# A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

Rahman Tafahomi ⬤

*Department of Architecture and Design, School of Architecture and Built Environment, College of Science and Technology, The University of Rwanda, Kigali, Rwanda*

**Abstract:** This paper aims to investigate some philosophical and epistemological foundations in collecting knowledge in three important schools of architecture including Beaux Art, Polytechnique, and Bauhaus. Those three schools not only had differentiation in the time and location but also different ontological views of the built environment. Despite the less philosophical arguments on the architecture education, the curriculum and structure of the design studios (ateliers) referred to the beliefs, ideology, and philosophy even though they were not explicit. The content analysis, logical argument, and interpretation techniques were applied in this research to compare, investigate, and analyze the content of design studios and curricula to demonstrate the epistemological approach and the philosophical foundations in those three schools. The findings of the research show some linkages between the contextual and philosophical movements in the times of the schools and the structure of teaching. The effective philosophical foundations in those schools included neoclassicism, idealism, and romanticism for Beaux Art, rationalism, empiricism, and functionalism for Polytechnique, and socialism, modernism, and constructivism for Bauhaus. While it was not possible to draw a distinctive line between other philosophical thoughts from the schools, however, those philosophical schools were more related. In conclusion, the research realized a significant connection between four factors that form any architecture school, curriculum, and studio including philosophical and ontological context, epistemological discourses on knowledge, architecture projects and context, and architect's beliefs and ideology. These four factors orient architecture education. The results could be useful for architecture schools, which will guide the other schools to select their orientation in the future.

**Keywords:** Philosophy, Epistemology, Design studio, Beaux Art, Polytechnique, Bauhaus.

## Introduction

Architecture education has been an open discourse in different institutions to be appreciated or criticized based on styles, methods, and approaches. There are many studies to appreciate the application of different topics, (Goldschmidt, 2002); reflection-in-action (Schon, 1984), research (Franz, 1994; Frayling, 1993; Groat & Wang, 2002) or approaches in curricula and design studios; (Park, 2020; Schon, 1984). On the contrary , there are many critics of architecture education and training such as an unmodern style (Garric, 2017), a set of rules (Griffin, 2022; Littmann,

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2000), far from research (RIBA, 2014), and a complicated curriculum (Jones, 1981). Nonetheless, architecture's methods in education were celebrated by great philosophers such as Hegel in terms of the creation of the most completed form of art (Fields, 2000; Karatani, 1995). Probably, it is related to the varieties of educational styles in architecture that formed such kinds of diversities.

This variety of educational styles can also encompass a wide range of varieties from a more conservative to an Avant-garde approach in schools of architecture (Tafahomi & Chance, 2023). Despite the trend to call architecture in terms of discipline, architecture has been one of the multidisciplinary fields of study, knowledge, and skill that is interlocked with art, philosophy, science, and education (Karatani, 1995; Marder, 2017). For example, Leonardo Da Vinci (1452-1519) defined the architecture as an amalgamation of art and engineering (Stephen, 1962) which fundamentally needs drawing skills and art knowledge (Tafahomi & Chance, 2023) or Hegel (1710-1831) defined architecture as a conjunction point to connect art and philosophy through aesthetes (Tafahomi, 2023).

Training of the students in the architecture profession has a long history; and three major architecture educational movements discussed in this paper have been so effective on the current style of education in terms of teaching and learning styles in architecture schools that in some way all instructors inherited those styles or skills through observing, participating, training, or reading. The Beaux Art, Polytechnique, and Bauhaus are three major schools of architecture that challenged, changed, and advocated specific architectural styles in different times and locations. While these schools of thought in architecture have been rooted in the history and philosophical context (Proudfoot, 2000) of Europe; however, those schools effected deeply the architecture education in around the world (Laroche, 2008; Littmann, 2000) and to date there are some universities that maintain those styles and orientation (Tafahomi & Chance, 2023).

The Beaux Art, Polytechnique, and Bauhaus schools have been under celebration and criticism in over time, also in the same time, and they have their own fans, supportive people, and educational styles. Those schools have been a role model for the many architectural schools for a while (Draper, 1977; Fox, 2013) such as New Zealand (Madanovic, 2018), USA (Littmann, 2000), Greek (Armstrong, 2016), Egypt (Ramzy, 2010), and East African countries and Iran (Tafahomi, 2021). The level of effectiveness of each school refers to the model of teaching and the responsiveness of those schools to the time of location (Doyle, 2016; Mindrup, 2014). Garric (2017) mentioned that each architecture school not only creates its own spirit, system, and culture of teaching but also establishes its own ideological system of thought to train the students. In this regard, it is of great importance to know the philosophical foundation, teaching methods, and approaches (Dennen, 2004; Lupton & Miller, 1993) of those architecture schools that appeared in the courses, design studios activities, and projects.

The philosophical foundations of those three schools and their teaching approach have been rooted in their viewpoint on architecture, education, and the world. The term philosophy means the "love of wisdom" about knowing human 'existence' and 'experience' (Britannica, 2024). Philosophy is defined as a process of critical examination of beliefs and logic (Britannica, 2006). Kemmis and Groves (2018, p. 116) defined the philosophy in education in terms of "a good set of knowledge for the practice to be learned by individual, humankind, and society". It takes place through saying, doing, and relating all together in a project (Schatzki, 2010). For example, François Blondel (1618-1686) as a teacher in the Beaux Art mentioned that the mission of the Beaux Art in education is 'absolute classicism' (Griffin, 2022). Such kinds of expression refer to the philosophical foundation, beliefs, and ideology that appears in the expression. The philosophical thoughts have had a significant role in distinguishing those schools from other styles of construction and masonry (Tafahomi, 2023). However, the critique theorized that

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architecture practice is more ontological than epistemological to know about it, and it is a differentiation between architecture and other fields of engineering (Kemmis & Groves, 2018). Social, political, and philosophical contexts of the architecture institutions have been very effective on the arrangement of the educational materials, contents, and instructions (Kemmis & Groves, 2018; Tschumi, 1996).

Fox (2013) indicated that the architecture job before the new generations of architectural institutions such as the Beaux Art's graduated students focused the building construction and management rather than design. However, with the new generation of architects, projects, and sources the new form of architecture education, projects, and ideas are expanded. At any architecture school, the question will be about different aspects of knowledge that are celebrated, produced, and applied in the school. This applied knowledge in terms of epistemology was always questioned (Jones, 1981). For example, the study highlighted that some of the philosophical influences of Bauhaus took time to appear in educational systems in the US through practitioners (Langmead & Garnaut, 2001).

