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LIFELONG KINDERGARTEN: THE PAST AND PRESENT OF FRIEDRICH FRÖBEL'S TEACHING PHILOSOPHY IN CULTIVATING CREATIVITY

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Abstract: *The title is borrowed from a book written by Mitchel Resnick (1956) who is the Director of the Lifelong Kindergarten group at the Massachusetts Institute of Technology Media Lab. His position already suggests that the kindergarten is way more than a day-care institution where children may spend time in a safe and loving environment. This paper seeks to explore the main motives that led Friedrich Fröbel (1782-1852) to the establishment of his series of experimental pre-schools from the early 19th century onward, that distinguished them from the already existing similar social institutions. It will be shown that despite the challenges the kindergarten and their founders themselves have been witnessing since the very beginnings, the firm foundations of its philosophy allow it to survive and to revive itself and become a major component in any progressive-creative endeavour. The author of the present paper brings examples for the manifestations of the Fröbelian pedagogy both in the work of modern artists and architects, and its multi-layered connection to the Bauhaus school. The main focus is to provide an overview of the present creative enterprises that draw heavily on the kindergarten philosophy – Professor Resnick's research group and how they transformed it into a methodology that boosts (childhood) creativity in the 21st century.*

Keywords: *Friedrich Fröbel, kindergarten, Bauhaus, MIT*

INTRODUCTION: KINDERGARTEN AT MIT MEDIA LAB

"My nomination for the greatest invention of the previous thousand years? Kindergarten" – writes Mitchel Resnick (1956) in his award-winning book *Lifelong Kindergarten Cultivating Creativity through Projects, Passion, Peers and Play* [1]. As a LEGO Papert Professor of Learning Research at the MIT Media Lab which focuses on designing learning experience that is engaging and fun through new technologies and activities, Resnick is not the first who takes Friedrich Fröbel's brainchild, the kindergarten to be a point of reference in reforming our attitude towards learning and knowledge. Fröbel, through his unconventional life experience in educating himself and finding his life-mission proved to be an enduring legacy in preparing individuals for an active role in society in an age which deprived its population from a sense of integration and belonging coming from shared values and knowledge.

FRIEDRICH FRÖBEL (1782-1852) AND THE INVENTION OF THE KINDERGARTEN

Childhood experience and the finding of his vocation

From the onset Fröbel was heated by idealistic goals. After and amidst of war-ridden history, he wanted to contribute to the birth of a humanity that lived in harmony with nature and with each other which set him on a long quest. Son of a Lutheran pastor, he lost his mother before the age of one. Due to his movement coordination challenges, during his first years he was practically locked into his father's house, where he received little attention. The unhappy boy was taken under the patronage of his uncle,

who was also a pastor. While staying with him, he experienced the beneficial effects of playing outside in nature, which came to be the cornerstone of his later pedagogy.

Because of his passion for nature and introverted figure, he first studied forestry and later opted for architecture after various careers in science. Due to his constant financial difficulties, he undertook various tutoring posts; at the beginning of his architectural studies in Frankfurt at a school headed by Dr. Anton Gruner, one of the patrons of Johann Heinrich Pestalozzi (1746-1827), the pioneer of "natural teaching" in Switzerland. This encounter prompted Fröbel to abandon his original plans in order to become an apprentice at Pestalozzi's Swiss institution.

Pestalozzi's school in Yverdon was a practical test of the educational principles described in Jean-Jaques Rousseau's (1712-1778) work *Emile* (1762), which informed Fröbel's thinking as well. Rousseau's suggestion is that the engine of learning is the child's curiosity that teachers only gently direct. Children develop during active pursuits that involve physical experience; their "curriculum" moves from the simple to the complex – the educators include learning stages into their rather free daily program. The real means of education are not books, but various (natural) objects. Pestalozzi also constructed an experimental ABC that decomposed the letters into a combination of squares and curves enclosed in a square grid. Composing with basic geometric shapes that can be arranged in a square grid later became an important element not only of Fröbel's method but also of modern architecture and typography.

