Chapter

Understanding in Action: An Analysis of Its Levels and Qualities

Aldo Ocampo González

Abstract

The present chapter analyzes the features of the understanding of learning in action. Understanding is defined as the ability to think and act with flexibility using what one knows, implies being able to take knowledge and use it in different ways, constitutes a final cognitive process, producing a generative knowledge. Understanding involves an active knowledge, that is, being able to be used in different situations, it is transferable, it consolidates a vertebrate pedagogical model around thinking, allowing students to actively use learning. This paper analyzes the multidimensional role of understanding, describing it in cognitive terms, qualitatively describes its performance. It ends by offering a detailed analytical-methodological description of the levels and qualities of understanding. Finally, it contributes to knowledge by providing clues and solutions for the design of the school curriculum, teaching and evaluation through the principles of understanding.

Keywords: comprehension, comprehension performance, flexible use of thought, levels and culiadades

1. Introduction

Understanding has multiple strata. Its complexity demands attention to the multidimensional nature of each of its pieces in the didactic context in which it takes place. Conceive the whole through the metaphor of the mosaic-universe. In this work, the qualities and levels of comprehension are analyzed, and the comprehension of the conditions for the production of comprehension based on the main tensions derived from schooling. According to Stone Wiske [1], to sharpen understanding, we need to teach novel things and things that oppose school grammar legitimized within the framework of neoliberal policies on educational quality. It also analyzes the concept of key flexible performance in framing systems of comprehension activities, that is, thought-stimulation strategies. In this regard, Perkins [2] argues that it is necessary to foster learning climates that promote the ability to do a variety of things with thought, in front of that, the question arises: what things are useful to forge the memory? Preliminarily, as an answer it indicates the ability to *"look for patterns in ideas, find own examples and relate new concepts to previous knowledge, for example, they serve both to understand and to store information in memory"* ([2], p. 81).

How to know if a student has reached a valuable level of understanding? Undoubtedly, it is one of the main objects of analysis of this work. Understanding goes beyond the possession of a unique style of knowledge, expressed through the

ability to go beyond what has been learned, that is, to be able to think flexibly, to apply that information to an infinity of contexts and areas of performance. Understanding is synonymous with acting flexibly, manipulating information, that is, doing things with it. Understanding is going beyond the possession.

Understanding is always a state of autonomy. Understanding in action refers to comprehension activities. As such, it designates a flexible cognitive activity, creative, in turn, is typical of crystallizing environments [3], in them, the student has the ability to do things with thought; it goes beyond its limits. Understanding is always action, movement and permanent challenge. It is synonymous with deep learning [4]. Comprehension activities demand different types of thinking. Understanding is open and gradual, it means mastering the unknown. With regard to mental images, it should be noted that they are one of the most powerful resources of the mind. They help explain comprehension processes and the consolidation of cognitive processes throughout life.

Mental images are the result of the quality and condition of three-dimensionality; this is what allows things to relate to each other. The morphology of comprehension is structured on the basis of mental images, which are closely linked to the devices through which the understanding in act emerges and consolidates. Each dimension and level of understanding reveals a complex mental singularity. It is through mental images that we can perform refined and finished comprehension processes.

The comprehension activities take on a visible character and are what people do when they understand something. A mental image is a holistic and coherent form of knowledge; it helps us to reason when performing a certain operation. Mental images install mental designs, which house ways of doing things, establish systems of reasoning to perform certain comprehension activities. The quality of mental images depends on the quality of comprehension performance; a good mental image fosters comprehension performance. The relationship between mental images and comprehension activities takes on a bilateral character [2].

Why do we need a pedagogy of understanding? For Perrone [5], understanding aims to train critical thinkers, capable of acting in complex environments, is interested in strengthening a deeper understanding of what is taught in schools. It proposes the challenge of establishing new connections based on what has been learned, urges students to build connections that go beyond their traditional ways of conceiving them. Understanding, as we will argue in later pages, establishes a close relationship with learning the meaning of something, doing things with thought, going beyond what has been learned. Understanding is a deep commitment of the intellectual. Epistemologically, it is based on the idea of active, constructive and transformative learning. It explains a powerful educational proposal that is flexible and suitable for all students, conceived as a multiplicity of differences. It fosters a key cognitive evidence about the learning of its students, it incorporates a representational vision of the comprehension and the learning in act, key in the construction of evaluation systems of the learning. The teaching of comprehension poses challenges to the forms of education offered in school, in this conception, the perspective of performance is key, favors the articulation of a *"full range of intellectual possibilities so that students can apply all their talents in the school work"* ([5], p. 65). Teaching for understanding becomes a device of justice and cognitive equity, operationalizing conditions that affect curricular design, the crystallization of educational practice and the reconfiguration of the evaluative system, focusing on the perspective of performance. Indeed, the "performance" perspective says that understanding is the ability to do a variety of things that stimulate thinking with a theme ([1], p. 103). In short, *"understanding is to be able to carry out a diversity of actions or" performances "that demonstrate that one understands the subject and at the same time broadens it, and be able to assimilate knowledge and use it in an innovative way"* ([1], p. 105).