Despite the studies on the history of architecture, the history of the educational centers and schools was discussed briefly (Tafahomi & Chance, 2023). Some of studies attempted to highlight specific aspects of the education, training, or projects in those schools (Bokov, 2021; Carlhian, 1979; Cunningham, 1980; Doyle, 2016; Draper, 1977; Garric, 2017; Griffin, 2022; Madanovic, 2018; Proudfoot, 2000). Kemmis and Groves (2018, p. 124) classified architecture education in three aspects "cultural-discursive arrangements, material-economic arrangements, and social-political arrangements" that refer to the belief, knowledge, and context of the education. Nonetheless, belief, knowledge, and context indicate philosophical foundations that were interpreted by Schazki (2010) in terms of ontological aspects of architectural products. However, there are a few comparative studies, and even rare philosophical analyses (Kemmis & Groves, 2018; Ramzy, 2010). Nonetheless, the Beaux Art, Polytechnique (s), and Bauhaus schools trained great architects who changed architectural projects, knowledge, and studio styles during their period. Those schools established particular methods and manners in their education that are called as style, school, or tradition. They have had similarities and dissimilarities in the themes, topics, and methods that made them schools of architecture with specific character and identity. Despite the quadruple theories on architecture educational styles including architects, architecture projects, architecture knowledge, and architecture context (Long, 2017) (Figure 1),
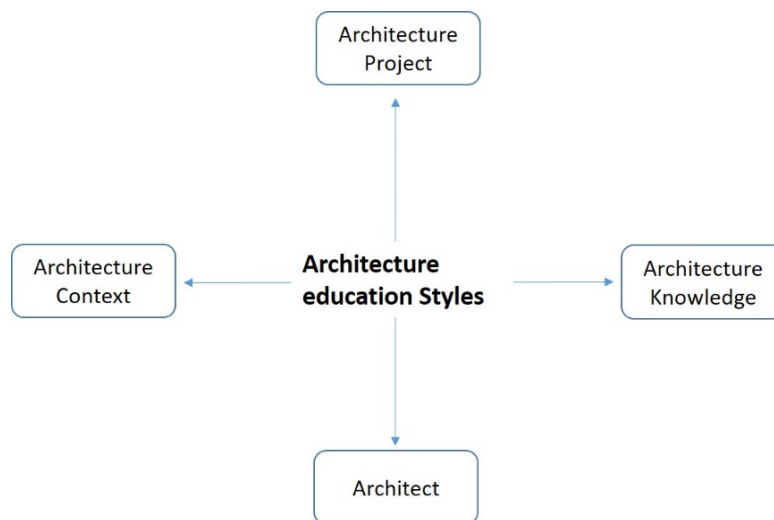


*Figure 1: The effects components in the architecture education*

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seemingly there are more important factors that lead the studio studios philosophy.

The research questions in this paper are designed as what is the relation between the philosophical context and architecture program at the time? What sort of knowledge was celebrated and applied? What courses and modules represent the ideas of the instructors in the program? And how do those aspects affect today's teaching tradition? The objective of this research is to trace the philosophical approach of the architecture programs in different periodsand locations to compare acquisitions of knowledge and the application in the courses particularly in design studios. In this frame, the three architectural schools are analyzed through on content analysis, logical argument, and historical review.

**Methodology and Research Design**
This section explained methodology, research design, process, and relevant data.

**Methodology**
The qualitative method was applied widely in historical studies (Denzin & Lincoln, 2018; Given, 2008; Silverman, 2010). Qualitative method was oriented to describe, explain, or analyze the phenomena in the context deeply (Creswell & Creswell, 2018; Ezzy, 2002; Groat & Wang, 2002). There are some levels of interpretation in qualitative methods (Krippendorff, 2003) in applying for the deep analysis of the data (Groat & Wang, 2002; Neuman, 2006). The qualitative methods in architecture areas were applied through graphical analysis (Ching, 2015; Crowe & Laseau, 2011; Laseau, 2000; Tafahomi & Nadi, 2021), descriptive (Chiarella, 2005; Mugerauer, 1995), analytical (Carmona, 2001; LaGro Jr, 2008; Lang, 2005), research by doing (Adams, 2008; Boradkar, 2010; Goldschmidt, 2002; Koskinen et al., 2011). A few studies referred to the philosophical aspects of architecture (Franz, 1994; Groat & Wang, 2002; Tafahomi, 2022a; Wang, 2006). Content analysis, logical arguments, and interpretation have been common techniques in the qualitative method to analyze historical and comparative studies.

The content analysis technique was applied in analyzing the texts, speeches, images, and maps to discover meanings, themes, and similarities (Krippendorff, 2003; Schreier, 2012). This technique commonly utilized in built environments. For example, Carmona (2001) applied content analysis to discover the urban design qualities in the housing policies in the UK. Lang (2005) used the techniques to compare 50 urban design projects in the US to classify the common aspects in those plans. In a similar study, Bently et al (2003) drew a guideline for the design through prior design documents. The study indicated a variety of applications of this technique in architecture, urban planning, urban design, and landscape (Tafahomi, 2022a).

Logical arguments were mentioned as a process for the theoretical discussions on the specific topics in architecture research (Groat & Wang, 2002). The logical arguments were applied to explain theories in architecture (Pallasmaa, 2005; Schon, 1984), urban planning and design (APA, 2006), and landscape (Spirn, 1998). The logical argument was defined as a way to understand elements and things through explanation (Grimm, 2011) to expose the meaning through a new interpretation (Hancock, 1995; Seamon, 2015). Interpretation was also mentioned as part of the logical arguments to interpret, explore, and discover sets of meanings (Barker, 2005; Dreyfus & Rabinow, 1982; Jin, 2021) in texts and elements in historical studies and to expose the relationships for new sets of meanings (Mugerauer, 1995; Norberg-Schulz, 2019).

**Research design**
The qualitative method was the most relevant technique to analyze the content of the sources of studies about the three schools of architecture at different times and locations. This research applied content analysis, logical argument, and interpretation techniques based on qualitative methods to describe, explore, and define the teaching process in those three schools (Creswell & Creswell, 2018; Given, 2008; Groat & Wang, 2002; Tafahomi, 2022a). Those techniques applied to discover the philosophical foundations (Proudfoot & Lacey, 2010),

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knowledge (Crumley, 2009; Grimm, 2011; Rescher, 2003), and teaching styles (Carlhian, 1979; Kavuran & Dede, 2016; Lerner, 2005). The content analysis was utilized to analyze the documents concerning the three architecture schools to extract the applied themes, topics, and approaches in the schools (Carley, 1990; Drisko & Maschi, 2016; Elo et al., 2014). The related documents about those three schools included historical books, critical papers, and reports as sources of data (Krippendorff, 2003; Schreier, 2012).

The logical argument and interpretation techniques were used to explain the relationship between different aspects of those three schools of architecture in the philosophic context in terms of predominate schools of thought in the time and location of the applied knowledge (Groat & Wang, 2002). The logical argument explored to demystify relationships between the educational materials, knowledge, and approaches they applied.

The interpretation technique was employed to ascertain the meaning of the documents, reports, texts, and design styles (Krippendorff, 2003; Mayring, 2000; Schreier, 2012) in those schools through making a "mapping of meanings" (Barker, 2005, p. 85; Jin, 2021), layers of meanings (Gomez, 2003; Seamon, 2015), or structure of meanings (Dreyfus & Rabinow, 1982; Hancock, 1995; Mugerauer, 1995; Park, 2020). The meaning for three different "meanings" indicated the changing behaviors and beliefs during the time, to explore hidden meanings behind the activities and traditions, and relations between different elements of the meanings, respectively.