Fröbel encountered the geometric structure of nature in his earlier studies in botany and crystallography, which experience he deepened during his position at the University of Berlin – a reward for his participation in the Napoleonic Wars – where he organized the crystal collection under the professional guidance of his revered professor, Christian Samuel Weiss (1780-1856) who was the founder of the crystal classification method he employed. During the two years thus spent, he became thoroughly acquainted with the laws of crystal growth, discovering the stages of development of all forms of creation, and considered it to be the best means of acquainting children with the harmony created by a higher power in the universe. [2]

The kindergarten philosophy

In 1817, in recognition of his professional excellence, Fröbel was offered a professorship at Stockholm University, but he decided to set up his own educational institution instead, where he was involved not only with the education of pre-schoolers but also with the development and teaching of his methodology. His scarce philosophical writing, which did not provide a systematic theoretical basis during his three decades of pedagogical activity, recalls the ideals of the Neoplatonist-pantheist characteristic of German Mysticism and Romanticism by the Lutheran pastor Jacob Böhme (1575-1624) and Friedrich Schleiermacher (1768-1834) but more importantly, is based on his lived experience coming from the physical manipulation of objects.

The essence of the Fröbel method was its philosophy that geometric rules prevailed behind the manifested universe, which became tangible to children as they played with the simple geometric devices he invented. Fröbel did not expect, as later criticized by child psychologists, that at this age these connections would be intellectually perceptible; rather, he tried to tune children's sensitivity to these laws and thus to the harmony of the universe. Simple geometric forms were personified as people, animals, plants in the improvised tales that accompanied active play. Few kindergarten educators had

such extensive scientific knowledge as Fröbel, thus it was precisely this metaphysical content that declined during the spread of the kindergarten movement in the promotional literature written by his followers and in the kindergarten teacher courses they organized.

The kindergarten pedagogy in modern art, architecture and the Bauhaus

Friedrich Fröbel is best known to designers today through Frank Lloyd Wright (1867-1959), who in his autobiographies traced his very first attempts in architecture to his childhood preoccupation with the fröbelian teaching devices, the so called Fröbel gifts. Wright grew up in one of the late 19th century "progressive" middle-class families among which the kindergarten teaching method was well known.

This popularity was not only because the fröbelian ideal was an alternative to mainstream education streamlined for rote learning, but also because it offered a status for mothers who, completing kindergarten teaching courses addressed directly for them, could act as trained educators for their children. Citizens of leading industrial nations value efficiency and the idea that everything would be better if experts identified problems and fixed them – probably this view supported the desirability of the specialization of women to become professional mothers. Thus, while her visit to the 1876 Philadelphia World Fair, Anna Wright decided upon purchasing maple wood building blocks and a kindergarten teachers' course for herself to ensure her son's successful career as an architect.

In addition to Wright, a whole generation of artists and grew up in kindergarten institutions: among others, Georges Braque (1882-1963), Paul Klee (1879 -1940), Piet Mondrian (1872-1947), Wassily Kandinsky (1866-1944), Le Corbusier (1887-1965) Richard Buckminster Fuller (1895-1983) and Johannes Itten (1888-1967). The latter also had a kindergarten educator qualification, and he employed the method during his teaching years in the Bauhaus, which also influenced the pedagogical work of Klee (*Pedagogical Sketchbook* 1925) and Kandinsky (*Point and Line to Plane*, 1926). [3]

The kindergarten movement, together with the Bauhaus, became one of the strongest trends in German pedagogical reform movements in the 1920s, influencing each other's development beyond the educational methodology. Walter Gropius (1883-1969) was in charge of designing the 'Friedrich Fröbel House' in 1924 which was to be built in Bad Liebenstein, Thuringia. The briefing and the spatial organization of this institution, which eventually was not realized due to a lack of financial resources, inspired the design of the Dessau Bauhaus School buildings – the similarities of the two concepts are very apparent from the surviving plans and drawings. [4]

