Categories as Tools for Educational Developers

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How to design a holistic platform for an academy with a distinctive educational philosophy? My research into this problem made me conclude — the answer lies in the application of categories.

In this article, we are going to explore an educational framework at Quadrivium Academy that may be of interest to educators, educational developers, curriculum designers, educational philosophers, and specialists involved in the foundational work of educational organisations. Readers whose primary interest lies in quick teaching tips or daily classroom activities may find this exploration and analysis less immediately relevant.

We will first describe categories, distinguishing them from mathematical sets, and examine their Aristotelian origin to define their assertive nature. Next, we will explore categories as practical tools, demonstrating their value in transforming knowledge domains into comprehensive educational models.

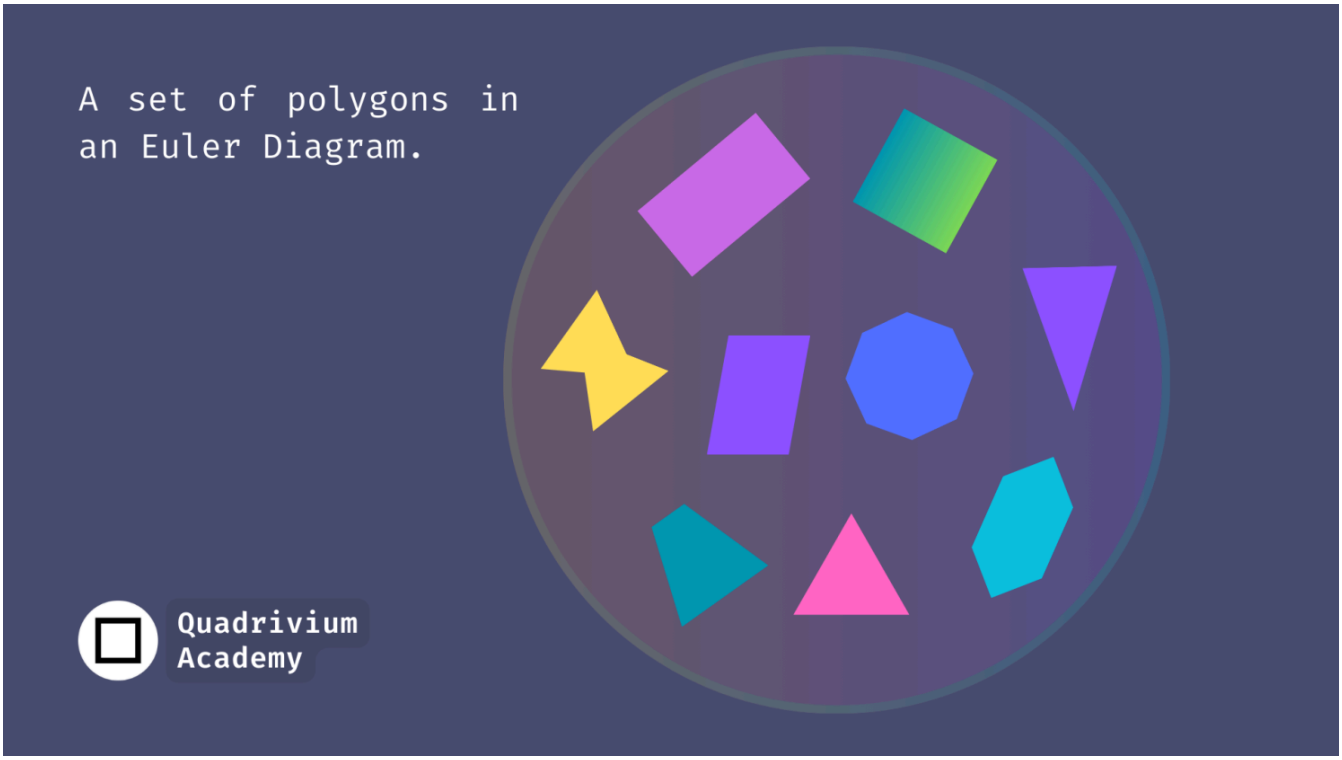
Finally, we will demonstrate how to apply categories in educational development, showing how a categorical framework — like Logos-Oriented Education — can help design holistic curricula, unify

methodologies, and help build learning platforms, providing philosophical structure for practical educational context.

