

How is the World Made... and Is that Good?

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In the curriculum of general education schools, art education is unique in that it provides children with the opportunity to learn through their original creative expression. In other words, in art lessons children should and can learn by expressing their thoughts, ideas, opinions and attitudes through artmaking activities. There is no difference between them and visual artists – a work of art, whether artistic or that of children, is an original creative expression.

An original creative expression would be of no value to children's learning, nor would it have a value in a broader cultural sense, if its content did not bring new knowledge, if it did not expand and enrich human experience. Zuidervaart (2015) therefore characterises the original work as an *unveiling* – as the act of discovering of the unknown. In the same sense, we speak of arts-based research (cf. Eisner, 2006) or artistic research (cf. Hannula, Suoranta, & Vadén, 2005).

Comparing artistic expression with scientific research, we openly confront the authority of art with the authority of science and can cast doubt. In what sense can an original artistic expression be a discovery or the unveiling of the unknown, if it is not substantiated by a scientific method and objectively supported by evidence based on facts in the regime of evidence-based research? What is possible to explore, to analyse or to learn through artistic means, so that we do not face legitimate criticism when confronted with scientific learning? Arguments to discuss these issues are offered in the following lines.

Original Creative Expression is Worldmaking

Just as scientific research leads to a scientific text and its publication, an original artistic expression leads to an artistic artifact and its presentation. The originator of an artistic expression, as well as the originator of a scientific text, is an empirical author – a mortal individual embedded in their social environment and historical cultural time.

A statement of an empirical author would have no probative value in science or art if it did not have any content. Only the content that people can interpret from the work can be what goes beyond the limited time of its empirical author, because it expands the experience and brings knowledge to other people.

The content of a work that is in some way new and expands human experience is called *a discovery*. Without discoveries, there would be no human culture – discoveries are a necessary condition for the origin and historical development of science, technology and art.

The link between an empirical author and a discovery is creation. Creation is the process of forming or articulating content into an obvious and communicable form. The result of a creation is an artifact. An artifact is a cultural instrument.¹ The content of the artifact-instrument is a discovery mediated to other people provided they can interpret it from the work.

¹ An artifact-instrument is everything that can be realistically created, perceived and used factually or symbolically in a cultural context: from the physical form of words and electronic or printed books, sheet music

The artifact-instrument connects the personal (micro-) and socio-cultural (macro-) levels of human existence, because without the creation of artifacts-instruments no discovery or knowledge could be expressed and recorded, and thus it could not be socially or culturally shared or used. Therefore, no learning can exist in science, technology or art without the original expression that is creation.

Using the words of a constructivist, the world is discovered and known only by being expressed and created in a cultural context. The dependence of learning on creation is represented by the neologism 'worldmaking', coined by Nelson Goodman (Goodman, 1988). 'Recognizing patterns is very much a matter of inventing and imposing them. Comprehension and creation go on together [...]', so 'knowing is as much remaking as reporting [the world],' as Goodman (1988, p. 22) explains his concept of worldmaking.

Experimentation as a Condition of the Value of Worldmaking

The result of worldmaking in science or technology, as well as in art, are artifacts-instruments through which we experiment – we search for and repeatedly verify the relatively best versions of instruments for our interactions with reality. The condition of the value of worldmaking is experimentation.

Experimentation is based on the creation, evaluation and verification of two or more possible alternatives of the same artifact-instrument. The choice of the best alternative is decided during the experimentation. This decision-making takes place and is verified simultaneously at the personnel (micro-) and socio-cultural (macro-) levels. At the personnel level, it has the form of self-informing: the author assesses various alternatives to their creative expression and selects the ones that suit them best. At the cultural macro level, the community enters the experiment: people evaluate works, they prefer some and deal with them, and neglect others.

With regard to the comparison of artistic expression with scientific research, we distinguish two key types of experimentation here: factual experimentation, expressive experimentation. Factual and expressive experimentations differ from each other in *the way they make decisions*, and in *the subject of their research*. Based on this distinction, we will try to explain the main differences and similarities between scientific discoveries or the ways of learning on the one hand, and artistic discoveries or the ways of learning on the other.

Factual Experimentation and Veridical Decision Making

Factual experimentation examines and verifies the relationships between the properties of real phenomena – the facts found – and their ideal models. The most fundamental basis of factual experimentation is built by mathematics at the intersection of geometry with arithmetic, or algebra. This applies not only to the 'great' cultural production, but also to the first children's original experiments – one just has to notice them in this respect.

Even young children learn to try and verify the correlation between real shapes and their geometrically based representations (drawing a house from rectangles and triangles) or between grouping of objects and numerical operations. Other basic principles are offered in physics: from the

through dance or music production, machines, computers, vacuum cleaners and sculptures or paintings to nanotechnologies.

first steps, a child experiments with the action of various forces, examines how to maintain balance, learns to be afraid of touching hot things, and so on.