There is an even more striking resemblance between compositions that can be assembled from Fröbel gifts and many modern paintings and buildings. Although these works prove Fröbel's contentions that childhood experiences shape the future outlook on the world of the individual, it took a similarly unconventional and influential individual and those inspired by his tenets to provide psychological underpinning and practical evidence about the potentials of active learning. [5]

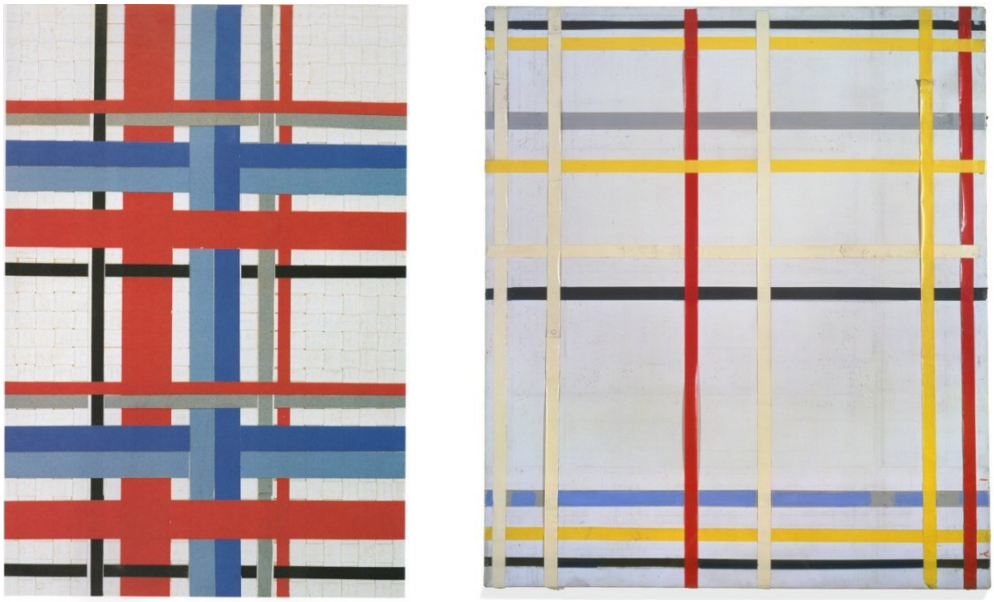

Figure 1: Paper weaving, unknown kindergarten creation and Piet Mondrian's New York City III unfinished composition (1941-42)

THE ENCOUNTER OF CHILD PSYCHLOGY AND COMPUTER SCIENCE

Jean Piaget (1896-1980) and Seymour Aubrey Papert (1928-2016)

Contemporary with the Bauhaus movement, in the early 1920s, Jean Piaget conducted research in human cognition that corroborated the Gestalt psychological principles widely applied in modern art. Like Fröbel, Piaget placed great significance on the education of early childhood and proposed a later much-debated theory on the cognitive development of children where he differentiates 4 major stages through which our perception of the world and the internal we construct upon them develop and published his results of extensive testing in his foundational treatise *The Child's Conception of the World* in 1929. [6]

While many in his intellectual circles – including Albert Einstein – left their homeland with the rise of Nazism, Piaget remained stationed in the neutral Switzerland, where, working at the University of Geneva has met his student, the South African-born Seymour Aubrey Papert, who was a mathematician and computer scientist with whom they worked together from 1958 to 1963. Their collaboration is well expressed in Piaget appreciation of Papert's sensitivity "no one understands my ideas as well as Papert". [7]

In 1963 Papert took up a position at MIT as a pioneer in artificial intelligence studies co-directing the Artificial Intelligence Lab and spent all his active life there as a researcher and an educator until 1981. Drawing on Piaget's cognitive development theories, often called as constructivism, he proposed his own take on the idea which made him the founder of the constructionism movement in education. Its prime tenet was that the most efficient learning takes place when real, tangible object are created during the learning process. Papert advocated a systems-approach so that students start from their own experiences and within a project-framework they discover new ideas through making connections between various elements of that system.