Part I: What are Categories?

Categories are often understood as a way to classify things. We can see definitions similar to the following: "category is a type, or a group of things having some features that are the same". Isn't it the same thing as a mathematical set then?

As you probably know, sets are collections of objects that satisfy a certain condition. For example, there can be a set P that contains all x shapes, where x is a *polygon*.



A set of polygons

The definition of a set of polygons in the formal notation could be the following: *P = { x | x is a polygon with 3 or more sides }.*

Similarly, we can define a set of cheap vegetables: *V = { x | x is a vegetable with a price < €1/kg }*.

Unlike sets, categories are not just a way to group things (it might be an oversimplification in understanding sets either). Categories can be used for classification but this is not their original meaning.

Philosophically, categories are fundamental and the most general (universal) concepts in philosophy and science. To bring an example of the most general concepts, consider the Aristotelian categories like quality, quantity, or action.

Why is Action a Category?

Action is an Aristotelian category of being. In his philosophical framework, it’s a fundamental concept describing the process of change and activity initiated by a subject, which resides entirely in the agent. It answers the question, "What is N doing?" (e.g., “he is learning,” “she is creating”).

Action is one of the ten predicaments described by Aristotle, primarily in Categories and Metaphysics. Aristotle's categories are the ten

highest genera, or the ten fundamental ways of asserting or predicating something about a subject (a substance).

The Greek word “κατηγορία” (katēgoria) translates as “judgment,” “decision,” “testimony,” “explanation,” and “statement.” This indicates that a category is less a mere class of an object, but more a crucial judgment about a phenomenon, as if through it we announce something internal and essential. To unfold this, let's bring a natural example.

Natural Example

Imagine, you see a tree. It is a tall, spreading tree with a lot of branches and leaves in the public garden located in one of the neighbourhoods in Tallinn, Estonia. Suddenly, you notice small green apples on its branches. Strangely, it's the end of September, but these apples aren't ripe. You come closer to see them. Then step onto a low stone fence and stand on your tiptoes to reach one. Very interesting. Are these actually apples? You take a few pictures of the tree leaves and bring one apple from the ground to your home to explore.

The tree's branches, leaves, and fruits

The answer is no, these are not apples. Instead, we've found a wild **pear tree** in our neighborhood. How did we judge? We came to conclusion by observing the features and qualities of the tree and its fruits:

- The leaves are dark green, glossy, and oval-shaped with slightly pointed tips. Unlike apple tree leaves, which tend to have matte leaves, these shiny leaves are a common characteristic of a pear tree.
- The small, round fruits growing on the tree from a distance look like small apples, but a closer look reveals the distinct narrow

top part of a fruit connected to the stem, which is a common feature of pears.

- The skin of the fruit looks slightly rough with some markings, which is more typical for pears. Apples usually have smoother and shinier skin.
- The seeds in the cut fruit look elongated and more pointed at the ends, which is typical for pear seeds. Apple seeds, by contrast, tend to be shorter and more rounded.
- Finally, the cross-section of the fruit shows a texture of the flesh that looks dense and grained, which aligns with pear characteristics. Pears generally have a gritty texture due to the presence of stone cells with high levels of lignin and cellulose, while apples have crisper, more uniform flesh.

In this way, we concluded that our initial assumption about apples was very close but yet a mistake. In reality, this is an entirely different plant *category* — the pear tree. By exploring the tree's external and internal qualities we can state: “that's a pear tree.”

From our small natural research, we see how intrinsic properties determine the category to which the observed phenomenon (the pear) belongs. Now, we know that these fruits are the pears and this tree is the pear tree. The process we just went through is the process of categorization and our judgment is a categorical statement.

Definition

Category is a fundamental *judgment* or *predicate* about a phenomenon that reveals its internal, essential nature, providing a universal framework for understanding and appropriate interaction. Unlike a mere set used for classification and mathematical operations, a category encompasses the necessary intrinsic properties that determine not just where an object belongs, but what it *is*, how it can and should be approached, studied, utilized, or created.

Part II: Categories as Tools

As it was said, categories are the most general concepts, and if something is recognized to belong to a category, then it has all the qualities of that category. Apparently, **in order to know how to approach an entire class of things belonging to a particular category, we must study that category**, a task that presents its own challenges. Since arts, crafts, sciences, and all other educational disciplines belong to the category of knowledge, they can be treated as knowledge and studied accordingly.