### Research process and data
To analyze the transformation of architectural education during the time, this research started to explore the foundation of the first generation of architecture schools through the Renaissance and Enlightenment movements. This research explored the effects of those movements on the architecture schools' structure importantly philosophical approach as a manifesto, applied knowledge as an epistemological view, and structure of program and delivery in the schools

due to the documents and data. All applied data in this research were combined from documents, sources, critical papers, reports, and images or drawings. For this reason, perhaps the research missed some of the sources that could open a new perspective. However, at the same time, this problem could create an open discussion for the folk to start to write their critiques about this structure and it could continue to enlighten the topic.

### Critical Discourse on Three Schools of Architecture
The architecture schools in the 17th and 18th centuries faced many social, economic, and political transformations that were rooted in the philosophical movements through Renaissance and Enlightenment movements. The Renaissance freed art, philosophy, and science from the pressure of the religious dogma. The results of the Renaissance were defined in terms of a journey from macro to micro exploration (Brotton, 2006) and as a rebirth of culture in terms of "the beauty of nature and the dignity of mankind" (Merriman, 2010, p. 44). The Renaissance constructed a platform for the Enlightenment era with some philosophers such as Edmond Bacon with empiricism (1561-1626), René Descartes with methods (1596-1650), Baruch de Spinoza with naturalism (1632-1677), John Locke with epistemology of knowledge (1632-1704), Isaac Newton with mathematics and physics measurements (1642-1726), David Hume with skepticism (1711-1776) to form rationalism era (Lacey, 1996; Proudfoot & Lacey, 2010).

Before the Renaissance and Enlightenment movements, education in different fields of knowledge took place through religious schools or apprenticeship activities (Labaree, 2008). There were few universities around the world (Verger, 1992). In the architecture school case, Broadbent (1995) referred to the Academia Platonica in Florence as the first private school of art and architecture that trained the students through apprenticeships in the school based on the application of Vitruvian theories to train the architects in the time. Achievements of the Enlightenment movement resulted in the institutionalization of educational centers as the

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main component of the policies. Frijhoff (1996) mentioned that the demand for technical schools increased due to industrialization in Europe. Many of the colleges and the technical universities took the birth to be independence from the central university and government in the south of Europe to involve other social classes rather than nobles and aristocrat families (Vandermeersch, 1996).

The Enlightenment context with rationalism, natural laws, reasoning, and methods led countries in Europe to do the institutionalization for the "depersonalization" of education (Schwinges, 1992, p. 172). Despite the disagreement in the classification of architecture and medicine either as art or earth science in Middle-Age time, the Renaissance and Enlightenment led the architecture programs to be established as individual institutions or be part of technical programs. The disagreement was constructed based on the definition of Virtuous from architecture in terms of the art of building including art, theory, and construction (Ruegg, 1992). The first school of architecture after the Enlightenment was established in French as the foundation of the Beaux Arts.

**The Beaux-Arts Style**
The 17th century was the starting point for establishing private and independent schools and academies such as the Franciscan Literature Academy (literary Académie française) in 1635 by Cardinal Richelieu (1585-1642) for the French Language, the Academy of Sculpture and Painting (Académie de sculpture et de peinture) by Cardinal Jules Mazarin (1602-1661) in 1648, and the Academy of Sculpture (Académie de sculpture) and School of Architecture (Académie d'Architecture) by the king Louis XIV (1638-1715) in 1671 in Paris (Pedersen, 1996). The academy was designed based on the private offices of great architects who came from noble families. The first director of the academy Nicolas-François Blondel (1618-1686) also was an engineer and architect who believed in classical design and rationalism in the construction of buildings (Vuillemin, 2008). The Academy missioned to train the students based on the monarchy, hierarchy, and aristocracy structure (Griffin, 2022).

Two movements were effective in the discontinuity of the Academy of Architecture in France. First, the Great Revolution of France 1789-1799 that changed all social and political thoughts. Second, the Enlightenment movement was transcribed to an atheist idea among the general public that had the consequences to a new movement in thought in terms of God as a metaphysics (Griffin, 2022). French Great Revolution ended the Academy and after some years of fluctuation, Ecole des Beaux Arts was born in 1819 through the integration of three art schools including sculpture, painting, and architecture (Griffin, 2022). The Ecole Beaux Art was a revolutionary movement to respond to the philosophical and political streamlines in France and Europe at that time (LDCRT, 2024). While, the motto of the Renaissance architecture was the "ideal city" and "harmonic architecture" (Merriman, 2010, p. 62), however, Beaux-Arts, Paris innovated an ideal form for buildings design which was celebrated for many years in Europe and North America (Sennott, 2004). Two great philosophers were so effective to form new ideas that could be applicable in the new generation of schools in Europe importantly Emmanuel Kant (1724-1804) with transcendental idealism and consciousness, and Johann Fichte (1762-1814) with the philosophy of psychology. These two foundations formed the German Idealism that generated idealism and romanticism in Europe and the world in the 19th century.

**Program structure and design studios**
The Beaux Art style in education was concentrated on ateliers (design studios) which were the location of the major part of education including painting, sculpture, art, and architecture. The photographs showed that the drawing desks were common and shared in Beaux Art ateliers. The students had individual tools such as drawing boards and tools (Verat, 2022). All the activities took place in an atelier as a common place with different students to work in the mornings for the preparation of drawings on a well-known project and in the afternoons, the comments of the patron (the

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master) of the atelier. Students in the Beaux Art worked from 8 am to 9 pm in the atelier with a short time for lunch six days per week (Cunningham, 1980). The tasks of the students included two important sections first, theoretical courses through lectures and drawing tasks in the morning, and critiques and evaluation by the patron (the master of the studio) in the afternoons. The key aspects in both activities were the application of sketches (esquisse) as the process of assimilation of knowledge by the students (Laroche, 2008). This assimilation of knowledge through sketches enhanced the abilities of the students in drawing through different courses in drawing, painting, and sculpture (Garric, 2017). For a long time, the Beaux Art did not include an academic structure (Griffin, 2022). The Beaux Art educational structure was contracted based on weekly lectures, public lectures, drawings, examinations, and critiques. The Beaux Art did not follow systematic courses or module-credit structure but rather encouraged the atelier activities, competition in design, and critics. The pedagogy in the Beaux Art was constructed in three portions basic drawing elements, sketches (esquisse), and design competition (Garric, 2017). The main academic ideology of the Beaux Art was a trinity that started from Vitruvius' ideas on architectural specifications. So, ateliers encompassed three instructors with different responsibilities including tutor for beginner students, competitors, and the selector of the students for the competition. This style was inherited by new generations of instructors who were former students in Beaux Art (Cunningham, 1980).