Teaching Comprehension (EpC) assumes the challenge of

> *[...] provide all students with comparable high-quality educational opportunities, while responding to local priorities and individual needs. The curriculum should engage students in a work that is generally considered important and an intellectual challenge that promotes the fundamental values of a democracy and that allows students to move freely between different schools without facing intellectual expectations. totally distant ([5] p. 65).*

In tune with Perrone [5], Perkins [6] in "The full learning. Principles of education to transform education," argues that one of the central objectives of education is *"to help us learn what we do not naturally acquire during our daily lives. Education must always ask itself what can be done to make knowledge and stimulating practices accessible"* (p. 24). The perspective of the performance promotes a situated understanding about how certain knowledge will be used in their daily life, emphasizes the ability to do things with what they have learned. Traditional school grammar-even in higher education-legitimizes curricular construction and teaching practices centered on what Perkins [6] calls 'elementitis,' that is, acquiring various bodies of information without knowing what to do with them, beyond what is commonly required. Elementitis is synonymous with strategic and superficial learning. Bain [4] explains that the first learning style is carried out with a competitive desire, that is, it demonstrates a behavior based on use, on being better, on obtaining the best grades. While, the second, unveils an operation primarily aimed at avoiding problems and school failure. The behavior of the student values the qualifications that can be obtained as compensation system and reward of their own social worth [7] before their peers and relatives. Surface learning makes explicit a nature centered on evasion and lack of motivation. By constituting the elementitis a curricular and teaching praxis of reductionist, simplifying and mutilating character of the cognitive experience of the student body, it gives way to the syndromes of fragile and poor thinking [2], both of which explain the significant deficiencies that education faces transversal in almost the entire world.

The fragile thinking syndrome, according to Perkins [2] is characterized by the inability of students and didactic mediations to actively use what they have learned. The 'fragile' section designates weaknesses of knowledge in various aspects, expressed through a type of knowledge: (a) forgotten, characterized as a portion of knowledge that has been studied, but has been forgotten, or easily disappears. This type of knowledge denotes the absence of an active functioning linked to the thought process. (b) Inert, conceived as a knowledge that is remembered or not, in specific situations. The situation that best exemplifies them is the preparation of exams to pass the subjects, without necessarily pursuing a value of change from learning. It is intimately linked to strategic and superficial learning.[1] (c) Naive, typology of cognitive risk characterized by the mixture and hybridization of stereotyped theories or misconceptions about a particular topic of study. At this level students are able to understand the conceptual component, their difficulties are presented when explaining or interpreting something, erroneous conceptions are almost intact. This knowledge demonstrates a poor level of understanding [2]. (d) Ritual, dimension of learning that expresses a superficial and scarcely authentic understanding. Perkins [2] calls it 'ritual,' since students learn the necessary

[1] The student emphasizes the intention to meet the requirements of the task. Memorize the necessary information for tests, exams or controls (procedural and cumulative). Approach based on loose elements, unconnected and without integration.

procedures to solve certain problems. This knowledge demonstrates a poor level of understanding. For its part, the poor thinking syndrome, Perkins [2] is based on the premise that students are unable to use what they have learned in different situations and contexts, or to think through what they know. Students affected by poor thinking [2], resort to repetition to retain knowledge, instead of using more elaborate techniques that stimulate their higher levels of thinking. Faced with tensions, it is suggested that the mediation of teaching and evaluation consider the following dimensions: (a) clarify, supposed to determine what type of questions allow to better understand some points, strengths or weaknesses expressed in students' work. (b) Value, implies paying attention to the work that students are developing—emphasizing the dimensions of the representational vision of learning. (c) Express concerns, correspond to the set of elements that call the attention to the teacher once he monitors or monitors the work of the students. They are also often referred to as critical points of teaching and mediation. From the perspective of Feuerstein [8], it serves the set of deficit cognitive functions. (d) Make suggestions, a dimension that includes the need to publicly explain the concerns and interests of the teacher regarding the learning of their students.