We call *deterministic* such situations in which factual experimentation is applied. In other words, deterministic situations are the subject of research to which factual experimentation relates. Deterministic situations are characterised by the fact that it is possible to find and rationally justify the only best solution for them. In addition, deterministic situations can be solved by finding out and checking only *external* (observable) facts and mutual logical connections represented by different ways of symbolic representations. E.g. the shape of a table can be symbolically represented by drawing a rectangle or a circle, grouping of two and three objects with the notation of $2 + 3$.

Thanks to these characteristics, deterministic situations are characterised by the fact that when managing them, one can be substitutable with an intelligent machine, even if they are very complex. It is possible to find a solving algorithm for them, e.g. in programs for weather forecasting or for medical diagnosis based on laboratory data.

Veridical decision making is a special way of decision-making, which is typical for deterministic situations, and which was named by the neuroscientist Goldberg (2009, pp. 103–104). In everyday life, this type of decision-making is used to solve problems associated with, for example, repairing a broken instrument or device, financial considerations and operations, choosing the shortest path to the goal, playing chess. This type of problems and the decisions associated with them are characterised by the fact that all their alternatives relate exclusively to factual and logical situational determinants. That is why their research and verification was called factual experimentation.

Expressive Experimentation and Actor-Centred, Adaptive Decision-Making

Expressive experimentation examines the correlation between the properties of real phenomena – facts, their symbolic representations and their original conception (cf. Nohavová & Slavík, 2012, p. 28). During expressive experimentation, the author or perceiver of the work imagines or realises various versions or alterations of the work in order to best capture their themes and fulfil their creative intentions (cf. Kulka, 1989).

In expressive experimentation, in contrast to factual experimentation, emphasis is placed on the original conception of the expressed and researched content. The decision between alternative solutions does not therefore depend only on 'bare' facts or logical contexts, but the original approach, the attitude taken by the author and the associated evaluation of the examined content are particularly applied in it. In addition, in expressive experimentation, key emphasis is placed on the original way of communicating the content, i.e. on its stylisation and style.

Goldberg (2009) calls this approach to decision-making *actor-centered, adaptive decision-making* (also as *adaptive decision-making*). Adaptive decision-making differs significantly from veridical decision-making in that it does not do without the so-called first-person ontology.

With the term *first-person ontology*, the philosopher Searle (2004, pp. 83–85) warns against uncritical reduction of learning only to objective data conceived from the position of so-called third-person ontology, especially in the study of human consciousness and related phenomena. He gives a specific example (Searle, 2004, p. 84): 'Performances of the Beethoven's Ninth Symphony can be reduced to wave motions in the air, but that is not what is interesting to us about the performance'.

Goodman's (1968) theory of symbolisation is useful here to clarify Searle's example, in which Goodman distinguishes three basic types of symbolisation: denotation, exemplification, and

expression. Denotation is a designation of meaning, exemplification is the demonstration or execution of a property / properties, and expression is a metaphorical representation of the content, resp. the topic.

If Beethoven's Ninth were *only* a denotation or exemplification of a certain content, it would be limited to the interpretive aspect of third-person ontology: musical sounds would be reduced to either denominations (this sound means...), or to representations of objectified properties (that is, 3kHz sound; it is three dashed c). However, in expression, this 'technical' property of musical sound has the function of a mere medium for the pictorial mediation of other content of the human psyche, which is to be rich in interpretation and emotionally impressive.

In other words, it is only in terms of expression that the physical properties of musical sound acquire the function of a medium for the metaphorical mediation of a special cultural content: the content of a musical performance. Experimentation becomes purposeful here in the context of music and its socio-cultural and personal influences.

Therefore, if, from the point of view of exemplification, we can simply denote a certain musical melody by its musical notation or denominating tones, from the point of view of expression we can say about it figuratively that it is cheerful, optimistic, spiritually illuminated, characteristic by its execution for a certain musical style, etc.

This clearly expresses the difference between only the technical (craft-based) approach to musical expression (in music to manage vocal cords or fingering, in visual artmaking to handle a graphic editor for example) and its necessary aesthetic and artistic overlap, which must connect the subjective side of expressive experience with the intersubjective and cultural side.

Expression in Goodman's concept implicitly includes both Searle's ontologies because it is a *metaphorical exemplification* (Goodman, 1968, p. 95, etc.). It requires a special skill from its author or performer to understand the content connections between the structure of sensory data exemplified by the work and the organisation of relationships between the meanings of individual elements of the metaphor that is expressed in the work.

This particular skill consists of 'combining' the first- and third-person ontologies, as it depends on the ability to mentalise – to generalise one's states, thoughts or attitudes so that one can understand someone else's states, thoughts or attitudes by taking a view that could hypothetically be common to both. Without this basic skill, no expressive experimentation can take place.

The unique consequence of 'combining' the first- and third-person ontologies in expressive experimentation is that an agreement in generalisation (I experience the same as you) can be accompanied by the acceptance of differences in conception and the re-creation of the same content. Therefore, the selection of the best work (model of the world) in expressive experimentation may not have a single correct solution, but allows for a variety of original approaches subjecting them a reflective critical dialogue.