Garric (2017) highlighted that the main critique of the Beaux Art was based on the application of the romanticism style to arrange juries for the competition coming from painting, sculpture, and architecture fields rather than construction and engineering. This critique was first exposed by Viollet le Duc (1814-1879) former instructor of the Beaux Art who left the Ecole and joined to Polytechnique of Paris (Laroche, 2008). The Beaux Art style of teaching, running of ateliers, and competition changed over the years in the 19th and the 20th centuries. However, the students played important roles in inviting the

architects, tutors, and juries to the school and final projects. Garric (2017) exposed that the Beaux Art was the most liberal school of architecture in the mid-19th century and the studios were run by the students to facilitate free speech and design. Despite the structure of the Academy based on the aristocrats and noble people in the early stage of the academy, the French Revolution resulted in to open the door for the bureaucrats, bourgeois, and middle class people (Crosland, 1992; Roche, 2000).

**Epistemological knowledge**
Cunningham (1980) mentioned that the Beaux Art ateliers were arranged to select the best students through different examinations and exercises. The examination was a main process to filter the students in different stages. The talented students should proceed and other students should stay in the level (Draper, 1977). This style of filtering the students for learning process was rooted in Kantian idealism and prior philosophers' ideas about the ultimate purpose of everything (Van de Vijver & Mathijssen, 2024) that was the predominate philosophical approach in 17th and 18th centuries and resulted in the establishment of the first school of architecture. The Kantian theory was constructed on fundamental reasons for the all actions we do in terms of self-development and practices (Maskivker, 2014). The structure of the education in the Beaux Art was designed based on differentiation between the students as talented or gifted students and normal who should be eliminated through serious and systematic competitions and examinations (Draper, 1977; Drexler, 1975).

The students followed the instructions of the patron to fulfill the tasks in design studio. Theoretical courses were free speech by famous instructors, architects, or artists. The source of knowledge was provided by visiting the great buildings, redrawing, sketching, examination, and critiques to assimilate knowledge in the minds and hands of the students (Carlhian, 1979). Despite Vitruvius's suggestions about educating architects through supplementary topics such as philosophy, music, poetry, and astrology, many educational institutes did not follow the suggestions. One of the main reasons

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was the relationships between architecture education and architecture practices that education follows the practices (Draper, 1977; Garric, 2017).

Transformation of knowledge in the Beaux Art was designed based on the learning history of architecture through redrawing of the monuments and great masterpieces of architecture projects particularly from Rome (MOMA, 1976). While the study of the students was limited to individual projects in Rome, in the early of 20th century, there was another perspective to study the entire city (Garric, 2017). Looking to the teaching structure and applied knowledge identify that the Beaux Art passed three philosophical approaches during the time including rationalism, idealism, and romanticism.

**Philosophical foundations of Beaux Art Neoclassicism as the sign of rationalism**
Neoclassicism was the main objective of the Academy of Architecture in the earlier period of establishment in the late 17th century. Despite the speech of Blondel (Griffin, 2022, p. 1) to recommend survey classicism to be used for the "monarchic and civic buildings", the Great French Revolution changed the mission of the Academy. After the revolution, the Academy was restructured with the name of the Beaux Arts in the line with neoclassic style that should be celebrated by the architects, instructors, and students. It was based on the Enlightenment achievements grounded on the mathematics and science which predominated over all aspects of thoughts and activities based on rationalism.

Neoclassicism was the reaction of the art movement to the Enlightenment era in terms of the 'era of wisdom' (OER, 2024). This movement in art and architecture vitalized the classical ideas to put human figures, size, and form as the central elements of expression, illustration, and representation. In architecture, it referred to the celebration of Greek and Roman proportions, principles, and forms in building design (Jones, 2015). The main mission of this style was to show the authority of science and empirical activities over the power of the church, imperial oligarchy, and aristocracy in the manifestation of buildings such as to push back Rocco, Baroque, and Gothic styles that represented aristocrat, monarchy, and church powers, respectively. New classicism encouraged geometric, symmetric, harmony, and balance as the key principles in design based on mathematical perspectives. The main philosophical reason beyond the neoclassicism was to advocate a continuation between classicism and neoclassicism to deny the historical gaps particularly, the Dark and Middle Ages, based on the achievement of the Renaissance and Enlightenment.

Rationalism and its physical product in terms of neoclassicism resulted in a set of great buildings and architects across the world in the 18th and 19th centuries such as Claude Nicolas Ledoux (1736-1806) with Château de Mauperthuis, Jacques-Germain Soufflot (1713-1780) with The Panthéon, Paris, Jean-François-Thérèse Chalgrin (1739-1811) with Arc de Triomphe, Louis-Pierre Baltard (1764-1846) with Palais de justice historique de Lyon, and many other architects and projects (Craven, 2019; Drexler, 1975; Garric, 2017). However, rationalism faced a new fundamental counterpart as idealism with Kant, Fichte, and Schelling (1772-1829) to form German Idealism (Tafahomi, 2023).

**Idealism as critiques on the Enlightenment**
The Enlightenment did not continue in many countries as it started. Germany was the location of the criticizing the Enlightenment philosophy which resulted in German Idealism. Ameriks (2006a) exposed that the German Idealism was a cultural movement rather than a philosophical school of thought. Kant was the key figure to start the idealism in the 18th century by criticizing Descartes' philosophy (Fleischacker, 2013). Kant's ideas were constructed based on sets of critiques on the predecessors' philosophies who formed the Enlightenment as rationalism and reasoning. Through the critiques, Kant formed a new form of metaphysics grounded on the knowing, perception, and understanding in terms of transcendental idealism (Baur & Dahlstrom, 1999). Successors philosophers developed

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German idealism such as Fichte with subjectivity, consciousness, and intellectual intuition, Schelling with non-mechanistic aspect of nature, and Hegel with dialectical history and aesthetics (Ameriks, 2006b; Dunham et al., 2011).

The main ideas of German idealism were embedded in the role of humans to understand, perceive, and interpret reality. Despite the emphases of the Enlightenment movement on the objectivity of science and knowledge from the subject, German idealism criticized the objectivity of the subject and believed in the important role of the subject to form the consciousness. For Kant, the reality of materials was dependent on the perception of the people about the materials. He criticized pure reason and practical reason through hypothetic ideas on the existence of other aspects of knowledge in the mind, perception, and experience of people (Holzhey & Mudroch, 2005; Thorpe, 2015). Kant also in answering questions about the Enlightenment criticized the unpublicized results of the Enlightenment among the general public (Kant, (1999) [1784]). The critique on pour reason was recognized as the main engine of Romanticism movement. The romanticism started by Goethe (Johann Goethe 1749-1832) and his works in Europe (Regier, 2016).

