attention" (1995, p. 7). In Step 2 the designers create a meaningful educational narrative and ascertain that the designed environment will be educational and not detentional.

Step 3: Describing the desired graduate

Step 3 extracts from the previous steps an image of the educated person or the desired graduate—the product of the designed educational environment.

Educational activities are essentially "closing the gap activities"—activities intended to reduce the gap between the actual student and the ideal graduate. In fact, the image of the ideal graduate generates the image of the actual student. For example, a teacher does not see a real student who is "weak in mathematics"; she sees him as such because she has an image of ideal graduate who is "strong in mathematics." The diagnosis of the "real" student is derived from the ideal image and not vice versa.

We may delineate the profile of the desired graduate in terms of four categories: knowledge, skills, character traits and attitudes. The first two are generally associated with instruction, and the second two with education. Teaching imparts knowledge and skills; education shapes character traits and attitudes that coalesce into a world view.

Step 4: Implementing the narrative in the means of education

There is an intrinsic link between aims and means in the realm of education; particular aims require particular means. When the educational means do not "broadcast" the educational aim, the educational aims are a hollow declaration. Students do not encounter the aims of education as such; they encounter them as they are embodied in the means by which they are educated—how they are taught, assessed, organized and so forth. Students are educated through the means, not the aims. In this respect, in education, as in communication, "the medium is the message": the means of education (the medium) form the (real) educational aims (the message).

There are six fundamental means of education—six levers by which educational environments try to leverage students to realize the ideal image of the desired graduate: curriculum; pattern of teaching; method of assessment; organizational structure; educational climate; and physical conditions. Each educational aim imparts different practical meanings to these means. The designers should be mindful that their educational means are dictated by the declared educational aim and do not bespeak other, inconsistent aims, in other words, that the overt curriculum matches the covert curriculum.

Curriculum

Essentially, curriculum is chosen content organized according to some guiding principle. When education is socialization, the curriculum is mainly comprised of tools—practical knowledge and skills. They might be organized in hierarchical order, according to their level of complexity. When education is acculturation, the curriculum is mainly comprised of canonical content—content that reflects the values and truths of the preferred culture. The content might be organized in spiral order in which the same content is taught and learned at different levels of depth. When education is individuation, the curriculum is "written" largely by the student and organized flexibly according to the student's developing interests.

Pattern of teaching

The pattern of teaching is the way in which the teacher mediates content to the students. When education is socialization, the pattern of teaching is based on exemplifying and practicing. When education is acculturation, the pattern of teaching is based on modeling and initiating. When education is individuation, the pattern of teaching is based on facilitating and supporting.

Method of assessment

The method of assessment is formal evaluation through tests, grades etc., or informal evaluation through feedback. The key question in this context is what is assessed. When education is socialization, the assessed element is mastery of the tools imparted. When education is acculturation, the assessed element is internalization of values endowed. When education is individuation, the assessed element is personal development.

Organizational structure

We may speak of organizational structure in terms of organizational regularities. The aim of the organizational regularities is to enable behavioral regularities—mental and physical forms of behavior. When education is socialization, the organizational regularities seek to enable behavioral regularities that relate to the mastery of tools. When education is acculturation, the organizational regularities seek to enable behavioral regularities that relate to the internalization of values and truths. When education is individuation, the organizational regularities seek to enable behavioral regularities that relate to self-fulfillment.

Educational climate

The educational climate relates to the organizational culture, to its explicit and implicit messages. When the aim of education is socializing the students, the educational climate is characterized by practicality and efficiency. When the aim of education is acculturating the students, the educational climate is characterized by excellence and inspiration. When the aim of education is individuating the students, the educational climate is characterized by laissez fair and creativity.

Physical conditions

The physical conditions relate mainly to the architectural contours of the educational environment. When the aim of education is socializing the students to the technological society and work environment, the architectural contours resemble a hi-tech building. When the aim of education is acculturating the students, the architectural contours resemble a cultural center. When the aim of education is individuating the students, the architectural contours resemble a park. In all instances, the architectural design should emerge at the end of the designing process and serve it, not as is most often the case in which architects design, builders build, and education is "imprisoned" in a concrete block to which it must adjust itself.

Step 5: Monitoring the design

Step 5, like the following one, encourages designers to be reflective practitioners, designers who reflect on their work and try to improve it. The designers should consider their product from three perspectives. Is it coherent: Do the means (Step 4) derive from the aim (Steps 1, 2, 3)? Is it sufficient?: Does it suggest an initial plan that allows implementation of the design? And is it adjusted? Does it suit the community to which it is targeted?

Step 6: Monitoring the implementation

The previous step evaluated the design prior to its implementation. This step evaluates it during and following implementation. The purpose of the design is to guide performance, but performance also guides design; the design should be reconsidered in the light of its implementation.

In Conclusion

The premises of pedagogical design thinking suggested here are: (1) There is no one good education, or as it commonly referred to today "education of the 21st century." There are three ideal types of education that, in reality, are manifested in myriad and mixed versions. (2) Educational means derive their practical meaning from educational aims and narratives. Accordingly, there is no good curriculum/teaching/assessment, and so forth; the educational means are formed, or should be formed, by the educational aim and narrative. (3) Designing educational environments should be systematic and holistic and should reflect the epistemological structure of education.

The strategic and practical scaffold presented above enables those who seek better educational environments to design it rationally and effectively. The second part of this article exemplifies the process.

Part 2.
Designing a Teaching for Understanding and the Motivation for Understanding Environment

The design presented here seeks to illustrate the effectiveness of the Six Steps strategy and, no less, to express the author-designer's belief that schools nowadays should "go back and onward to basics"—education for understanding and the motivation for understanding.

Step 1: Choosing a Meta-aim and Meta-narrative

The "tragic choice" of the designer of teaching for understanding and the motivation for understanding (U&M) is education as acculturation. The designer strives for students and graduates who will understand, and will desire to better understand, the world and themselves. The designer believes that in the era of "late capitalism" (Jameson, 1994), which embeds its utilitarian values in all realms of life, including education, and cultivates egocentric individualism, the status of education as acculturation has receded in comparison to the other two educations — education as socialization and education as individuation. Education, therefore, should be buttressed by "useless" values-oriented educational environments, values that constitute our humanistic, liberal and democratic culture and view humankind as autonomous beings that are an end in themselves. In the context of the following designed environment, U&M are perceived as a key element of acculturating education, particularly its intellectual dimension. In the spirit of Socrates, the designer believes that an unexamined life—life without understanding and the motivation for understanding—is not worth living.