Understanding [1, 2, 5, 6, 9] and deep learning [4] are intimately related. They coincide in the company destined to dominate the unknown, strengthen the structuring forces of learning, such as imagination, fantasy, play, creativity, play, etc. Strengthens a corpus of capacity that allows us to master the unknown, establish associations of diverse nature and scope, giving the student the ability to do various things with thought. Deep learning is synonymous with cognitive challenge and education with awareness. So, what do we mean by cognitive challenge? As a category of analysis, it designates a multiplicity of positions and meanings, many of them adopting a heterodox status, by becoming strategies of opposition and breaking to the historically legitimated conceptions of how we better learn human beings at school stage. A cognitive challenge is, in turn, an invitation to go beyond what has been learned, requires leaving the space of cognitive and emotional comfort, implies a creative attitude, open to the unknown, implies acting flexibly from what each person knows, looking for hidden possibilities in diverse contexts, fields and situations. A cognitive challenge is first and foremost a psychobiological process, strengthens neuronal connections, if after 48 hours does not re-exist challenging and enhancing cognitive activity, then the set of strengthened neuronal networks tend to disappear. For the assurance of a good learning climate, which in terms of Feuerstein [8] corresponds to an active-modifying climate, demands the need to keep energy high in the student body, keeping the emotional networks calm. A solid cognitive challenge consists of increasing the levels of curiosity and above all, 'novelty' brought by the neurotransmitter of noradrenaline. Its materialization is carried out through a repetitive teaching practice, that is, capable of giving the student the ability to constantly apply what they have learned, connecting it with their daily life. Through a practice of learning based fundamentally on the application and refinement of what has been learned, it strengthens working memory, that is, it invites teachers to design learning experiences articulated fundamentally in the manipulation of what has been learned, which is what Stone Wiske [1], Blythe [9] and Perkins [10] call 'acting flexibly'—henceforth a performance perspective.

The most relevant and recent research on human cognition reveals the great obstacle that these approaches face, with respect to the neoliberal engineering that supports the approaches on the quality of education. In fact, the 'neuro' revolution has shown the need to educate in function of the structuring principles of human nature constitutive of the human being, showing that the regulative notions and the signifiers associated with quality in education, express antagonisms every time more marked. A teaching practice focused on understanding [1, 2, 5, 6, 9] invites

teachers to think about teaching through questions such as: Why am I teaching this?, how will I decide which are the most important things my students have to learn?, what activities are I really reaching my students?, how can I plan the practice so that everyone can master it?, how will I find out what they have really learned? Teaching for comprehension proposes that educators avoid *"falling into blind and limited thinking and behavior patterns, making mistakes in situations where they could proceed with greater awareness"* ([6], p. 26). Teaching for comprehension prevents the knowledge and school skills legitimized by their respective curricular frameworks from becoming atomized and become instrumental. Both forms of learning production what Gardner [3] and Perkins [2] call the 'triviality' of teaching, characterized by the accumulation of facts without direct connection with everyday life and the set of cultural relations in which the student.

2. On the concept of understanding: concept and characteristics

The goal of education is to help us consciously do what we do not learn naturally during our daily life [1]. For this reason, education must always ask itself: what can it do to generate spaces accessible to knowledge through stimulating practices? [6]. Teaching for Comprehension (EpC) fosters a global vision of cognition, allowing educators to give a deeper and more complex meaning to the challenges presented to them by their students. It invites them to transform and develop the implicit unconscious knowledge into explicit conscious knowledge, through an active participation that guarantees the strengthening of a generative knowledge through the retention, understanding and active use of knowledge [2].

For Perkins [2] the Teaching for Understanding (EpC), reaffirms the conception that people construct their own meanings from learning experiences to which they are confronted. The multidimensional nature of understanding demands the strengthening of enriching generative connections. A study content acquires generative status when it occupies a 'central' place within the subject or disciplinary field under study, it is 'accessible' as long as it articulates activities of challenging and generative understandings between teachers and students. Finally, it is 'rich' when establishing connections between different subjects and subjects. The relational power is key in the construction of the curriculum and the forms of mediation of teaching. A pedagogy focused on understanding is conceived as a critical commentary and a performative invitation to observe, analyze and reorganize the curriculum around generating themes that give origin and support to various comprehension activities, offering students greater opportunities from which to build, learn and go beyond their possibilities and what is commonly required by schooling.