Types of Knowledge in Epistemology

From an epistemological perspective, there are three basic types of knowledge: knowledge-that, knowledge-how, and experiential knowledge:

1. **Knowledge-that**, or declarative knowledge, is awareness of truths that can be expressed using declarative statements. It is also sometimes called theoretical knowledge, descriptive knowledge, and propositional knowledge. This type of knowledge is not restricted to one specific use or purpose and can be expressed and stored in books or on digital data storage.
2. **Knowledge-how**, or procedural knowledge, is the knowledge exercised while performing some task or action and related to the ways we do things. Procedural knowledge involves one's ability to do something within a distinctive method or approach but does not necessarily require it to be expressed in a declarative way to be counted as knowledge.
3. **Experiential knowledge**, also known as practical knowledge or knowledge by acquaintance, is gained through direct experience, personal involvement, or firsthand interaction with the world. This type of knowledge is often embodied, contextual, and subjective, as it arises from one's lived experiences.

The significance of these three knowledge types in education lies in their constant relevance to learning and creativity. Across any discipline — be it an art like mathematics or a field such as medicine — these three subcategories of knowledge consistently prove applicable. Moreover, holistic education must equally incorporate them into the learning process, thereby adjusting its methodology to

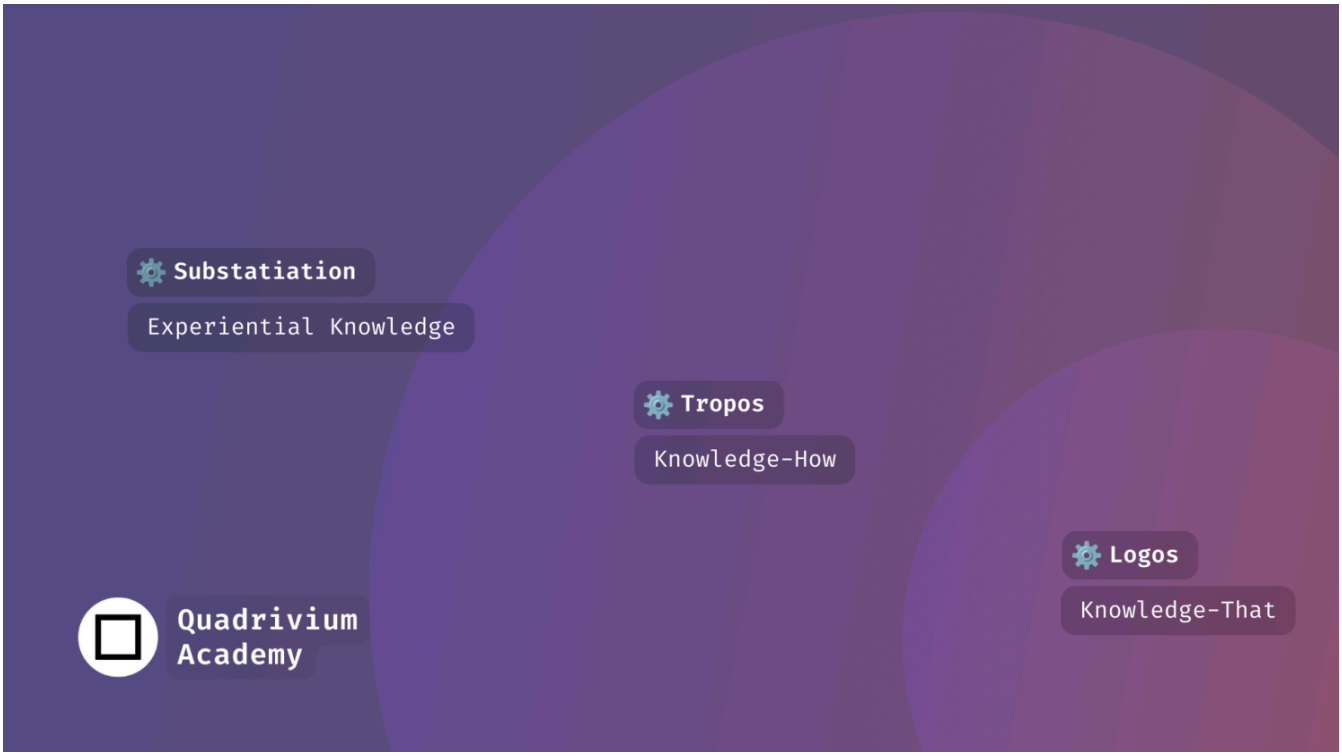
ensure our understanding of the subject is comprehensive and unified.