Choice of an acculturating education, that is, education guided by the truths and values that constitute the preferred culture, provides the conceptual framework and contours of the remaining design steps.

Step 2: Creating our Aim and Narrative

The point of departure for creating our aim and narrative is the following question: What is the fundamental thing that teachers—acculturating teachers committed to the intellectual and moral development of the students—want to achieve in each lesson? The answer is: understanding and the motivation for understanding. Teachers wish students to understand the lesson's topic and to have a better understanding of it and its discipline beyond the classroom in their future lives. Hence, in our educational context, the fundamental aim of teaching is understanding and the desire to understand more deeply: cognition and motivation. And not simply U&M, but U&M of meaningful contents, of "big ideas" (see below).

Nowadays schools evade the basic aim of teaching. To brand themselves as "innovative" or "21st century" schools, they yield to flashy trends like gamification, escape rooms, makerspace, mindfulness and others—most of which belong to the category of "edutainment." The designed educational environment calls for "back to basics!"—U&M. And not just "back to basics!" but also "onward to basics!" since the structure of the traditional school (Lamm, 1976), its "grammar" (Tyack & Cuban, 1995), or its regularities (Sarason, 1996) do not enable U&M. Schools promote superficial and flawed knowledge for the purpose of recycling information on exams. David Perkins (1992) denominated this sort of "schooled" knowledge as "fragile knowledge": inert (not transferable to different contexts); naïve (nondisciplinary, based on personal experience); and ritualistic (stored exclusively for school-based demonstrations). Lee Shulman applied the term "pathological knowledge"—knowledge that suffers from three pathologies: inertia (not transferable to different contexts); amnesia (quickly forgotten); and fantasy (the illusion that it is understood). Therefore, the designed environment, which goes back and onward to basics, must offer an environment organized differently, in ways that support U&M and yield non-fragile and non-pathological knowledge—knowledge that is understood, that is meaningful both subjectively (experienced as such by the learners) and objectively (imparting meaning to concepts and phenomena).

What is understanding? What is motivation for understanding?

Understanding: Relating and performing

Following philosophers and researchers, let's conceptualize understanding as an intellectual process of *relating* and *performing*. According to the relational concept, understanding is a process in which the intellect creates sound relationships among concepts and generates understanding webs (Harpaz, 2018). According to the performative concept, understanding is a process in which the intellect thinks with knowledge and generates "understanding performances": explains knowledge, interprets knowledge, criticizes knowledge, creates knowledge, and the like (Wiske, 1998). We will enlist these two concepts for the benefit of teaching, which goes both back to and onward to its fundamental mission, and to designing an educational environment that provides conditions for learning that is rich in U&M.

Understanding as relating

John Dewey wrote:

> To grasp the meaning of a thing, an event, or a situation, is to see it in its *relations* to other things: to note how it operates or functions, what consequences flow from it, what causes it, what uses it can be put to. In contrast, what we have called the brute thing, the thing without meaning to us, is something whose relations are not grasped. (1933, p. 137–38)

To understand something is to grasp its meaning; the meaning of something is generated through its relationship to other things. We cannot understand a "brute thing," something detached from its relationships, out of context. The process of understanding, therefore, is a process of releasing something from its isolation and connecting it to other things—capturing it in a web of relations. And not only in a single web but in many: webs of operations, functions, causes, consequences, uses and more.

Relationships are the essence of understanding; to understand is to relate. But not any relating; *the relating must be proper*. In contrast to subjective experience of understanding ("I see"; "I heard a click"; "Aha …"), teaching seeks to achieve universal understanding: understanding of concepts and phenomena by means of the natural sciences, the humanities, or the arts—understanding subjected to intersubjective rules of justification and verification, or to scientific methods (natural sciences) and interpretive methods (the humanities and arts). The process of understanding manifests itself in the mind of individual student, each in his or her unique way. Yet, it must be performed properly; the student should reconstruct the understandings implicit in the taught content.

Traditional school encourages *reconstructive understanding*. It expects the students to reconstruct in their minds, in an elementary or initial or "amateur" way (Perkins maintains that the desired graduate to which we can realistically aspire is an "amateur-expert." 2014), the understandings of experts mediated by teachers, books and websites. The research institute, on the other hand, encourages *innovative understanding*. It expects researchers to develop new understandings or discoveries within the dominant paradigm (to do "normal science" in Thomas Kuhn's terminology). But even in reconstructive understanding there is a degree of innovation or creativity (routine creativity, with a small *c*): the student must generate the relationships and connect the concepts that construct understanding for him or herself, in his or her mind. Only rarely does a student create truly new connections and generate a "breakthrough" understanding (creativity with a capital *C*); most of the time students reconstruct pre-existing connections (Newton, 2012, p. 2).

Understandings based on personal experience or intuition are comparatively easy, but when content transcends or contradicts these subjective resources, as is often the case in the academic disciplines, understandings are difficult and challenging. For instance, it's difficult and challenging to understand that objects tend to persist in motion (in our personal experience after some motion we

need a rest), or that human beings forgo freedom (in our personal experience we desire freedom). The mission of school is to teach knowledge that was generated in the scientific and interpretative disciplines, namely knowledge that often contradicts commonplace intuitions and undermines them. Therefore, the understandings expected by schools are often difficult and challenging, and when conditions for their emergence are not provided, they do not tend to emerge or to be reconstructed, connected or webbed.

And when a student does create or connect proper networks of understanding in spite of the obstacles school poses, it becomes easier to understand new content, to assimilate it, in Jean Piaget's term, into an existing understanding web. But webs of understandings are not static or stable; they transform or, in Piaget's term, accommodate themselves in order to resolve internal contradictions or to grasp phenomena or concepts that are important for someone to understand.