How to understand the complex and multidimensional act of understanding? The 'understanding' according to Perkins ([2], p. 78) is expressed when a person is able to think and act with flexibility using what one knows. It is being able to take knowledge and use it in different ways. "Understanding" according to Blythe [9]? is achieved when *"the student develops the ability to do with a theme or content a variety of things that stimulate thinking"* (p. 39), whose purpose is to apply it in divergent ways and each more elaborated, with the purpose of going beyond knowledge and repetition, that is, instrumentalization and atomization practices.

3. The multidimensional nature of understanding and levels of metacognition

Metacognition has traditionally been understood as the reflection on one's knowledge, or failing that, the conscious recognition of the learning achieved by

each person. However, the usefulness of the concept refers to the possibility of operating mentally in several interconnected tracks or levels in a continuous and permanent manner. The number of clues or metacognitive levels is directly related to the intellectual capacity and mental agility linked to the flexible performance of each student. It considers the subordination and over-ordering of each cognitive process in play, that is, the reference and coordination of some of its cognitive levels. Perkins et al. [11], identify four levels of metacognition, among which stand out: (a) level 1. Tacit: the student does not achieve awareness of their metacognitive knowledge, (b) level 2. Conscious: the student handles some categories of thought that he uses to generate ideas, find evidence but does not use his knowledge strategically, (c) level 3. Strategic: these students can organize their thinking to solve problems, make decisions, etc. and (d) level 4. Reflective: they are able to strategically use their knowledge and review their thinking through the identification of their learning strategies.

4. Learn what is worthwhile: the generator knowledge

The fundamental purpose pursued by the Teaching for Understanding (EpC), is the development of a vertebrate pedagogical model around thinking, where students learn to reflect on what they learn and understand. It requires them to go beyond their abilities and what they have learned. Permanently, challenges educators to transform their praxis with focus on the compensation of educational and cognitive inequalities. It is essential that teachers confront their students to learning experiences that allow them to 'retain,' 'understand' and 'actively use knowledge,' through situations in which students reflect on what they are learning, how they are learning and what they are learning with what they are learning. It is a knowledge based on a style of teaching centered on topics rich in possibilities and connections. This is knowledge that does not accumulate but acts. It helps students to understand the world and to develop in it.

Generative knowledge should be understood as a broad understanding [2]. Students learn to understand, through the development of actions, strategies and learning experiences, fundamentally active, flexible and reflective, that is, paying attention to the processes involved in the construction of knowledge-perspective of performance-. Learning strategies that wish to increase student understanding should devote more of their time to activities that demand intellectually stimulating tasks, such as explaining, generalizing, and ultimately applying that understanding to themselves. It must be done through a feedback (academic monitoring of students, fundamentally, structured to monitor their difficulties and strengths) constant throughout the learning process, in order to put in the foreground the reflective commitment with the performances of understanding. The demonstration of what has been learned plays a crucial role in this type of didactic and curricular mediation, henceforth representational vision.

Students learn more and better, when they are able to *"organize events, relate them to previous knowledge, use visual associations, examine themselves and elaborate and extrapolate what they are reading or listening to"* ([6], p. 40). The ability to learn to understand is strengthened through strategies that help them process the way in a more refined way, giving priority to reflective and flexible performance in complex tasks that admit more than one response. Good learning is the result of a reflective commitment of the student to the content of the teaching. Why do you take advantage of students' expectations? The Teaching for Understanding (EpC), by promoting the development of generative connections in teaching issues, takes as a frame of reference the intellectual passions of teachers and students. These are

also conceived as the students' expectations and relate to their motivations and interests. The motivations and expectations of the students are the result of a cognitive predisposition of content achievements and other dimensions of growth, which will project great expectations and forge the trust and commitment of the students with their training process.