**Romanticism and Beaux Art Style**
Romanticism was also described as the "counter-enlightenment" movement in Europe (Regier, 2016, p. 170). Despite the extreme sense in the definition, romanticism in Europe was a reaction to the mathematical and rationalized form of thinking. Many factors were counted in terms of the roots of romanticism such as the French Revolution, Fichte's philosophy, and Goethe's novels (Warman, 2016). Fichte developed the Kantian ideas based on effective factors in perception such as intuition, emotion, and insight into both objects and subjects rather than rationalism. This style in art and literature refers to storytelling from the perspective of the users in daily life. The characters of romanticism in art and literature were selected by the authors from the ordinary people who engaged in extraordinary conditions to discover the right

things to do which was called by Friedrich Schiller (1759-1805) in terms of 'purification of the soul' (Guyer, 2006). The Sturm und Drang (storm and stress) musical play in 1760, Faust by Goethe in 1790, and Quasimodo by Hugo in 1831 were the characteristic streamlines of romanticism in the literature in Europe that connected the romantic art to romanticism architecture in the Beaux Art.

While rationalism and neoclassicism were the starting point of the academy and then Ecole des Beaux Art (Griffin, 2022), Kantian theories, revolutions in the world and France, and the romanticism movement transformed the Beaux Art style from neoclassicism to own special style as a selection of neoclassicism, classism, Baroque, Rocco, and Gothic under the atmosphere of romanticism. The Beaux Art style was formed based on the intuition, emotions, individualism, and meaning-ability of beauty in a wide culture. The common character of the Beaux-Arts style with the inspiration from romanticism was constructed based on symmetrical rhythms, distinctive ground and skylines, roof form, arched façades with windows, sets of windows and balconies, decorative balustrades on facades, minimalistic decorative elements from renaissance styles such as sculptures, motives, and decorative garlands, in eclecticism forms and scales. The fine examples of the Beaux Art style of design were the National School of Fine Arts (l'Écolenationale supérieure des Beaux-Arts) and then Beaux-Arts Architecture by Alexandre Lenoir (1761-1839), François Debret (1777-1850), Félix Duban (1797-1872) constructed 1830-1863, Palais de Justice, Paris by Joseph-Louis Duc (1802-1879) constructed 1847-1871, Paris Renovation Project by Georges-Eugène Haussmann (1809-1891) and the sets of Parisian apartments constructed 1854-1870, and the Royal Museum for Central Africa by Charles Girault (1851-1932) constructed 1904-1910. In 1850 the idea of the ideal city was emerged through a romantic approach to the future living style of inhabitants (Mumford, 2018). Sennott (2004) mentioned that in the Beaux-arts there were critiques of the artistic way of designing buildings rather than mathematical logic. While the Beaux Art kept

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its style for many years; however, it resulted in many student's movements (Littmann, 2000; Madanovic, 2018) to force universities to change the Beaux Art style. The study suggested that from 1929 there was another movement in the school that referred to a more modern style of design rather than Beaux Art style (Griffin, 2022).

## Polytechnics Style

European academic approach historically was divided into a dichotomy approach to classify knowledge in terms of Liberates Arts (artes liberates) and Mechanical Art (artes mechanicae) in Middle-Age era (Ruegg, 1992). In this classification, sciences were related to the earth, and nature was categorized as mechanical knowledge. However, other fields such as philosophy, laws, and art were sorted as liberates knowledge that the term of liberates was referred to the metaphysical aspects of those fields. Even medicines and architecture were classified in the liberates arts in the first classification in the 15th and 16th centuries. This classification continued in the Renaissance, Enlightenment, and the early stages of the modern era.

Evidence showed that the technical schools were established by militaries to teach technical topics such as architecture, engineering, artillery, and hydraulics to the students. For example, the Court Academy in Spain in 1583 was one of the fine examples to governmentalize and militarize the educational processes (Simone, 1996). Such kind of activities also took place in other places such as Northern Italy where the religion, law, art, and physicians field of studies were divided into specialized schools with the order of Victor Amadeus II (1675-1730) in 1719 (Frijhoff, 1996a). Pedersen (1996) made a list of the first polytechnic movements by governments in Europe to create disciplinary technical centers for military purposes in the 17th century such as Prague in 1717, Hungary 1735, France (Ecole des Ponts et Chaussées) in 1744, Freiberg in 1775, Vienna in 1776, Hanover in 1778, and Copenhagen in 1778.

The major part of the technical schools in Europe were designed either to introduce the students to the fundamental courses in science such as mathematics, chemistry, and physics as a foundation and then a new registration for professional schools such as medicines and engineering. For example, the Ecole Polytechnique of Paris was founded in 1794 "to provide basic knowledge for the further studies in more specialized Ecole'(s). The architecture course in this structure was arranged under geometry including "stereometry, architecture and fortification" (Bockstaele, 2004, p. 496). Guagnini (2004, p. 596) revealed the technical schools in Europe were a demand from militaries to train the students as future state officers in some technical fields such as "Ecole du Genie Militaire at Mezieres(from 1775, the Ecole Royale)" and "Ecole de l'Artillerie et du Genie Militaire in 1802. This training process by the technical schools was celebrated by industries and the number of the students for registration in those schools was increased. A high level of demand for technical schools resulted in tensions between the technical schools and universities at the end of the 18th century and the whole 19th century. Nonetheless, with the pressure of the central and local governments and the new orientation toward research in natural science, many technical fields were adopted in universities. This new movement resulted in new waves of war or potential of war based on the educated military officers in Europe and accelerating the establishment of Polytechnique (s) in other regions.

## Program structure and design studios
The main question raised by the technical institution was whether to train or to teach the students (Stewart, 1992). Bockstaele (2004, p. 496) analyzed the Polytechnique educational structure and highlighted that for the first time curriculum of Polytechnique recommended the general and specific aspects of knowledge such as general mathematics and applied mathematics in geometry and mechanics, general physics, and experimental physics. Nonetheless, all courses were fundamental based on the military and industry needs to lead the students for higher Ecole (ecoles

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d'application) such as "the Ecole de Medecine, the Ecole des Arts et Metiers, Ecole d'Artillerie, the Ecole du Genie militaire in Metz, the Ecole des ponts et Chaussees, or the Ecole des Ingenieurs de Vaissaux".

Ecole Polytechnique had a more construction-oriented architecture program than design as the Beaux Art. Polytechnique was a criticism on the Beaux Art style of education (Garric, 2017). Polytechnic movement was rooted in the similarity between construction and architectural activities. There is a quotation from Jean-Baptiste Rondolet (1743-1829) who argued that architecture is construction not art (Sennott, 2004). Lean Nicolas Louis Durand (1760-1834) as the first pioneer to create modular systems for building industrialization and modern architecture was a professor in Ecole Polytechnique (Sennott, 2004). The Polytechnique with the selection of some special courses to teach made a differentiation between Newtonian science and the other field of knowledge

The education in technology in Britain was more fitted on the apprenticeship activities for engineers who should work in constructions, railways, water channels, and mining. The courses were divided into different topics and projects that should be fulfilled by the students such as mathematics, mechanic, physics, engineering, drawing, astronomy, fortification, and practical activities (Frijhoff, 1996a; Guagnini, 2004). The Ecole (s) was normally led by mathematicians or engineers such as Gaspard Monge (1746–1818) a key figure of Ecole in the early 19th century. This technological perspective was the mainstream of Ecole, which some of the rationalist instructors who left or were pushed to quite from the Beaux Art, joined the Ecole Polytechnique due to the beliefs, ideology, and teaching styles such as Viollet le Duc (1814-1879) (Laroche, 2008, p. 12). Laroche advocated the main differentiation between Beaux Art and the Polytechnique was in the application of technology.