According to the model of the mind accepted by cognitive science (cf. Entwistle, 2009, chap. 2; Newton, 2012, chap. 4; Willingham, 2009) we can describe the process of generating understandings as follows:

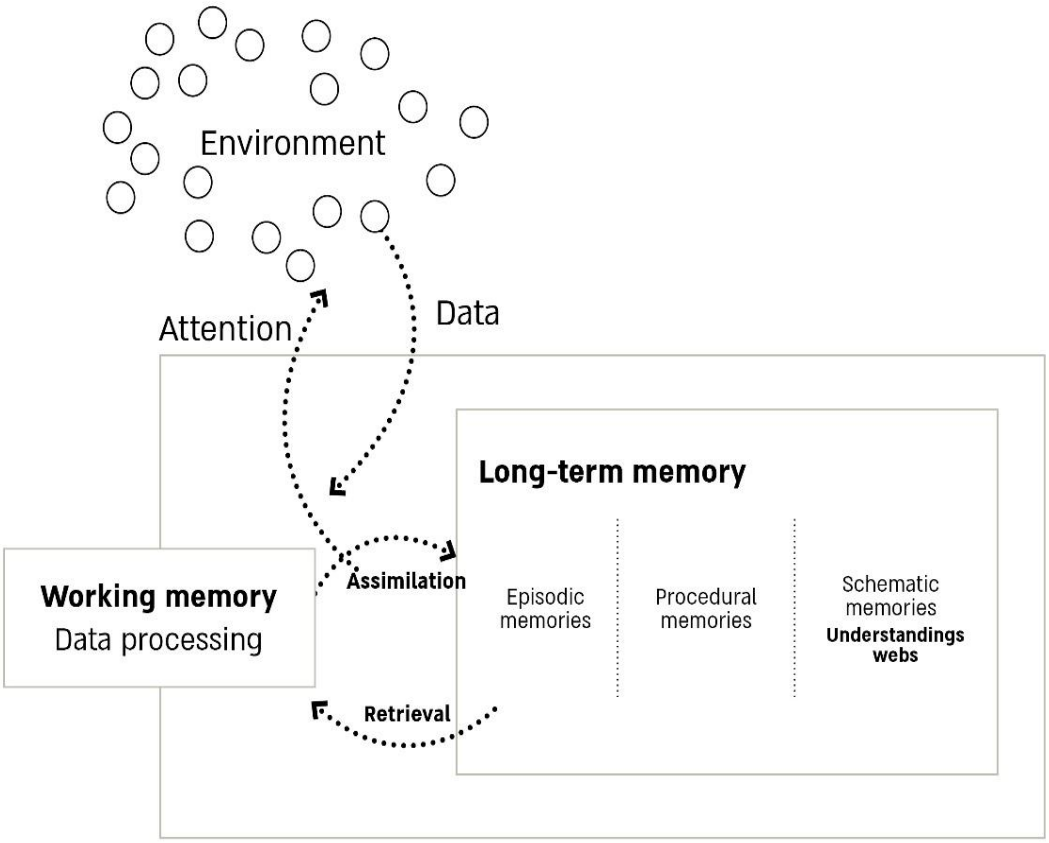


Figure 2: The process of generating understanding..

The mind's attention mechanism is directed to the external or internal environment and extracts data it seeks. That data is processed in the working memory. The working memory processes data by means of relevant content stored in long-term memory. Long-term memory stores its content in three different repositories (separated by penetrable walls; their contents are connected and support one other): episodic content—memories of myriad occurrences; procedural content—memories of "how to" (to ride bicycles, to use a computer, etc.); and schematic (or semantic) content—memories

of concepts and ideas. The third repository is most relevant to our analysis since it stores schemata—concepts, ideas, understanding webs—whose generality and flexibility enable transference of knowledge from the context in which it was learned to new contexts. Transference is the quintessential characteristic of understanding of a concept, idea, rule, etc. Moreover, it facilitates understanding of the content to which they were applied and render them meaning. When students are equipped with relevant understanding webs, they achieve understanding of content taught in the classroom more quickly and more deeply.

But sometimes the student's schematic repository is equipped with mis-understandings or naïve theories—intuitive false and intransigent theories that youth develop to explain phenomena in their lives—that hinder them from generating correct understanding webs. And on occasion a student retrieves from his or her schematic repository irrelevant content that diverts understanding of the topic taught. Sometimes a new piece of knowledge is not assimilated in a proper schema. The process of understanding is replete with obstacles and difficulties that stem from the quality of the understanding webs stored in long-term memory, the accuracy of their retrieval and assimilation, and more.

But it merits emphasizing that understanding is not a mechanical process of paying attention, processing, assimilating, accommodating, retrieving and the like, that leaves the person unaltered. Understanding—particularly of big ideas—exerts holistic impact on a person, on his or her modes of thought, imagination and emotion. In such cases, we may talk about *insight*, holistic understanding, sometimes sudden and fleeting, that generates a conceptual change and switches the perspective on the particular issue he or she is trying to understand. (It worth warning here that the feeling of understanding is misleading. Someone can experience a strong feeling of understanding but not understand, while someone else understands without a strong feeling.)

Moreover, understanding is not always a linear and smooth process—a continuous improvement of a series of understandings. At times it entails transforming understanding webs or replacing them with others. We might call this kind of understanding *disruptive understanding*, an understanding that disrupts or undermines an understanding web and suggests a new one. When a new web resolves contradiction in the existing one or helps capture something it could not grasp, it is accepted willingly. But when it disrupts dearly held understandings, understandings that implicate personal identity, then it is accepted, if at all, with resistance, sometimes with pain.

From the perspective of the relational concept of understanding, the aim of teaching is to improve the understanding webs and the process of webbing. Improved webbing is achieved through established or verified processes and concepts, and improved webs are cogent, rich, coherent and abstract, namely, webs that explain effectively. The process of webbing empowers the webs, and the webs empower the process of webbing. Empowered webbing and webs enable the students to understand conceptual content, and through them the world and themselves, more wisely.

Understanding as performing

According to this concept *understanding is a capacity to perform thinking operations with what one knows—understanding performances.* This concept reduces or translates understanding to thinking—the ability to think with the knowledge that is taught and learned. According to David Perkins, "understanding is the ability to think and act flexibly with what one knows. To put it another way, an understanding of a topic is a 'flexible performance capability' with emphasis on the flexibility" (1998, p. 40). And according to Tina Blythe, "performances of understanding require students to go beyond the information given to create something new by reshaping, expanding, extrapolating from, applying, and building on what they already know. The best performances of understanding help students both develop *and* demonstrate their understanding" (1998, p. 56).

There are a good many understanding performances. The following table presents eighteen key understanding performances divided into three categories (Harpaz, 2018):

Table 1: Key understanding performances.

To present knowledge	To manipulate knowledge	To criticize and create knowledge
To express knowledge in your own words	To analyze and synthesize knowledge	To give reasons and justify knowledge
To summarize knowledge	To suggest example, metaphor, analogy, comparison	To reveal contradictions or tensions in knowledge
To explain knowledge	To generalize from detailed knowledge	To question knowledge
To suggest interpretations of knowledge	To predict from knowledge	To reveal basic assumptions of knowledge
To represent knowledge in various ways	To contextualize knowledge	To suggest counter-knowledge
To generate perspectives on knowledge	To apply knowledge	To generate knowledge on the basis of knowledge

Understanding performances should be qualitative. The explanations, examples, predictions, questions, etc. should advance the understanding of the topic under discussion and "go beyond the information given." Trivial or misleading explanations, examples, predictions, questions, etc. are not understanding performances; at times they are misunderstanding performances.