Teach to transfer? According to the approaches of cognitive science, the transfer is defined as the ability to learn something in a given situation and then apply it to a very different one, exploring their points of encounter and multiple forms of application and relationship. Perkins [6] identifies three types of transference: (a) distant transfer: it appears when the application of learned knowledge moves to unpublished or completely different situations, provoking a cognitive challenge of great significance for each cognitive structure, (b) close transfer: involves making connections with situations very similar to the original learning and (c) negative transfer: occurs when something that a subject has learned in a particular context inhibits performance or learning in another. It is the most common of the three.

The importance of teaching transfer from the tensions of schooling is closely linked to the concept of full development learning by Perkins [6], which should promote rich and extensible didactic repertoires in diverse fields and contexts of learning that allows them to go beyond their abilities and cognitive potential. Talanquer [12] states that, the didactic development in teaching for understanding emphasizes on the need to reflect on those procedural aspects that contribute to move from a cognitive tendency centered on the intuitive vision of learning, for a constructive tendency that is the type of representation about the learning necessary to successfully face the demands of schooling, promoting a deep understanding of what is learned.

5. Levels and qualities of understanding

The levels of understanding identified by Stone Wiske [1] in: "Teaching for understanding. Link between research and practice," are: (a) content, (b) problem solving, (c) epistemic level and (d) research. Each of these levels is intimately articulated with the multidimensional qualities of understanding. The content dimension according to Perkins [2], refers to data and information of an instrumental nature, reaffirms the nature of transmission of information. The dimension referred to problem solving highlights the direct resolution of common problems of each subject. The epistemic, on the other hand, assumes understanding as the articulation of generalizations and explanations about what students do. Finally, at the level of research, students have strengthened their learning, possess the ability to build new knowledge. According to the tensions of schooling, it is necessary to strengthen the level of content in educational practices, in order to promote mental images. It faces the challenge of strengthening the higher levels of understanding in each section of the school curriculum and of its forms of didactic and evaluative mediation.[2]

Teaching for comprehension (EpC) faces the challenge of configuring powerful representations, what things cultivate comprehension in the school space? In what way do the disciplines support this process? What activities encourage the construction of powerful mental images?, through the disciplines and their multidimensional and multi-structural nature? The mental representations

[2] Los niveles de la comprensión corresponden a una de las dimensiones más significativas de un metacurriculum.

expresses relation with the creation of mental images, determine the application of singular conceptual models, according to the specificity of the cognitive structure of each learner. How do our students build their mental models? Perkins and Unger [13], affirm that powerful representations effectively articulate the understanding of learning through models such as: (a) analogical models-established analogies with the empirical phenomena that they deal with through teaching. Avoid based on ordinary models because they lead to errors-, (b) concrete models-present in a concrete way the phenomenon in question, mental images, comprehension activities, etc. (c) debugged models-reveal the strange elements that affect to the construction of knowledge- and (d) built models-linked to the construction of diagrams, direct reference to everyday experience. Comprehension activities build mental models. The development of mental models through curricular activities requires the incorporation of criteria such as (a) breadth, (b) coherence, (c) creativity, (d) accessibility, etc. Each of these dimensions encourages the development of a superior understanding. In this regard, Perkins [2] adds that, *"what we commonly understand by the content of a subject does not include higher order knowledge"* (p. 103). How to structure a learning experience that focuses on higher order knowledge? A possible answer suggests the configuration of a curriculum that helps us think correctly. It is a knowledge closely linked to the subjects.

Elements of a curriculum centered on the stimulation of a higher order that is nothing more than knowledge about the functioning of meta-cognition, integrates the questions about what and how-its functionality-, guides its activity to retention, to the comprehension-the conceptual organization of thought and of the disciplines of study that make up the curriculum plan—and the "active use of knowledge"—transfer of learning. A higher order curriculum or a meta-curriculum according to Perkins [2], provides tools to rethink the content of teaching, not only attends to the conventional aspects of the selected study content, but rather, to the meta-scientific aspects, linguistic, philosophical, artistic, etc.—of it. The nature of a meta-curriculum from the perspective of Perkins [2], aims to expand and enrich teaching conditions. A meta-curriculum is configured through dimensions such as: (a) levels of understanding, (b) languages of thought, (c) intellectual passions, (d) interrogative mental images and (e) learning to learn and (f) teaching how to transfer. A meta-curriculum is characterized by the holistic integration of each of the aforementioned elements, its integration allows us to understand the multidimensional nature of the understanding and language of human cognition. Each of its dimensions is transversal to each cycle and educational section. Introduces tools to understand the complexity of cognition, incorporates specific skills for its approach from the specificity of each discipline.