**Epistemological knowledge**
The Ecole Polytechnique (s) had a significant role in the modernization of France and European countries based on the industrialization model of development (Guagnini, 2004). The technical instructions such as Polytechnique (s) emphasized the training and practical activities in a special field due to the needs of the industries in specific locations. So the Polytechnique was well fitted to the context and market needs. They started with a basic program which was claimed by the industries and then upgraded to more developed forms.

Courses in Polytechnique (s) included three years of fundamental education and training in both theoretical and practical subjects to make ready the students for an advanced 2 years education in specialist Polytechnique (s) (Guagnini, 2004). This style of Polytechnique was vitalized by the Bologna agreement in 1994 to reorient architecture education in Europe (EEA, 1999). The new generations of the Polytechnique (s) were influenced by the Ecole Polytechnique of Paris which advocated the educational system of pupils as a "discipline". Guaginin (2004, p. 605) described the discipline in terms of the "strict and well-established rules that had their roots within the engineering community" through "apprenticeships" in a "hierarchical system" based on "experience" of experts at that time. In the middle of the 19th century, the curriculum of the Ecole Polytechnique Paris in terms of the discipline was adapted to the major Polytechnique (s) in Europe such as Prague and Vienna (Polytechnisches Landesinstitut of Prague, the Polytechnisches Institut of Vienna) in 1806 and 1815, respectively.

Napoleon supported the Ecole Polytechnique as the most "prestige center" for education in 1804 in France and it made the polytechnic a leading model of education in France and Europe (Guagnini, 2004, p. 600). Many of the foreign students participated in Ecole Polytechnique between 1800 to 1850 (Bockstaele, 2004). Even, the legitimacy and popularity of mathematics and physics were so high that civil engineering and architecture programs were

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under subdivision of physics departments such as the University of Vilnius. However, Guagnini (2004) claimed that the general trend in Europe kept civil engineering, architecture, and artillery under technology subjects in the hand of Ecole (s) of the military. This structure referred to the Newtonian rationalism, empiricism, and functionalism ideas in the design process.

**Philosophical foundations of Polytechnique (s)**
**Newtonian ideas and mechanical rationalism**
Isaac Newton (1642-1726) advocated the principles in science, philosophy, and nature through mathematics through different publications. His great work concentrated on developing, approving, and clarifying the predecessors such as Nicolaus Copernicus (1473-1543), Johannes Kepler (1571-1630), and Galileo Galilei (1564-1642) (Edelglass et al., 1991) theories in astronomy, mechanic, and mathematics. The Newtonian ideas were constructed based on the natural laws that exist in nature that could be explained through mechanics, mathematics, and physics. Those laws constructed permeant and consistent relationships that was called as principles. Newtonian ideas followed the matter section of the Cartesian ideas by Descartes based on a trinity of matter, mind, and god. In Newtonian ideas, all phenomena should be reduced into the exact matter to be observed, tested, and defined through mechanics and mathematical physics. For him, mind and god were in the field of theology and metaphysics discipline.

Matters are the central point to analyze in Newtonian ideas through science, particularly the mathematical explanation. It resulted in establishment of mathematical courses in Polytechnique (s) to train students. The mechanical and mathematical explanations were related to industry, nature, and science. This structure formed the common courses in Polytechnique such as mathematics, physics, chemistry, mechanics, and geometry. The architecture courses were also translated through mathematical relations and the laws and disciplines to follow. Newtonian approach to make laws for physical elements was resulted

to the fundamental and advanced principles, disciplines, and laws (Guagnini, 2004) that should be applied in design and construction in architecture program.

**Empiricism**
The empiricism was a result of the Enlightenment achievements to focus on the empirical evidence particularly Descartes and Hume. Hume emphasized deductive reasoning in science and philosophy. He argued that inductive reasoning creates a circular explanation rather than exact fact, evidence, and matter. Therefore, all the aspects of knowledge and science should be reduced to a deductive scale to be tested through the methods. A new generation of the Polytechnique based on the request of militaries and industries reoriented the curriculum based on related courses to empiricism.

The evidence showed (Long, 2017) that there was an interconnection between the architects, architectural projects, and education in architecture. The experimental activities in the educational center particularly in Polytechnique (s) were common through different classes and subjects in the curricula. While Blondel started this style in the Academy, however, the experimental tests on the technology, materials, and systems were developed mainly by Viollet-le-Duc the characteristic instructor of Polytechnique who was a former instructor in Beaux Art (Bressani, 2017). Empirical activities not only were a new trend in the educational undertaking but also were encouraged by industries in the context of the industrialization movement in 18th and 19 centuries.

**Functionalism**
Functionality was one of the key pillars in Vitruvian theory to define the architecture. Vitruvius categorized three fundamental prerequisites for architectural products including "firmita, utilitas, and venustas" (Jones, 1981, p. 68) in terms of construction, function, and aesthetics that were also rephrased in terms of firmness, commodity, and delight (Proudfoot, 2000). The functionality specification of buildings based on the

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Vitruvian theory was one of the elements that supported the Renaissance architecture to rebirth the Greek and Roman styles which many documents showed such respectfulness to the function of the buildings by the Renaissance architects in their design (Marder, 2017).

Functionalism was theorized in the 19th century in science and advocated in all fields of knowledge even in metaphysics. In the architecture schools, Viollet-le-Duc was the key person to emphasize the functionality of the buildings. Even, there is a hypothesis that the term of function in architecture first was seeded by Viollet-le-Duc, not by the modern architectural movement in the 20th century (Bressani, 2017). Louis Sullivan (1856-1924) in his study time in the Beaux Art in 1875 learned the theories of Viollet-le-Duc in both Beaux Art and Polytechnique. Nonetheless, Bressani (2017) claimed that many of the restoration projects by Viollet-le-Duc were more decorative than just functional. In this regard, the functionality of a building in that time was more referred to the technological aspects rather than the programming of the building (Tafahomi, 2022b). New technologies and materials advocated by the Polytechnique instructors particularly metal and glass due to the connection with industries. New materials and technologies were symbols of modernism and Europe celebrated this trend based on the Enlightenment achievements.

In detail, some exhibitions were so important to form the modernism entitling and distinguishing. It started with the Crystal Palace Great Exhibition in Hyde Park in 1951 which was a new approach to applying metal and glass in a wide range of forms, sizes, and scales. The designer was a gardener and botanist who learned design activities through apprenticeship and practices in the UK. While the main reason behind the design of the Crystal Palace was a large greenhouse for the colonial species, the building itself was a manifesto to challenge the knowledge of architecture, engineering, and design in Europe. A set of exhibitions took place in Europe to demonstrate such progress such as the Ireland Exhibition in 1853, the Munich Exhibition in 1854, and the Paris

Exposition in 1855. Those exhibitions with a great number of visitors illustrated the power of iron, glass, and technology on the new generation of buildings, architects, institutions such as Polytechnique, and technological universities.