Mindstorms, the collaboration between Papert and the LEGO group

Papert was particularly intrigued by the potentials new technologies may open in the field of learning, specifically in school education. For this purpose, he created the Epistemology and Learning Research Group at the MIT, the forerunner of the present Media Lab where from the late 1960s onwards he developed the first programming language for children, Logo, to enhance their problem-solving approach using modern computing technology. In applying his constructionist principles, he paid particular attention to the development of the learning environment and came up with the playful idea that children were to program the movements of a friendly creature, a turtle which was either a physically built small robot, the 'Logo Turtle' or a graphic image on the computer screen.

Papert was not a technocrat who wished to introduce modern technology in a very young age through which children end up losing their ability to create intimacy with their immediate surrounding. In his ground-breaking book, *Mindstorms: Children, Computers and Powerful Ideas* published in 1980, he unfolds his view that it was the responsibility of science to ingrain children with a sense of mastery over technology to avoid an undesirable outcome, when technology holds a grip on them when reaching adulthood. His words echo the idealism of Fröbel: "the child programs the computer and, in doing so, both acquires a sense of mastery over a piece of the most modern and powerful technology and establishes an intimate contact with some of the deepest ideas from science, from mathematics, and from the art of intellectual model building." [8]

In 1985, Papert established a company with his colleagues Mitchel Resnick and Stephen Ocko which they named Microworlds, with the aim to surpass the limitation the turtle shape imposed on the Logo programming project. Their idea was to open up the design of the programmable object to children and to develop a construction kit that facilitated the creation of such self-made robots. The Logo Turtle was already a popular item that was documented in popular science media; the Danish television screened a documentary of Papert's pedagogy in action, which Kjeld Kirk Kristiansen (1947), the then owner of the Lego Group happened to watch. He immediately contacted Papert as LEGO's education division shared very similar goals with that of the Microworlds company.

The collaboration was quickly agreed upon and was moved back to the MIT Media Lab where research was sponsored by the LEGO Group. The Lab was both developing the technology and was responsible for its testing it by children. This initiative was so ahead of time that LEGO had to wait for a while until personal computers came to be common household items and the production parts needed for mass manufacturing of the intelligent bricks were affordable. This was the foundation of the LEGO Mindstorms product line which began in 1996 under the development of the home-learning division of LEGO Education.

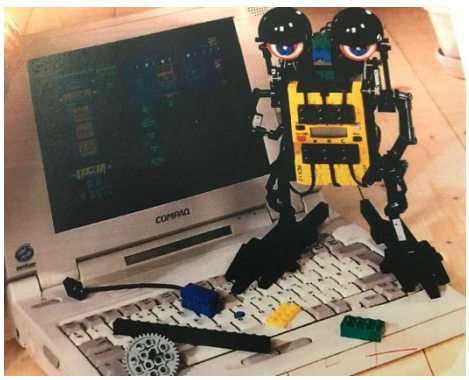

Figure 2: LEGO Mindstorms model from 1996

The Lifelong Kindergarten Group

Mitchel Resnick is a former student and long-time collaborator of Papert, who succeeded him as a LEGO Professor and is the head of MIT Media Lab's Lifelong Kindergarten research group. Following Papert's footsteps the group maintained the collaboration with the LEGO Company and participated in the development of the LEGO WeDo Robotics Kit. They also extended Papert's passion towards children programming software and introduced 'Scratch' around which a global online free community has been centred since its public launch in 2007.

According to their recent statistics the Scratch website that is being translated into over 70 languages connects 74 million users who keep in touch not exclusively in the online space, but also in self-organized public events where the 'Scratchers' may meet in person. Scratch, as a free product is not only a user-friendly programming language, but with time, its extensions came to be available, both software and hardware-based, including the above-mentioned LEGO WeDo kits, thus following the Logo Turtle 'tradition'. Although Scratch is mainly targeted at children, users include educators and parents, a trend intended by the creators of the software.