Table 1 presented summarizes the main characteristics of each of the dimensions mentioned above and involved in the configuration of a meta-curriculum according to Perkins [2].

The language of thought strategies is nothing other than the manipulation of various concepts and strategies that allow students to put into action various kinds of thinking to address certain cognitive challenges. The language of thought[3] and strategies of thought expresses a multidimensional nature, articulates a repertoire composed of specific classes of thought strategies. Its focus points to the application of different uses. The nature of understanding and the language of thought operate through the metaphor of the connection grid, following the logic of the foucaultian device, configured by the confluence of heterogeneous elements, forming a representational figure about what is learned. The metaphor of the network suggests a

[3] It refers to symbols of different nature.

Fundamental components of the meta-curriculum	Description
Levels of understanding	They correspond to the classes and dimensions of cooking that progressively goes through the student body with respect to a certain content of stud.
Thought languages	Consist of specific ways of manipulating what has been learned, according to specific kinds of thinking
Intellectual passions	Understands learning as a passion, as an affection, etc. Suggests conditions to captivate the learner A quality thought is highly strong and passionate A thought-centered teaching works in favor of the openness of the mind Strengthens a permanent commitment to thinking, fostering the culture of thinking in the classroom. Encourages and emphasizes the disposition for thought, transcends the idea of skill-how to do it-, emphasizes the inclination towards something (Ennis) Among the characteristics of a 'good thinker' Perkins [2] identifies that: (a) broad, diverse and risky intellectual capacity, (b) permanent curiosity, (c) search for unknown ideas, etc.
Interviewing mental images	It arises from the premise that understanding goes beyond learning the content Focuses its activity on the strengthening of powerful mental images that allow students to clarify what they learn in a timely manner, or they find it difficult Categories play a crucial role in the development of powerful mental images
Learn to learn	Corresponds to the ability to create tools that support learning. It consolidates a mental representation about what is good learning and the set of resources to achieve it
Teach to transfer	Transfer teaching emphasizes the strengthening of actions outside of school and between subjects. Trasferir is synonymous with applying what has been learned in a variety of domains

Table 1.
Main characteristics in the configuration of a meta-curriculum.

multilinear and fractal thought, articulated, fundamentally, in the operations of relational power, that is, to investigate and establish its multiple forms of application and relationship, etc. The teaching assumes the challenge of strengthening the link of students with education, due to the mistakes made continuously in Latin America in terms of public policies, is subject to breakages, assuming a naturalization status, which little or nothing, is discussed in the main political agendas. The forms of education installed contribute to undermine the students with their training process, contributing to practices of simplification and academic banalization. The omission of the educational subject continues being, among others, one of the irresolute tensions of greater pre-eminence. Coinciding with Paul [14], these tensions lead to weak critical thinking. Indeed,

> *[...] Weak critical thinking is the art of reasoning-of formulating valid reasons, of combining them into well-structured arguments, of refuting counterarguments, and so on. Paul states that one can become an expert in this practice without implying a true commitment to equity, or a genuine openness to the views that oppose the one that supports. This commitment implies the will and passion to keep the mind open to all perspectives, however different they may be from one's own. And this has nothing to do with the vacuous, kind tolerance of anything goes, but with a*

> *meticulous reflection. According to Paul, strong critical thinking is what teachers need to give form and encouragement to their classes, if they want students to overcome their prejudices or other equally harmful manifestations of intellectual narrowness ([2], p. 118).*

Stone Wiske [1], unlike Perkins [2], identifies four prototypical levels of comprehension, among which are: (a) naive understanding-acuptation of information directly in the world, there is no awareness of the links that exist between activity and its application in our life-, (b) comprehension of newbies-mechanisms and rituals-, (c) apprentice comprehension-obey disciplinary modes of thinking- and (d) understanding of mastery-critical, holistic, creative and flexible-. Each of these dimensions describe the multidimensional nature of understanding. However, *"deep understanding involves the ability to use knowledge in all dimensions"* ([1], p. 239). Its dimensions vary according to the specificity and interiority of each of its dimensions. To understand in depth the meaning and meaning of levels of understanding, it is necessary to refer to comprehension performances, that is, various ways in which subjects demonstrate what they have learned. **Table 2** presented below summarizes the main characteristics described by Stone Wiske [1].