**Bauhaus Style**
Private schools of architecture were a movement in modern times based on freedom from governments, authorities, and ideologies. For example, AA (Architectural Association) and RIBA (Royal Institute of British Architects) were established in the middle of the 19th century in the UK to lead the architecture practice and education out of the government structure. It was a starting point for the private and semi-private schools of architecture. Bauhaus in short and interrupted life opened a new perspective for the art, craft, architecture, and design in the modern time of Europe and then in the world. Berman (1988) pointed out that Bauhaus was a reaction to the results of WWI (World War One) in terms of modern style of design, crucial point of view to history, and industrial mass production. However, in the four volumes of the history of the universities in Europe, there is no name of Bauhaus. It seems this school of design and architecture did not exist in the history of the universities and higher education in Europe.

Bauhaus was established in 1919 after WWI in the Weimar Republic by merging two previous schools the "Academy of Fine Art" established in 1903, and the "Weimar Art and Craft Institute" (Curtis, 1982, p. 119). Bauhaus (Building-House) was a new term to show the objective of the new school in German language. Walter Gropius (1883-1969) was recommended as the new director of the institution to shape the school. The main idea in the new curriculum was integration between art, architecture, and craft activities with the support of Johannes Itten (1888-1967) Swiss expressionist painter. All studios were shifted from atelier-based to craft-based workshops. The motto of the school was constructed based on the "no distinction between artist and craftsmen" (Frampton, 1992, p. 123). The study suggested that Bauhaus was influenced by the

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British Art and Graft movement and the Munich Blue Rider style as a German expressionist led by Wassily Kandinsky (1888-1944) at that time. The first location of Bauhaus was in Weimar in 1919 until 1924. Then it was relocated to Dessau based on some political and financial issues. Despite no evidence of the Marxist idea in the Gropius publications, however, his speeches and the curriculum of Bauhaus referred to some level of sympathy and appreciation of the labor workers (Frampton, 1992). In addition, the second director of Bauhaus was a member of the socialist party in the country (1925-1930) and there were many collaborations with the Vkhutemas (Higher Artistic and Technical Workshops in the Soviet Union) movement that resulted in a new method of education as teamwork between tutors and students rather than up-down method (Adaskina, 1992; Bokov, 2021; Tafahomi, 2023). The third director of Bauhaus was Mies Van der Rohe who shifted the location of Bauhaus to Berlin (1930-1933). Bauhaus was disbanded by the pressure of the Nazi party in 1933. Despite the short life of Bauhaus for 14 years, Bryant (2004, p. 73) exposed that Bauhaus was the ultimate symbol of modernism for the change of the society through " a new social order through a new art" and consequently architecture which manifested by Gropius in 1919. While Bauhaus advocated an "apolitical socialism" based on "brotherhood manners" rather than a political orientation (Curtis, 1982, p. 119), however, the style of working in Bauhaus reflected a traditional working style similar to the medieval era based on the masonry and apprenticeship activities.

All Bauhaus architect-instructor had Polytechnique backgrounds or masonry experiences such as Walter Gropius at the Technical Universities of Munich and Berlin, Adolf Loos (1870-1933) at Dresden University of Technology, Adolf Meyer (1881-1929) in Kunstgewerbeschule (Applied Art) Cologne and Düsseldorf (Bauhaus, 2024), Hans Wittwer (1894-1952) in ETH Zurich, Hannes Meyer (1889-1954) through apprentice activities, Mies van der Rohe (1886-1969) through apprentice activities under supervision of Peter Behrens (1868-1940) who was an artist, architect, and craftsmen. Behrens's office inspired Gropius, Meyer, Rohe, and even Le Corbusier to be part of the art and craft movement when all of them worked in the office of Behrens in Berlin.

**Program structure and design studios**
The basic design course was an innovation by Bauhaus to introduce the students to the purpose-based design style through a combination of art, craft, and design. The materials, textures, fabrics, and colors were applied based on principles of design such as proportion, rhythm, and contrast (Cross, 1983). The basic design was presented by Itten in the first three years of the school, however, with Moholy-Nagy (1895-1946) the Hungarian designer the course shifted to more practical activities for products rather than theories of art (Curtis, 1982). Frampton (1992) mentioned that the main differentiation between the ideas of Itten and Moholy-Nagy in education was located in the spiritual and metaphysical foundations of Itten's ideas to teach art to the students.

According to the diagram of Bauhaus's curriculum (Getty, 2024), the program in Bauhaus included 4 to 5 years of studies in different levels and topics. The students started with preliminary courses in basic form, design, and workshops to learn drawing and design methods and techniques including proportions, color, shapes, forms, and compositions. The successful students participated in some progressive courses such as composition, natural and materials-tools, fabrics-colors, and construction studies. With this knowledge, the students participated in workshops such as metal, clay, stone, glass, color, wood, and fabric (texture). Those workshops provided experiments and knowledge to apply in buildings and construction which was the ultimate objective of Bauhaus. The final year was related to the specialized course in architecture, product design, or industrial design. This curriculum appeared in the motto of Gropius in terms of no differentiation between art and craft based on the art and craft movement at that time.

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Hannes Meyer, the second director of Bauhaus established specialized departments such as architecture in 1927 in Dessau (Bauhaus, 2024). Some of the courses added to the curriculum of Bauhaus such as philosophy, psychology, sociology, and photography were added into discussion and courses. Frampton (1992, p. 126) mentioned that the pedagogy of the Bauhaus was designed based on working with machines for "mass productions". Constructivist, expressionist, and suprematist approaches were celebrated by Bauhaus. The students started with a simple problem and mechanical machines and gradually the problem and machine became complicated. It was so similar to the factory structure of production. For this reason, Bauhaus made contracts with industry for the productions. The problem solving constructed a process of research in workshops by the students (Mindrup, 2014).

**Epistemological knowledge**
Cross (1983) attempted to draw a line between John Dewey's (1859-1952) pragmatic theories and Bauhaus's educational structure in terms of philosophical background. However, Fallace (2017) revealed that the atmosphere of education in the US was polluted with anti-German ideas that there were appeared in work of Dewey. The common ground for education in Germany and the US was German Idealism particularly Herbartians' philosophy (Johann Friedrich Herbart 1776-1841) and some aspects of Hegelian and Marxism thoughts based on the values of the educational centers to shape a new society. Nonetheless, the root of the pre-pragmatic approach in the Bauhaus should be investigated in the apprenticeship activities in the office of Behrens in terms of processes of art, craft, architecture, and design that were so effective on the structure of the Bauhaus.

This structure of the working in Behrens and Bauhaus was so close to the structure of teaching architecture in the Academy of Platonica in Florence (Frijhoff, 1996) based on apprenticeship through different practices through materials and skills that Frampton (1992, p. 126) called this style of the education in terms of "medieval" style. This style of

education was internalized by some of the instructors who did not have any official architecture education background but they learned art and design through masonry, practice, and self-learning. For this reason, the workshops were the main location of training and educating of the students in the earlier stage of Bauhaus (Doyle, 2016). The study mentioned that the most achievement of Bauhaus was the equality of the students and staff to work together in workshops and product processes (Cross, 1983).