This type of community dynamics was borrowed from Resnick's other major co-initiative, the Computer Clubhouse Network founded in 1993 and sponsored primarily by Intel. This non-for-profit organization targets children of underserved communities who meet afterschool and interact in person with their mentors who assist them in their development as creative users of advanced technology that build their confidence and perspective. Whereas Scratch relies on the users' own resources, the Clubhouse initiative provides today 25,000 youth with access to resources, skills and experiences to assist them succeed in their careers and serving back to their communities.

Figure 3: Scratch logo

CONCLUSIONS

The very foundation of both Fröbel's and Resnick's kindergarten concept is the same – to create an ideal society. They both believe that the earliest possible exposure to a 'true' knowledge is the key for the realization of such an ideal. However, Fröbel, contrary to Papert or Resnick was not a social reformer, he spoke solely for the development of the human soul, which unintentionally made him a proponent of social ideals he was not wishing to address. It is probably his troubled, sensory-deprived childhood that made him a Platonic adorer of women and a proponent of the role of sensory experiences during the discovery process of the world.

Although in Petalozzi's institution Fröbel worked with orphans, his vision was broader than aiming to elevate youth of underserviced communities to a desired social standard. Fröbel was willing to avoid clashes with the political mainstream of his age as his primary goal was to lay the foundation of early childhood education and leave a legacy so that his followers could take on his initiative. Unfortunately, life brought about that kindergarten pedagogy was mistaken for a revolutionary movement with political overtones, due to the involvement of such social circles and activities of Fröbel's nephew, whom he brought up as his own child – this controversy led to the official closing down of his pre-schools and eventually to his depression and death.

Together with other contemporary educational reformers, Papert and Resnick's explicit aim is to reform education as a whole through which to arrive at a "creative society". Papert presents the underlying reasons of his choice for developing a children programming language as follows: "The computer is the Proteus of machines. Its essence is its universality, its power to simulate. Because it can take on a thousand forms and can serve a thousand functions, it can appeal to a thousand tastes." (Papert 1980, p. viii) Here, he refers to his early childhood fascination with differential gears, and how this deep impression served him later in enabling him to think in complex mathematical terms. But, as he reckons, differential gears do not possess the potential to become universal inspiration for mathematical thinking, as opposed to computers.

It remains debatable whether the computer can be considered such a universally successful device which is capable to kindle every single child's fantasy and interest. Professor Resnick's claim: "We need to develop better technologies, activities and strategies for engaging children in creative learning activities" (Resnick, p. 181) suggests a technological bias that is more explicit in the failed One Laptop per Child (OLPC) initiative, a joint project of Papert, Resnick and other professionals from the MIT Tech Lab. The program, which was launched in 2005 aimed to provide children in developing countries with access to computer literacy. The major means in achieving this goal was identified with the development of a very basic laptop and software, the so called OLPC XO, which was to be mass-distributed in the countries of the Global South.

The positive aspect of this project was the development of a (1) low cost and low power computer, (2) the general recognition of the importance of computer literacy's role in primary education (3) the development of an interface that did not require literacy in any language. However, the project was criticized for its blindness to the real challenges that children were exposed to in developing countries, for the little attention paid for the maintainability of the devices and for the training of software-use which resulted in the shutting down of the initiative in 2014, acknowledging its failure.

Undoubtedly, utopia and realism intermingle in all the above introduced stories, as it does in every idealistic endeavour of humanity. A one-size-fits -to-all approach is more likely to fail especially when the one-problem-of-all does not exist. It remains an enigma, whether Fröbel would embrace contemporary technology to the extent MIT professionals do today and whether the benefits of technology would make him to rank direct experience in nature behind the use of technical devises. Without being able to answer this question, the lost sense of community and belonging that was brought about the Industrial Revolution seems to find its remedy in the noble ambitions of the Lifelong Kindergarten group.

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