Returning to the contributions of Stone Wiske [1], in relation to the four dimensions of understanding, identifies unlike Perkins [2]: (a) content, (b) methods, (c) summary of the dimension of purposes and d) forms of communication of what was learned. It also adds criteria associated with each of the dimensions indicated above (**Table 3**).

Dimension of understanding according to Stone Wiske [1]	**Main manifestations**
Naive understanding	• Characterized by a disconnection from real life • Lack of reflective ways about which knowledge is expressed
Understanding of newbies	• Describe the purposes of the nature of knowledge • They are linked to mediation systems of tests and schooling systems • Comprehension performance is based on an application mechanism, contemplating the development of a set of steps to achieve something
Apprentice comprehension	• Reproduce disciplinary ways of thinking • Flexible use of these ideas within a specific discipline. According to Stone Wiske [1] "the construction of knowledge is seen as a complex task, which follows procedures and criteria that are prototypically used by experts in the domain" (p. 240)
Master's comprehension	• Operate through integration: flexible, holistic • The student moves with flexibility between each of the understandings indicated above • Complex knowledge construction, resulting from complex interactions, confrontations • They use knowledge to act in reality, to intervene in it and transform it • Foster a disciplinary (meta-disciplinary) understanding, the subject of learning combines several disciplines to solve a particular problem

Source: Stone Wiske [1].

Table 2.
Understanding styles.

Dimension of understanding	Central idea	Criteria associated with this dimension
(a) Content	It corresponds to the first level of understanding, it refers punctually to the data, procedures and routine information. In this stage, the fundamental is given by the mechanization and reproduction of knowledge, and not by the active use of it. Level referred to the delivery of large corpus of information	• Transformed intuitive beliefs • Consistent and rich conceptual networks
(b) Methods	It corresponds to the second level of understanding. At this level, knowledge and practice are integrated to solve typical problems of a subject or a field of professional action. Through this level, the student becomes aware of the strategies and processes developed or developed to solve the problem or activity	• Healthy skepticism • Knowledge construction from the interior of the domain • Validate knowledge in the domain
(c) Summary of the purpose dimension	At this level the student must have already acquired and internalized the most relevant theoretical information, having identified the mental processes or cognitive strategies that will allow him to apply this knowledge. The task of understanding is now to generate explanations, justifications on the subject under study	• Consciousness of the purposes of knowledge • Multiple uses of knowledge
d) Ways of communicating what has been learned	Knowledge and practice concerning the way in which the results are discussed and new knowledge in the subject or subject is constructed. Strategies at this level are aimed at raising hypotheses, questioning information, etc.	• Mastery of the genres of realization • Effective use of symbol systems • Consideration of the audience and context

Table 3.
Dimensions of understanding.

6. Conclusions

6.1 The evaluation: demonstrate what has been learned, emphasize the perspective of performance

Orchestrating an evaluative system focused on understanding, that is, on the perspective of performance, suggests consolidating an interpretative path on the representational vision of learning and its functional architecture. It consolidates an evaluative perspective focused on performance, that is, on the demonstration of what has been learned-flexible action-, correspond to activities that demand putting their understanding at stake. It is an evaluation system characterized by strengthening comprehension performance, conceived as a flexible performance criterion [10]. The vision of understanding linked to performance is what allows us to recognize the multidimensional manifestations of nature and understanding. Evaluating comprehension implies attending to the flexibility of the different ways of demonstrating what has been learned-delements-. According to this, understand.

> *[…] means nothing less than being able to perform flexibly in relation to the [content] topic: explain, justify, extrapolate, link and apply in ways that go beyond knowledge and routine skill. Understanding is a matter of being able to think and act with flexibility based on what one knows. The capacity for flexible performance is understanding ([10], p.73).*

In this conception, comprehension performances are evaluated, that is, activities that go beyond information, memorization and typical routinization strategies that mutilate intelligence. Crystallizes a direct evaluation of the student's performance, that is, *"understanding-as-vision requires reaching a mental representation that captures what is to be understood"* ([10], p. 75). Performance is evaluated—demonstration of what has been learned—and the mental representation that each student produces, in order to determine qualitatively, their levels of understanding reached. He is interested in unveiling the action plans articulated by each learner. This evaluative perspective aims to strengthen teaching processes and deficits linked to understanding.