Categories are more than abstract philosophical concepts; they are practical tools for educational development. By viewing all educational subjects—such as arts, sciences, and crafts—as forms of knowledge, we gain an essential epistemological perspective. This allows us to apply categories like declarative, procedural, and experiential knowledge as powerful lenses for educational development.

Part III: Logos-Oriented Education

In the previous two parts, we defined categories and introduced the three epistemological types of knowledge: declarative, procedural, and experiential. We also emphasized that holistic education requires the inclusion of all three aspects.

This categorical approach, centered on the concept of knowledge, gives the basis for an entire educational paradigm — it is the starting point for Logos-Oriented Education (LOE), an educational philosophy and framework at Quadrivium Academy.



Mapping of three logos-oriented categories to three types of knowledge

Logos-Oriented Education establishes four fundamental categories — Essence, Logos, Tropos, Substantiation. Three of them directly align with basic epistemological types of knowledge. These categories offer a framework for describing various phenomena. For instance, consider our pear tree. Let's apply categories to it.

Category of Essence

As we learned, the tree we've seen in the public garden has the *Essence* of a pear tree. The *Essence* of a pear tree is the general nature present wholly within the real, tangible specimen thriving within the public garden. This specific, living tree is the hypostasis of the pear

tree nature, holding the full *Essence* of its kind, and is not a mere manifestation or copy — its presence offers a direct and accessible exemplification of the genus and species, providing the observer with the full, rich experience of what constitutes a pear tree: its distinctive structural characteristics (matter and form), its inherent capacity for bearing the characteristic fruit (potentiality), its specific leaf shape, and its pattern of growth and development (actuality).

In this sense, this particular tree possesses the defining characteristics (quiddity) that make it what it is — a pear tree, distinct from an oak or a rose, because the *Essence of Pyrus* is fully inherent in it. For a botanical observer, it is a practical, invaluable tool for understanding taxonomy — a living index of the final cause and efficient cause of its kind. Its reality — its roots in the soil, its seasonal cycles of bloom and dormancy (change and motion), its interaction with the local ecosystem — confers upon it an authenticity and pedagogical value that no mere drawing or description could ever fully capture. This tree, therefore, stands as a concrete, essential anchor, whose common fruit-bearing nature fully present in its existence within this particular instance.

Category of Logos

Unlike the singular, tangible *Essence* of a pear tree — which simply is what it is, a physical, biological entity — the concept of *Logos* in

education allows for a dual interpretation, functioning as a powerful intellectual tool. This duality offers two distinct yet complementary lenses through which knowledge and reality can be understood. The first is a pragmatic approach, focusing on accessibility and application. The second is a philosophical approach, delving into the deeper, often non-material or non-observable nature of things.

The preference for one approach over the other often depends on an individual's disposition, field of inquiry, or immediate goal. An educational developer, for instance, might oscillate between the two depending on whether they are designing a practical curriculum (pragmatic) or pondering the underlying theory of learning (philosophical). Crucially, these two perspectives are not mutually exclusive; they can, and often should, be applied simultaneously to achieve a more holistic understanding.

The Pragmatic Logos as Accessible Knowledge

In its pragmatic sense, the *Logos* represents the readily available, verifiable, and communicable knowledge about the pear tree. This includes empirical data, scientific facts, and functional information. It encompasses:

1. **Observable Facts**: The tree's species, its growth cycle, the composition of its wood and fruit, and the climate conditions it requires.

2. **Practical Application**: The methods for pruning, grafting, pest control, and harvesting. This is knowledge that allows us to interact with the pear tree effectively, to utilize its fruit, and to manage its growth.
3. **Linguistic Structure**: The logical ordering and naming of these facts — the word or reason used to categorize and discuss the tree. The *Pragmatic Logos* is the structured, explicit knowledge we use as a functional tool.