Understanding performances are not the aim of teaching and learning but a means; the aim is understanding significant content—big ideas. Like Perkins, who identifies four attributes of "big understandings" (2014), we might characterize a big idea as an idea that is: rich in insights—it explains a lot and makes us wiser; rich in values—it has an ethical dimension and makes us better; rich in motivation—it has motivational potential (it undermines, since it suggests a new perspective, and it resonates, since it echoes our implicit thoughts and questions; this double move, undermining and resonating, stimulates motivation); and rich in presence—it is relevant to the individual and society and promotes our involvement.

A big idea should be formulated as an affirmative statement. For example: "Gender identity is a social and cultural construct"; "In communication, the medium is the message"; "Beauty is in the eyes of the beholder"; "The mechanism of evolution is 'directed' by a 'blind watchmaker'"; "The power of the *Homo sapiens* stems from his ability to imagine nonexistent entities (God, state, money, etc.)"; "Understanding is relating and performing."

Wiggins and McTighe (2005) also reduce understanding to performances, extended performances, or six abilities: to explain; to interpret; to apply; to have perspective; to empathize; and to have self-knowledge.

From the perspective of the performance concept of understanding, the aim of teaching is to encourage and improve thinking operations with knowledge—understanding performances. Understanding performances are applied to worthwhile contents—big ideas. Big ideas enable students and graduates to understand the world and themselves.

The relational and performative concepts of understanding might complement each other and create positive synergy (though there is a certain theoretical tension between them). We advocate preserving the two separate concepts, as they help understand understanding and promote it from two different perspectives.

Motivation for understanding: Intrinsic motivation

Motivation for understanding is not merely a means to achieve understandings of ideas. *Motivation for understanding is an aim in itself*. The designed educational environment seeks to cultivate students and graduates who are curious, inquiring, and eager to gain understanding of phenomena and concepts. In our educational context the search for understanding is "the taste of life."

And note: *Understanding and the motivation for understanding are not entirely separate entities, one associated with conciseness and the other with emotions. Motivation is embedded in understanding; it's an essential component of it*—the effort to understand, to go beyond information given, to immerse oneself in the root of the matter, to understand what "under-stands" behind it.

And the more one understands, the more one wants to understand. Namely, understanding something is not the ultimate destination of understanding, as if having understood something our passion to understand is satisfied and abated. Understanding something is a refreshing or energizing way station; each new understanding opens new horizons and reinforces the motivation to understand further. Understanding though is contagious; or to use a less intimidating metaphor, it's a magnetic field that attracts new understandings.

Moreover, understanding generates understanding gaps, and they, in turn, produce motivation to understand—to fill the gaps. Hence, the more we understand, the more we understand how much less we understand, and the more and less we understand, the more we want to understand. We must speak, therefore, about *motivated-understanding*—understanding as a state of mind imbued with motivation; and also, about *understanding-motivation*—motivation imbued with cognition, since understanding not only generates motivation but is generated by it. If, for instance, you understood that the one who harmed you was well-intentioned, then your motivation "to settle the account" is replaced by motivation to reconcile. In the same manner, students understand that they can get by in school, that's to say get reasonable grades with superficial ("fragile" or "pathological") understanding, and thus their motivation to understand is diminishing, and they conduct cost-effective economy of motivation. In the spirit of Israel Scheffler's classic article "In praise of cognitive emotions" (1991, pp. 3-17), we may speak in praise of cognitive motivations and motivated cognitions.

At this point it merits adding that our designed educational environment does not purport to invent motivation for understanding out of thin air; motivation for understanding is a basic human desire. We might signify it differently, such as the will to power, the will to meaning, or some other will, but there is no reason for us to perform a "geology of wills." The motivation to understand looms as one of the elementary motivations of human beings; it drives each individual and every culture. Therefore, *the optimistic starting point of education for understanding is the assumption that all people possess a natural motivation to understand and that all educators need do is support it and enable its self-actualization.* (According to Kieran Egan's developmental theory of understanding [1997; 2008], young adults are in the philosophical stage in which they are eager to understand the world through conceptual schemes.)

But we are not simply naïvely optimistic (though dealing with education demands a measure of naïve optimism), but also soberly realistic. In addition to the natural motivation to understand, there is a motivation, perhaps no less natural, not to understand, to dim the lights, to shut the widows, to narrow the horizons. (Nietzsche wrote that man is measured by his ability to bear the burden of truths or understandings, and that rather than seeking truth and understanding, people are in search of "metaphysical comforts." And Roger Scruton wrote: "Aristotle told us that all human beings desire to know, but he failed to point out that that they do so only when first reassured that knowledge will be reassuring" [2014, p. 89]. "Understanding is useless, you have to have faith. I believe in the *Führer*" declared a German worker in one of those days [quoted in Snyder, 2017, p. 69]).

Certain environments reinforce and encourage the motivation to understand, and others weaken and suppress it. *That is why the educational environment suggested here is so vital: it is designed to support a distinctly human but vulnerable motivation to understand reality and respond intelligently to it.*

In order to support the "vulnerable" motivation to understand, our educational environment enlists the "self-determination theory" of motivation (Ryan & Deci, 2017). This theory suits the motivational-cognitive nature of understanding and our educational aim—cultivating intrinsic motivation (what Ryan &

Deci call autonomous motivation) for understanding.

It is possible, of course, by means of certain conditionings in which schools specialize to cultivate heteronomous motivation for understanding (for instance, an effort to understand in response to exam pressure), but we prefer autonomous motivation because: (1) it is more efficient; understanding flourishes when it experienced as an independently chosen goal (Daniel Pink wrote his book *Drive* [1995] from this perspective; intrinsic motivation is the fuel of the knowledge economy); and (2) it is more ethical; it respects the individual's autonomy, the person as an end in itself.

Intrinsic motivation, according to Avi Assor (2018), requires "two concepts of freedom": negative freedom, that is freedom from external and internal pressures (autonomy) and positive freedom, that is a will to achieve a meaningful goal that reflects the inner self (authenticity). *Similarly, intrinsic motivation for understanding requires these two kinds of freedom. Intrinsic motivation for understanding is autonomous and authentic*.