A reflective critical dialogue allows for full-fledged rational argumentation and reasoning of judgements with the right to general consent, that is, assuming the only correct solution exists and can be justified (cf. Kant, 1987). Goodman (1968, p. 79) notes: 'Standards of truth are much the same [...] application of a term is fallible and thus subject to correction'. Zuidervaart, cited above, also links the right to disclosure to the right to validity: what is expressed in the process of learning is to prove itself in the sense that if someone disputes a claim, we will be able to make a logically defensible argument to substantiate the claim (Zuidervaart, 2015).

How is the World Made... and Is that Good? Exploring Human Maxims.

With the support in the previous text, we can return to the questions posed in the introduction. In what sense can an original artistic expression be a discovery or unveil the unknown, even though it is not substantiated by a scientific method and factual evidence? What is possible to explore, to analyse or to learn through artistic means, so that we do not face legitimate criticism when confronted with scientific learning?

It seems hardly questionable that the original artistic expression cannot compete in terms of evidence-based research with a scientific statement based on precise factual experimentation. If a scientist discovers and displays a hitherto unknown form, say coronavirus Covid-19, this image is the result of special methods of research and experimentation, which may be an inspiration or object of interest for art, but should not be measured against it. So, how can learning benefit from art, resp. from a visual creation, if it is based on actor-centred, adaptive decision-making?

The previous analysis was to suggest that the benefit to learning of expressive experimentation should be sought precisely in the fact that it highlights the *original perspective* on the presentation of events, attitudes and values of their time. Expressive experimentation represents the original conception of the researched content. Attention is focused on the ways of worldmaking (cf. Goodman, 1988), that is, on how does one create (or waste?) the world, as well as on an ethical challenge to doubt: is that good? In this sense, the original artistic expression can be considered a *symbolic articulation of human maxims*. Maxims are a key subject of research in art.

According to Kant (1987), a maxim is a principle ('subjective determination of the will'), according to which one controls their decision-making processes about values, and which is to be measured against the right to general consent. A maxim is a guide for determining what is good and right in a person's relationship to the world. The maxim, according to which one acts, determines one's intelligibility for other people. It determines their meanings, as well as their conception, style and tact, judgments about their value and responsibility for them (cf. Weber, 1978).

A person turns to the world with the right to general consent whenever they are the originator-author of their actions and the judgements exposed to responsibility. Therefore, a maxim is reflected in the artistic creation as a determinant of the subjective will to the manner and scope of the original action. In their creative expression, the author of a work of art does not directly describe or interpret the maxims in words, but illuminates their nature by visual articulation of the content: by depicting or demonstrating a certain conception of the world and the way of being.

In practice, artificially articulated maxims are confronted with traditions, public opinion, ethical norms or political power, as well as with personal will and desire based on the eternal incompleteness of life. Claims from all these sides are usually not in mutual agreement, and all their possible discrepancies must be resolved in practice when engaging in a specific decision-making, without having an absolutely valid pattern of a situational form for individual events. That is why the original creative expression should be the subject of collective reflection and evaluation and should become a source of discussion, criticism, controversy. Only then an insight is offered reflecting on the key questions of how the world is formed, and whether it is good.

The conception of human maxims conceived in this way concerns all human things, that is, all those matters which on the historical axis between birth and death are connected with interpersonal relationships, with cultural, social and environmental values, with political actions and moral conduct.

The school should systematically teach students this type of research through original work. It is an opportunity to learn to make decisions in an adaptive decision-making mode, for which there are not many opportunities in a regular school curriculum. Therefore, Goldberg (2009) rightly points out that one of the biggest challenges for educators and psychologists is to create a way to explicitly teach the principles of adaptive decision-making.

In school practice, however, the strategy of adaptive decision-making has long been taught in the arts. However, the issue of arts disciplines lies in the ability to explain their procedures in a broader educational context and in collaboration with science-oriented curriculum disciplines. The starting point for this is the concept of the original creative expression as a way of learning. From this point of view, the educational training of creative scientists does not differ from the training of creative artists.

In both science and art, it is possible and necessary to rely on human dispositional (anthropic) and cultural (historical) constants, on which the process of even the most original creation depends, because a creation must be based on and confronted with them in order to be recognised as a creation and used for its originality and innovativeness. Boden argues (2004, pp. 13–14): it is possible to examine and explain the mental processes and structures that determine creativity, and thus to understand its nature and find out how to deal with it in the best way.

Therefore, it is important to gain an analytical insight into the basic requirements for an original creative expression. 'A study of how to develop the appropriate skills must begin with a study of how skills are to be identified and classified. Only in terms of some such initial conceptual apparatus can we ask pertinent questions about ways of fostering particular skills or about how improvement in a given skill may enhance or inhibit another.' (Goodman, 1984, pp. to 148–149).

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