The Logos as Internal Principle

The second sense, which has deep roots in ancient Greek philosophy (Heraclitus, Stoicism) and is particularly emphasized in Christian philosophy (especially the Gospel of John, where the *Logos* is identified with the Divine Word), views the *Logos* as an intrinsic, non-material principle. This approach moves beyond the physical manifestation to the underlying order and blueprint of existence.

In this context, the *Logos* is not just the facts about the pear tree, but the very internal principle that defines its being — the originating and genetic force that imbues the physical object with its specific identity and potential.

By acknowledging both pragmatic, philosophical, and sometimes theological interpretations of the *Logos*, we equip ourselves with a comprehensive framework: one for dealing with the world as it

appears and another for contemplating the world as it fundamentally is.

Category of Tropos

The *Category of Tropos* defines the specific *way* or *mode* in which the pear tree's essential nature (*Essence*) is actualized and appears in the world as a concrete phenomenon. If the E*ssence* answers "what it is" and the *Logos* answers "what it means" as principle and fact, the *Tropos* answers the crucial question: **"How?"**

This category serves as a bridge, describing the operational realization of the underlying *Logos* within the physical world, aligning with both the tree's natural processes and the method required to interact with it.

The *Tropos of Pyrus* is the pattern and footprint of its life. The pear tree exists as a perennial deciduous plant, characterized by a specific *way* of growth: it requires cold dormancy (vernalization), flowers in spring, sets fruit in summer, and sheds leaves in autumn. Its existence is realized through the *way* it metabolizes energy, absorbs nutrients, and maintains cellular structure.

This relates to its observable morphology and development. The tree's *Tropos* includes the *way* its branches form (often upright), the *way* its leaves are organized (spiral arrangement called phyllotaxis), the *way* its fruits develop (from an inferior ovary), and the *way* its wood is

structured (dense, with stone cells in the fruit). It dictates the method by which we visually categorize it (e.g., the specific shape of its leaves and fruit distinguishing it from an apple).

The pear tree's existence is contingent on a *Tropos of Propagation*, whether sexual (via seed, ensuring genetic diversity) or asexual (via grafting, maintaining clonal identity). This biological “method” is the means by which its *Essence* is made manifest.

In an educational context, the *Tropos* also dictates the appropriate **method** (the procedural knowledge, or *knowledge-how*) for studying and utilizing the object. The *Tropos* of the pear tree informs the curriculum for pomology or botany.