According the self-determination theory, *intrinsic motivation, including motivation for understanding, can emerge and thrive when three basic psychological human needs are satisfied*: a need for autonomy ("the need to self-regulate one's experiences and actions."); a need for competence ("competence refers to our basic need to feel effectance and mastery"); and a need for relatedness ("people feel relatedness most typically when they feel cared by others.") (Ryan & Deci, 2017, pp. 10-11). When people are not satisfied in these respects, they cannot exert mental energy in the effort to understand; their mental energy is invested in efforts to satisfy other, more primary needs. U&M, therefore, demands a supportive educational environment that responds to human basic needs.

According to the self-determination theory as applied to motivation for understanding, the aim of teaching is to cultivate and nurture intrinsic motivation for understanding—a motivation that stems from the experience of free choice and that reflects and generates the selfhood of the person who seeks to understand.

Summing up Step 2: In this step we generated our version of the educational meta-aim and meta-narrative we chose in Step 1. Our version includes an educational aim, U&M, and a narrative that includes two practical concepts of understanding and one theory of motivation applied to motivation for understanding. Step 2, perhaps the most important step, and certainly the most "our own," lays the foundation for the following steps.

Step 3. Describing the desired graduate

The image of the desired graduate or the educated person is implicit in Steps 1 and 2. It's important to make it explicit since the educational aim and narrative are represented in the teachers' minds as an image of the desired graduate. This image enables them to educate—to close the gap between the real student and his or her ideal image. The essence of the educational activities is closing the gaps between the ideal image of the student and his or her real image (which is derived from the ideal image of the student, and not vice versa).

Let's extract the image of the desired graduate from the previous steps by means of four categories: knowledge, skills, character traits and attitudes. The different educational aims and narratives charge these categories with different contents.

Knowledge: In our educational environment knowledge is organized in big ideas and also in "small" integrated ideas. The desired graduate knows—or, better, understands—ideas rich in meaning, value, motivation and presence. He or she conducts after school life with deep insights about the world and themselves.

Skills: Some are generic—understanding (relating and performing), learning, thinking, inquiring; some are disciplinary—skills needed "to know your way around" (to use Perkins' metaphor for understanding) in the various fields of knowledge and creativity. The skills are not taught separately but infused in the ideas taught.

Character traits: One is central: a passion for understanding, for disciplining chaotic reality and self to render them understandable. Additional desired character traits of our graduate are implicit

in the literature on thinking dispositions—cognitive traits with direct impact on the quality of thinking (cf. Costa & Kallick, 2014). We can reformulate them as understanding dispositions. For instance, dispositions to curiosity, clarity, flexibility, reflectivity, criticality and others support good thinking as they support deep understanding.

Attitudes: Among others, an admiration for the enterprise of human understanding, the ongoing endeavor to lend meaning to the enigmatic reality that eludes understanding. Choosing a meaningful life in search of insights and intelligence. Respect for human reason, scientific achievements, thoughtful ideas, and the freedoms that enable them. Moral, sometimes practical, support to education for U&M.

Step 4. Adjusting the means of education

Up to this point, the three designing steps dealt with the educational aim and the narrative that webs it and lend it meaning and vitality. If the webbed educational aim is not to remain a mere educational manifesto, it must be applied to the means of education. The design of an educational environment should be both practical and capable of implementation.

The means of education derive their conceptual and practical meaning from the educational aim and narrative and, in turn, provide the leverage for them to be realized. The following are short descriptions of the six means of education that leverage the kind of education we aim to promote.

Curriculum

A key term in our curriculum design is *realm of understanding*. Realms of understanding organize the knowledge for the sake of U&M. The meaning of knowledge is not implicit only in the knowledge itself, but also in the way it organized, and in educational contexts it organized by some educational aim and narrative. In education also, the medium—the curriculum, the pattern of teaching and the other means of education—is the message.

What is a realm of understanding? How does it differ from the school subject on the one hand and an academic discipline on the other? Amnon Karmon (2007) distinguished between the organization of knowledge in those two frameworks (see Table 2):

Table 2: Organization of knowledge.

The organization of knowledge → Basic characteristics ↓	**School Subject**	**Academic Discipline**
1. The ultimate goal	Transmitting existent knowledge	Generating new knowledge
2. The preferred cognitive performance	Final examinations	Research papers
3. The rule for choosing knowledge	Certain and consensual knowledge	Uncertain and controversial knowledge
4. The sources of knowledge	Secondary sources	Primary sources
5. The structure of questions	Closed	Open (within the paradigm, "scientific puzzles")
6. The deployment of knowledge	From fewer topics in fewer school subjects to more topics in more school subjects	From more topics in more disciplines to fewer topics in one discipline
7. The relation to knowledge	Passive and receptive	Active and productive
8. The picture of knowledge	Absolute truth; knowledge as a mirror of nature	Getting close to the truth, to a better mirroring of nature

The school subject and the academic discipline have different goals. (1) The goal of the school subject is to covey existing and privileged knowledge—knowledge selected by the society and the culture. The goal of the academic discipline is to generate new knowledge. *This fundamental distinction gives rise to a whole range of organizational differences*. (2) The subject assesses the ability of students to remember and recycle knowledge; the ultimate test of this ability is the final exam. The discipline assesses the ability of the researchers to generate new knowledge and interpretations; the ultimate test of this ability is a publication of research paper in a scientific journal. (3) The subject seeks to teach approved and conventional knowledge. The discipline seeks to inquire into doubtful and questionable knowledge. (4) The subject is based on secondary resources—teachers' talks, textbooks, websites, etc. The discipline is based on primary resources—observation, experiments, findings, documents, etc. (5) The subject asks closed questions—"Guess what I have in mind!" (Those who know the answers ask those who don't know.) The discipline asks open questions—as yet unanswered questions that lend themselves to resolution within the dominant paradigm ("scientific puzzles" in Kuhn's terminology). (6) The subject seeks to "cover the material," to transmit selected bodies of knowledge, and to favor breadth—the more subjects and topics the better (referred to as "the tastes method" – the students will taste as many subjects and topics and develop an appetite; Neil Postman and Charles Weingartner [1969] called it "the immune method"—students will be vaccinated against the subjects and topics they learn). The discipline tends to limit its deployment of topics to achieve expertise in a narrow field. (7) The subject fosters a passive and receptive relation to knowledge. The discipline fosters active and productive interaction with knowledge. (8) The subject promotes a correspondence picture of knowledge—knowledge as the reflection or the mirror of nature. The discipline promotes a progressive picture of knowledge—knowledge that approximates "the truth," a more accurate and sophisticated reflection or mirror of nature.