This conception of evaluation centralizes its activity in the multidimensional process of comprehension, allows the teacher to know what has been understood and, from there, trace the possible routes for the enhancement of learning. Among its most relevant purposes are: (a) diagnose, it allows to know what are the ideas of the students, the errors in which they stumble, the main difficulties with which they are, the most important achievements they have achieved. (b) Dialogue: the evaluation should be a conversation instance about learning and discussion about teaching, but this dialogue must be guaranteed by mutual respect and trust. (c) Understand: evaluation is a phenomenon that facilitates the understanding of what happens in the teaching and learning process. (d) Feedback: the evaluation must facilitate the reorientation of the teaching and learning process. Not only in what refers to the work of the students but to the planning of the teaching and (d) to learn: the evaluation allows the teacher to know if the methodology is adequate, if the contents, if the contents are relevant, if the learning that is has produced is meaningful and relevant to students.

The ideas described below acquire a transverse nature, since they are applicable to both formal and alternative procedures in the evaluation. It is necessary that teachers constantly take these ideas into account as it will allow them to identify the critical points that are affecting their learning-teaching process. Among the main aspects to assess comprehension, the following stand out: (a) the procedures used to evaluate must consider all aspects of the knowledge and abilities that are intended to be developed, by confronting constants of cognitive challenges aimed at increasing the reflective commitment of each students, about what they learn. (b) The evaluation must be developed through authentic learning evidences, clearly explaining the typology, characteristics and nature of the learning to be achieved. (c) The evaluation criteria must be known, shared and comprehensible by the students, so that they are aware of what is evaluated, how they are evaluated and for what they are evaluated. It is recommended that they be built jointly between the teacher and the student body, in order to strengthen the culture of thought and intellectual passions in the classroom. (d) Evaluative procedures should be designed in consideration of the levels and features of understanding, taking as a frame of reference the nature of the knowledge at stake, its forms of application for everyday life, multiple forms of connection with other knowledge, etc. First of all, they will promote spaces for permanent demonstration of what has been learned. The evaluation in the Teaching for Understanding assumes the challenge of designing spaces, strategies and evidence of learning in which students can demonstrate the degree to which they have acquired the defined abilities for each subject and disciplinary field.

IntechOpen

Author details

Aldo Ocampo González
Center for Latin American Studies of Inclusive Education (CELEI), Chile

*Address all correspondence to: aldo.ocampo.gonzalez@gmail.com

References

[1] Stone Wiske M. What is understanding? In: Stone Wiske M, editor. The Teaching for Understanding: Linking Research and Practice. Buenos Aires: Paidós; 2008

[2] Perkins D. The Smart School from the Training of Memory to the Education of the Mind. Barcelona: Gedisa; 2006

[3] Gardner H. The Mind Not Schooled How Children Think and How Schools Should Teach. Buenos Aires: Paidós; 2013

[4] Bain K. What the Best Collague Teachers Do? New York: Harvard University Press; 2006

[5] Perrone D. Why do we need a pedagogy of understanding? In: Stone Wiske M, editor. The Teaching for Understanding: Linking Research and Practice. Paidós: Buenos Aires; 2008. pp. 35-68

[6] Perkins D. The Full Learning. Principles of Education to Transform Education. Buenos Aires: Paidós; 2010

[7] Stigma GE. Deteriorated Identity. Buenos Aires: Amorrotu; 1989

[8] Feuerstein R. The Theory of Cognitive Structural Modifiability. Santiago: UDP Editions; 2010

[9] Blythe T. Teaching for Understanding. Paidós: Teacher's Guide Buenos Aires; 1998

[10] Perkins D. What is understanding? In: Stone Wiske M, editor. The Teaching for Understanding: Linking Research and Practice. Paidós: Buenos Aires; 2008. pp. 69-92

[11] Perkins D, Swartz D, Simmons R. Instructional Strategies for the Learning Computer Programming: Multiple Research Perspectives. Hillsdale. NJ: 1989. pp. 153-178

[12] Talanquer V. How do our students think? In: First Interdisciplinary Congress on Education Research; 2010. Available from: http://www.ciie2010.cl/docs/doc/conferencias/ppt_ciie2010_conferencias_talanquer.pdf [Accessed: 25 January 2011]

[13] Perkisn D, Unger C. The new look in representations for mathematics and sciense learning. In: Computers and Learning conference of the Social Science Research Council; 1989

[14] Paul R. Critical Thinking: What every Person Needs to Survive in from Rapidly Changing World. Sonoma: Sonoma University Press; 1990