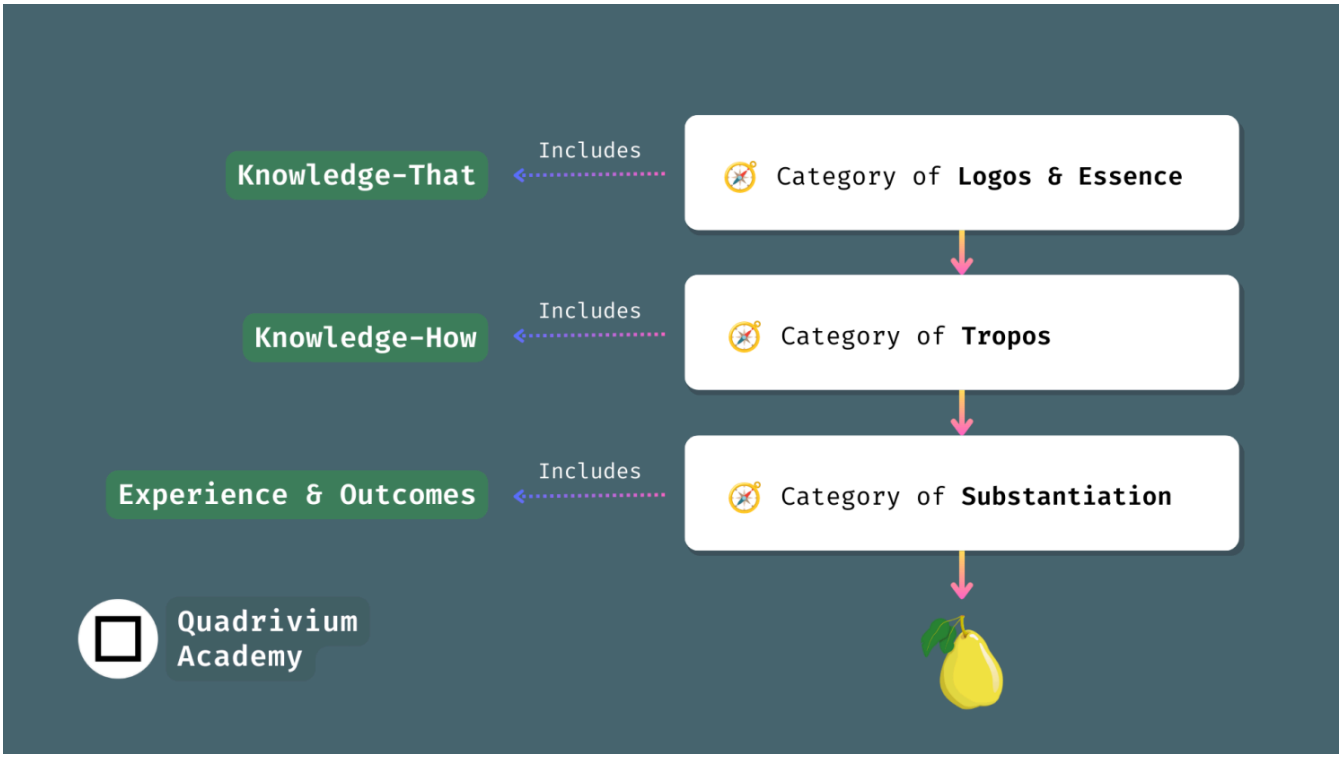
Category of Substantiation

The *Category of Substantiation* aligns directly with **Experiential Knowledge** (knowledge by acquaintance). It represents the moment when the abstract or potential (defined in *Logos*) and the procedural method (*Tropos*) manifest in a concrete, personal, and existential reality. While the *Essence* is the general nature, present wholly and constantly in the particular instance (the pear tree simply *is*), ***Substantiation* is the very moment of the very existence** — the living, active realization of the being.

This category is not merely the object itself, but its active **existence** in time and space, the *action of nature* in its present tense. For the pear

tree, *Substantiation* is not just the tree existing, but the experience of its existence: the act of its roots drawing water, the process of bearing fruit, the sensory experience of tasting the pear, or the physical action of pruning its branches. This active existence is inherently *predefined in Logos*; the internal principle (*Logos*) dictates the potential, and *Substantiation* is the fulfilling of that potential in reality.

In an educational context, substantiation means moving beyond theory (*Logos*) and method (*Tropos*) to **direct engagement**. It is the moment the student moves from reading about botany to *feeling* the texture of the leaf and *tasting* the fruit, or from studying a mathematical equation to *using* it to solve a physical problem. This is the ultimate proof of knowledge, gained through firsthand interaction.



The Framework for Education and Creativity

The Four Categories of Logos-Oriented Education establish a unified, interdependent framework for both education and creativity. Each category serves as the focus for a dedicated group of studies. Much like epistemology is the study of knowledge, each of these categories is studied through a lens where that specific category is dominant, examining itself and its related phenomena.

The interdependence of the Four Categories ensures coherence: once the *Logos* is grasped, the *Tropos* must inherently align with it. This categorical structure provides a powerful, integrated educational model, offering a consistent and clear foundation for mapping entire

fields of knowledge, thereby enhancing teaching, learning, and problem-solving.

Conclusion

The use of categories as tools offers significant advantages for educational development, facilitating the creation of efficient methodologies and adaptable educational systems. Logos-Oriented Education (LOE) is one such categorical implementation, providing the foundation for a holistic platform, curriculum, educational model, and the entire organizational framework at Quadrivium Academy.

LOE enables a structured and profound comprehension of any subject or curriculum. Rather than restricting creativity or flexibility, this framework actually strengthens our capacity to manage complex ideas. By adopting LOE at Quadrivium Academy, we are better equipped to address the varied requirements of both learners and educators, ensuring that education remains coherent and dynamic. This enables us to effectively respond to emerging challenges while simultaneously leveraging and building upon our previous accomplishments in education and culture.

The categorical approach becomes particularly effective in combination with the Modernized Seven Liberal Arts (mSLA) model at Quadrivium Academy, which aligns fully with LOE. We will elaborate on this in our upcoming articles.