In contrast to the school subject and the academic discipline, *the realm of understanding is organizing knowledge for the sake of U&M*. As reflected in the above table: (1) The ultimate goal of the realm of understanding is generating understanding of big ideas and motivation to understand them more deeply. (2) The preferred cognitive performance is a scientific or artistic project that develops and demonstrates understanding—conceptual relations and understanding performances. (3) The principles that dictate the choice of knowledge for teaching are implicit in the characteristics of big ideas. (4) The sources of knowledge are primary and secondary. (5) The structure of the questions is that of "big questions"—questions derived from big ideas (questions derived from approximated answers and not vice versa). (6) The deployment of knowledge is limited to a number of realms of understanding to enable deep learning for understanding. It's impossible to understand a curriculum of too many school subjects with too much knowledge in each subject. Less is more. (7) The relation to knowledge is curiosity, questioning, a drive to understand. (8) The epistemic picture of knowledge is of meaningful truth, reasoned, verified, explanatory, enabling, inspirational. It is by no means the sole and absolute truth, but it is a powerful one. (It corresponds to the third phase in the epistemic developmental scale of William Perry [1970]. The first is "there is one absolute truth." The second is "there are many truths," "anything goes." The third, our phase, is "there is more than one truth, more than one way to understand reality," but there are verified truths and false ones. The fourth is a commitment to one truth or conceptual framework and activity within it with critical awareness to its relativity.)

As called for by his or her aim and narrative, the designer of the "Back and onward to basics!" educational environment highly prizes the academic disciplines; they are the best incubator of good ideas, the best lenses through which to view the world and come closer to understanding it. But the purpose of the academic disciplines is to propagate and train experts, whereas the realms of understanding are directed to propagating and educated people of insight who seek further insights. We may speak though about *discipline-oriented realm of understanding*.

And since our educational environment seeks to encourage U&M of the world and "myself" it should choose discipline-oriented realms of understanding that promote them. For instance, psychology, philosophy, brain research, cosmology.

But good ideas are also flourish across disciplines (interdisciplinary) and above them (metadisciplinary). Take history for example. Within the discipline: The causes for the revolution were ...; across disciplines: some of the causes were economic, some sociological, some psychological ...; above the discipline: different historical perspectives detect or emphasize different causes. History is always perspectival.

Moreover, our educational environment seeks to encourage U&M in realms of knowledge and creativity that are not typical academic disciplines, such as the arts and sports. People understand the world and themselves through aesthetic experiences and bodily experience ("somatic understanding" in Egan's terminology). We may speak about "multiple understandings"—various ways to understand the world and ourselves (which might relate to Howard Gardner's famous theory of multiple intelligences; each intelligence is a typical way to understand reality).

Pattern of teaching

The last two decades saw the development of various frameworks of "teaching for understanding." (Cf. Entwistle, 2009; Erickson & Lanning, 2014; Harpaz, 2014; Leithwood at al., 2006; Wiggins & McTighe, 2005; Wiske, 1998). Some go by this designation and some don't, but all are directed to promote understanding. The various teaching for understanding frameworks offer differing concepts and strategies, but generally they share a common view of understanding as a preferred "phase-state of knowledge"—the knowledge is generative, structured, reasoned, abstract, flexible, transferable, in a word, understood. (Apropos of the metaphor phase-state of knowledge, we may say that there are three ways to hold knowledge in mind: a solid phase-state in which knowledge is conjoined to the context in which it was taught and learned and not disposed to migrate to other contexts; a gas phase-state in which the concepts that constitute a set of knowledge are dispersed and lack logical connections; and liquid phase-state in which knowledge is consolidated but fluid and able to flow from one context to another—an understanding state of mind.) There is no evidence as to which framework of teaching for understanding is most effective, and the large number of variables in the educational field render it doubtful there ever will be. We are free to adopt one of them or generate a reasonable combination of all or part of them.

Based on what was said above, we recommend ten generic guiding principles—before, during and after class lessons. The principles are general and require more detailed development.

1. Formulate one or more grand ideas that correspond to your teaching goal in the realm of understanding you teach.
2. Derive big ideas from the grand idea(s) and organize each class around one of them.
3. Extract big questions from the big ideas, pose them to the students in relevant contexts and guide dialogue on them.
4. Introduce new concepts with "warm-up discussions," established by means of "warm-up discussions", a brief questionnaire and other means, to help determine whether students have prior understanding webs that will facilitate their understanding of the idea you intend to teach.
5. Relate phenomena and concepts, generate understanding webs, and encourage the students to do so.
6. Have students produce understanding performances related to the big ideas discussed in the classroom.
7. Stimulate the motivation to understand an idea—undermine and resonate the students; ask provocative questions; and supply, or better, guide them to supply, answers that restore the cognitive equilibrium.
8. Forge a climate of a search of understanding in the classroom by speaking directly about understanding and its worth, modelling a search for better understanding, and feedback directed to manifestations of understanding and efforts to achieve it.
9. Provide students with assignments that challenge their understanding.
10. After a class ask yourself, "Did I help students understand the ideas we dealt with? What should I do next time to more effectively help them to understand?"

The meta-principle of the above principles is *activating teaching*, namely a teaching that stimulates students to question, to inquire, to grapple with intellectual challenges. A good teacher does not ask him of herself, "What am I going to tell them?" but, rather, "How am I going to activate them?" namely, "to do understanding." (as the well-known Confucius' epigram goes: "When I hear, I forget; when I see, I remember; when I do, I understand").

Method of assessment

A method of assessment that seeks to advance U&M confronts two principal challenges: (1) U&M are elusive entities that do not lend themselves to simple quantification and measurement. Mindful of our severe limitations in this area, we have to "translate" them into defined entities that are subject to quantification and measurement. (2) U&M are vulnerable to the "assessment effect" since the reinforcement and the conditioning inherent in assessment potentially diverts students from the intrinsic value of U&M to externalities—marks, grades, certificates, and the like. The aim of our educational environment is to energize students to embrace U&M as an end in itself, as a meaningful objective. Assessment, however, jeopardizes the entire project of our educational environment; it requires sense and sensibility. While a measure of extrinsic motivation is indispensable to reinforce U&M, that reinforcement should be weak—verbal feedback, for instance—since, as we know, intrinsic motivation is hard to build and easy to destroy by strong extrinsic motivation.

Our designed educational environment addresses these two challenges: (1) The relational and the performative concepts of understanding define understanding as relationships and performances, and these entities lend themselves to measurement and assessment. The relationships, as noted above, should be proper, and the performances should be qualitative. For purposes of assessment, we must define proper relations and qualitative performances with the greatest possible specificity. (2) Having formulated specific criteria for assessing good relations and performances, we must be on guard that the assessment based on these criteria will not adversely impact students' U&M.

The conceptual framework of formative assessment called "assessment for learning" (AfL) can be beneficially employed in assessment for U&M. "Assessment *for* learning (AfL) is a conscious attempt to make assessment a productive part of the learning process. It does this by making classroom assessment an essential part of effective teaching and learning" (Stobart, 2008, p. 144). AfL is essentially "assessment *for* understanding," i.e., AfU, hence it is appropriate to adopt the rationale and techniques of AfL as this educational means of our educational environment design.

Organizational structure

It is worthwhile to design the organizational structure of any educational environment based on Seymour Sarason's concept of "regularities" (1996). Sarason defined two types of regularities: programmatic (which we shall call organizational) and behavioral. Behavioral regularities are modes of mental and physical behaviors that the environment seeks to promote; the former are the organizational structures that enable (but by no means guarantee) the latter.

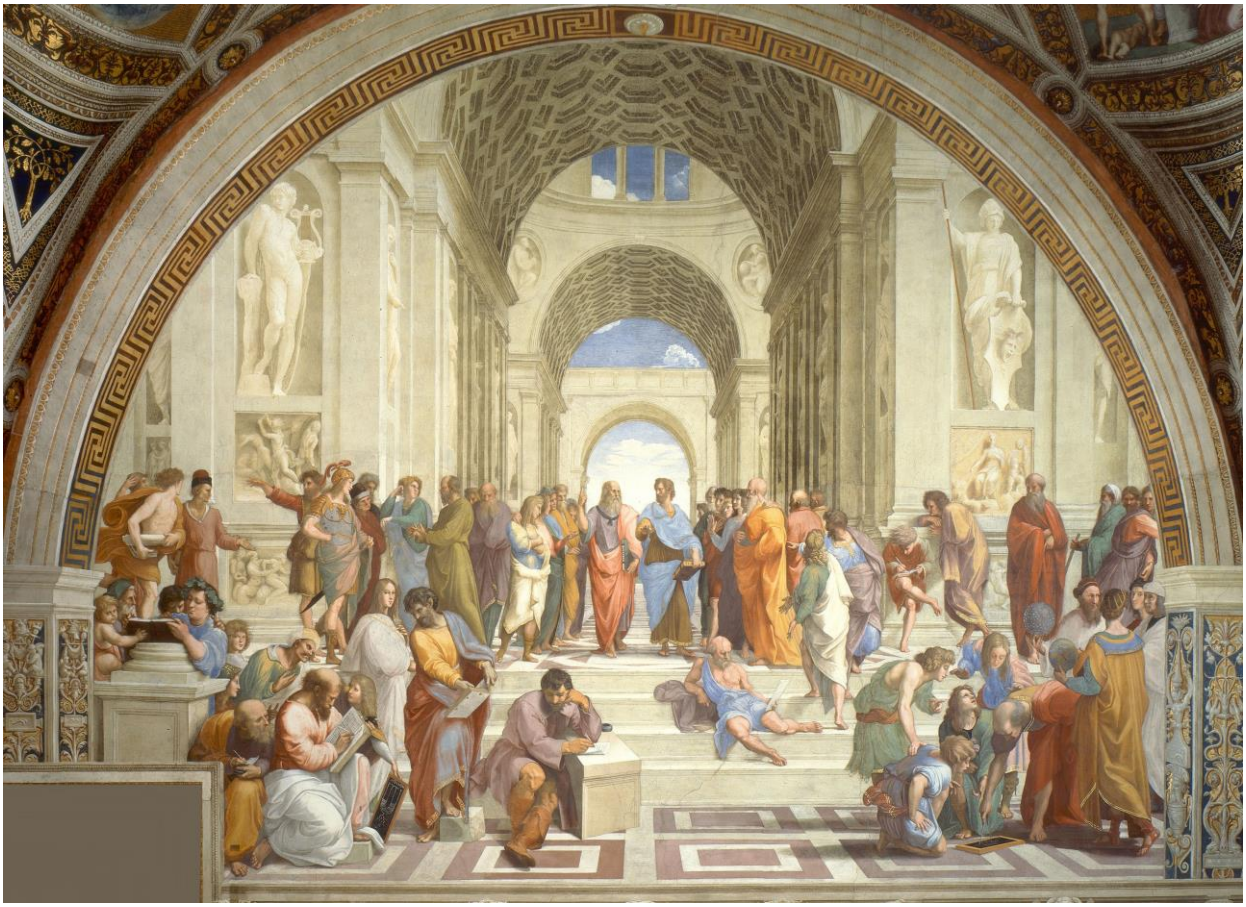
The essential behavioral regularities called for in our environment is U&M, namely deep and investigative learning motivated autonomously and authentically. Our educational environment then should generate organizational regularities that support and enable such mental behaviors.

We have already mentioned organizational regularities that support and enable U&M related to curriculum, teaching and assessment. Additional organizational regularities that support and enable U&M relate to the organization of realms of understanding—a limited number of realms selected from among others offered to the students; to the organization of classes—not necessarily based on age but rather on ability and motivation, with a reasonable number of students (about twenty), divided now and then into smaller groups involving peer teaching; to the organization of time—longer classes, perhaps devoting an entire day to one realm of understanding; to the organization of functions—principals, teachers and students cooperating to achieve the common pedagogical aim; and more.

There are primary and secondary organizational regularities. Changes in the former drive changes in the latter. We have cited primary organizational regularities, which transform the traditional organizational structure of school, its "grammar," in order to provide the optimal conditions for U&M.

Educational climate

While it is not easy to define school climate, it is easily discernible. A sensitive visitor can detect an organization's atmosphere or vibe relatively quickly. For inspiration in forming a suitable climate for our educational environment we might take another look at Raphael's famous fresco of *The School of Athens* (1510). In isolation, in pairs and in groups, through thinking, reading and conversing, Greek, Christian and Muslim philosophers (lovers of wisdom) seek to understand the heavens (in the center Plato points up to the ideas) and earth (Aristotle beside him points down to the facts). The vibe that emanates from this masterpiece is of admiration to wonder, thought, inquiry, search for understanding. We can distill the climate of this "educational environment" as *excellence and inspiration*. Excellence reflects an effort to actualize the potential of human reason, and inspiration reflects a sense of spiritual uplifting derived from understanding or coming to understand the world and human nature through new ideas.



Raffaello Sanzio or Raffaello Santi (Raphael): *Scuola di Atene* or *The School of Athens* (1509-1511). Apostolic Palace, Vatican City: https://upload.wikimedia.org/wikipedia/commons/c/c3/Raphael_School_of_Athens.jpg.

True, we are not the school of Athens, we are only a school; we are not philosophers, we are teachers and students obliged to teach and learn a given curriculum. But still, our educational environment should convey overt and covert messages of excellence and inspiration, by teachers and

students who try to excel in U&M and occasionally experience a sense of inspiration in encountering and generating meaningful ideas and deep insights.

In addition to the described academic climate, we should show concern for the social-emotional climate; it should be *supportive*. As the self-determination theory teaches us, students will be engaged by intellectual work only so long as their basic psychological needs are satisfied. A constructive educational climate entails a good balance between the *demand* for excellence and inspiration and *support* in satisfying the three basic psychological needs.

Physical Conditions

The physical conditions, mainly the architectural design of our educational environment, encourage and enable understanding-rich learning in large and small groups and individually. It is worth emphasizing that the physical conditions should be designed and built to accord with and serve the express educational aim and means, and not vice versa as is so common.

Step 5. Monitoring the design

We may assess the quality of an educational design from three perspectives: coherence, sufficiency and adjustment. From the first perspective we assess whether our design is coherent—if it reflects an overall narrative; if the aims defined in Steps 1, 2 and 3 are logically connected; if the means of Step 4 are deduced from the aim. It appears our design is coherent. From the second perspective we assess if the design is sufficient—if it provides a theoretical and practical framework for implementing an U&M educational environment. It appears that our design needs refinements that can be accomplished through the process of its implementation. From the third perspective, we assess whether our educational environment is well adjusted to the social and cultural circumstances of our student population, all the while taking into account that historically education as acculturation was designed for the elite. By making some necessary adjustments, our educational environment can and should accommodate diverse populations. After all, the will to understand is universal, and lives of U&M are interesting and meaningful. Why then shouldn't we seek to respond to the existential needs of all people?

Step 6. Monitoring of implementation

This step can only be taken during the process of implementation. At this initial stage it is only possible to plan for orderly implantation of the design.

In conclusion

If understanding (of big ideas) + the motivation for understanding (of big ideas) = wisdom, then wisdom is our regulative ideal. And since wisdom is the product of lifelong experience—a set of growing insights developing over time—our educational aim is to lay foundations for wisdom. Our desired graduate, therefore, is “on the path to wisdom,” equipped with an initial set of insights and with a drive to expand and deepen them. Laying foundations for wisdom is an ambitious educational aim. It requires a wise educational environment. The Six Steps we have traversed (see Figure 1) draw its contours.

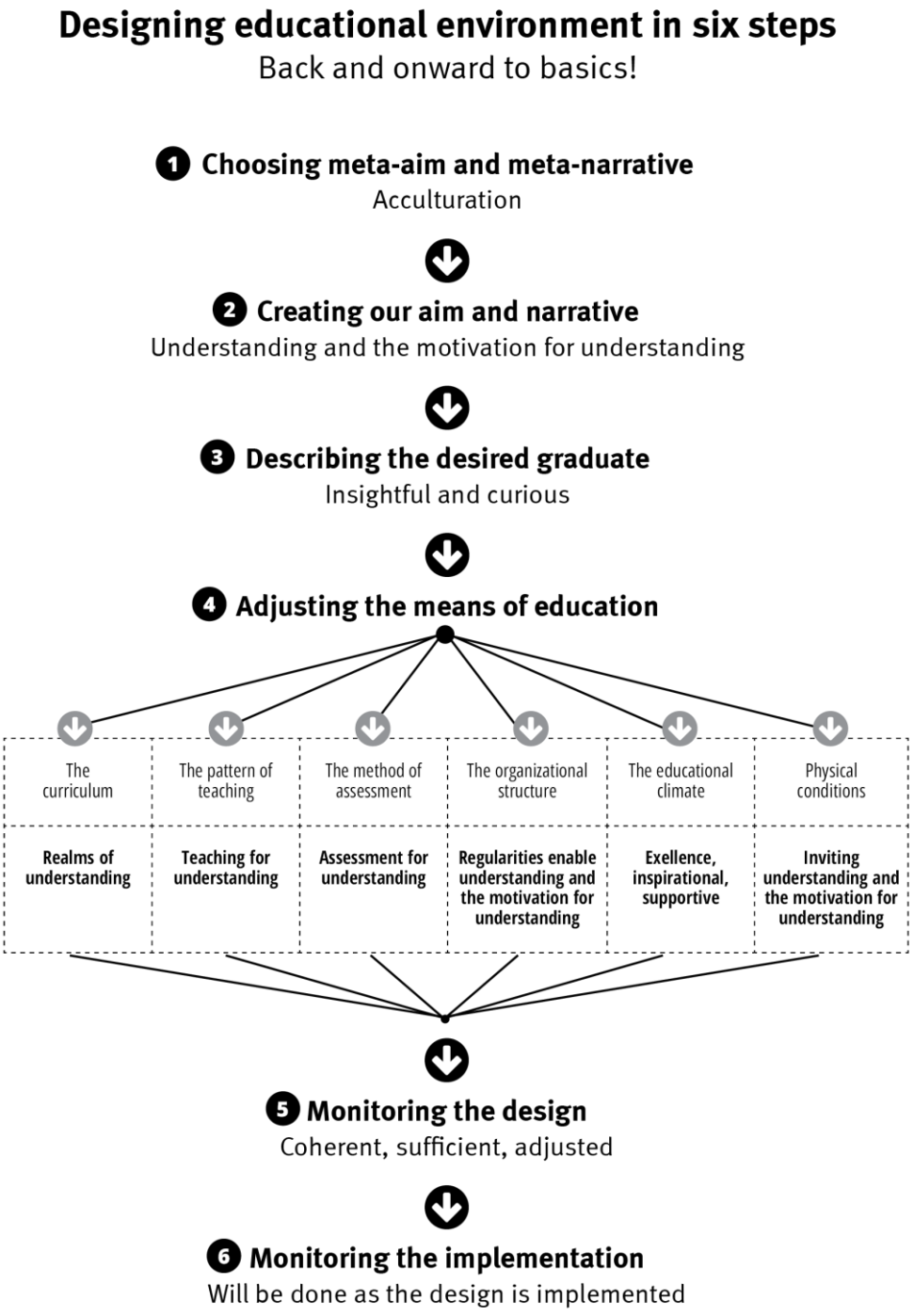


Figure 3: The six steps draw its contours.

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