While there are many advocating left-wing movements in Bauhaus, evidence of sympathy between the staff and the Marxist ideas in the Soviet Union, and collaborations with the Vkhutemas movement, however, the main objective and mission of the Bauhaus was to teach the students through self-experience and doing in the real context of the society. This process was more close to the German Idealism theories such as Fichte, Herbert, and Hegel rather than Marxist-Leninist theories for education.

Two factors were so significant in the shaping of the philosophy of education in Bauhaus. First, Behrens's office influenced deeply of his apprentices to see architecture not only building but also a process of the production and industrialization of materials, and product design. Second, working as construction workers, masons, and draftsmen in different offices and projects framed their ideas to apply craft as the main medium to design projects. There were three contextual and effective ideas that shaped Bauhaus philosophy for education including socialism and Marxism, modernism, and constructivism movements.

**Philosophical foundations of Bauhaus**
**Sociology and Marxism**
Europe and France were centers of the social and particularly urban movements between the 18th to the 20th centuries. Four times revolutions, three republics, three empires between 1789 to 1871, other revolutions in the world such as Haiti and the United State, renovation of the Paris by Hussmann made the social issues on the top list of requests by the

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general public and political activists such as Hegel, Auguste Comte (1798-1857), Proudhon (1809-1865), Marx (1818-1883), and Engels (1820-1895) through different research and publications (Tafahomi, 2023). The social theories were formulated by Comte under the supervision of Saint-Simon (1760-1825) who was an important activist in the French Revolution. Comte advocated the term sociology in mathematical and experimental ways to study human life in a sociological context he formulated it in terms of positivism. In addition, Engels published a book about the working class conditions in England in 1845 as the first systematic research about the working class, and three years later Marx and Engels published the Communist Manifesto in 1848 to expose the condition of the laborers after the industrial revolution (Royce, 2015).

Due to increasing the population of cities based on industrialization and social diversities architecture arrived at the central point to deal with social problems. Some new approaches to urban planning and industrial cities were introduced by Arturo Soria y Mata (1844-1920) an engineer, Ebenezer Howard (1850-1928) a journalist, Tony Garnier (1869-1948) and Eugène Alfred Hénard (1849- 1923) architects (Mumford, 2018) that referred to the imagination about by-pass, garden, and monumental cities, respectively (Hall, 2014). In the late of the 19th century the first movement for affordable and social housing took place in Europe and the US through the investment of municipalities such as London and Manchester in England and industrial companies such as Pullman in the US. This process of paying attention to social aspects of the design resulted in thinking about the process of architectural design in terms of social context and people needs. Frisby (2004) highlighted that without social, political, and economic changes cannot imagine modernism in the world. Under advocating of the social equality, Bauhaus moved toward standardization of design to generalize the results to everywhere in terms of international style. The standardization was rooted in the Polytechnique-biological approach and the social theory of the similarity of human needs (Whitford, 1981). In addition, the Constructivist art, Suprematism, De Stijl styles also were a reaction to the social and political norms to present an alternative art and point of view to the world which applied in Bauhaus as a grounded style.

**Modernism**
Modernism is a label to covers all changes between the 18th to the 20th centuries as a result of the Enlightenment. Despite a variety of definitions in literature, modernism was a clear result of the Enlightenment era. Studies on the achievements of the Renaissance and Enlightenment movements listed 5 important accomplishments including 1) empiricism to examine all observations, 2) rationalism to apply methods, 3) skepticism to question beliefs, 4) liberalism to respect individuals, 5) human rights to establish common laws (Dupre, 2004; Fleischacker, 2013; Schmidt, 1996; Tafahomi, 2023). Those achievements resulted in to institutionalize academic center in Europe and other countries. Both institutionalization and industrialization paved the way for modern society. Lavey (1996) in the definition of modernism referred to a 'difference' in any aspect of the previous style of beliefs, life, and actions with the new one. This differentiation from the past was the key essence of modernism. Berman (1988) advocated modernism with a sentence from the Communist Manifesto "All that is solid melts into air". He implied the role of Marxism in publicizing modernist ideals in the world through experiences in different societies and contexts. Industrialization, rationalism, liberalism, and secularism constructed modernism to give room for the individuals.

The modernism process was not expanded in a similar way in all societies, and there were sets of differentiation between the social space and physical spaces in the modernity expressions (Frisby, 2004). Nonetheless, modernity referred to modern social relationships that before did not exist. Particularly, the White and Red revolutions in Russia as ideological change, the WWI (World War I) as political change, rising powers for women and labor in cities as social change were some elements shaped modern thinking in the 20th century to form modern

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architecture (Berman, 1988; Whyte, 2004) as context of Bauhaus for education. This context also generated a great cluster of architects who formed particular styles in architecture in terms of modernism such as Frank Lloyd Wright (1867-1959) with organic theory, Le Corbusier (1887-1965) with machine theory, Walter Gropius (1983-1969) with international idea, Mies van der Rohe (1886-1969) with glass cube, Erich Mendelsohn (1887-1953) with utilities idea which all of them graduated from Polytechnique institutes although some of them took the title as Technology.

## Constructivism theory in art and Architecture

Constructivist theories had rooted in the Art and Cart, Art Nouveau, and school Vkhutemas movements as the manifesto of modern time for art, design, and architecture. Harvard (2013) exposed that the foundation of the art and craft movement was rooted in social movement in the late 19th and earlier times of the 20th century. The art and Craft movement and the Art Nouveau style were a parallel movement to represent modern art in the century although there are some disagreements on this interlocking concept. While the art and craft rejected historicism in general, however, they applied art, aesthetics, and geometric principles in designing things and goods for market and decorations. The movements were a reaction to the mass production and industrialization of art decoration, and design. They started in the 19th century to criticize the low quality of the applied art and design to produce goods for markets. They believed in the quality and artistic aspects of the design to improve the visual and perceptual qualities for people in their social context.

While the movements were effective in the Bauhaus; however, many artists such as Moholy-Nagy, Paul Klee, and Wassily Kandinsky, Piet Mondrian transformed all art styles in Bauhaus and constructed their special style of design based on the constructivist social theory of art. The applied art in a modern time was the main objective of the movements although art and craft movement was related to pragmatic theory (Fallace, 2017). Drexler

(1975) mentioned craft was an initial orientation by Bauhaus to produce craft students to be part of the modernism movement. This movement was based on a geometric design that fitted well with industrialization and machinery activities. Nonetheless, all movements in the Bauhaus transformed into a modern style of art and design that was fundamentally different from the original styles to advocate a modern style of design for a modern society.

## Conclusion

The Beaux Art School in Paris faced three times transformations (one source referred to four times) based on rationalism, idealism, and romanticism to respond to contextual demands for the neoclassic, national, and innovative styles. Despite the emphasis on the construction techniques in the earlier years of the Beaux Art, after the Great Revolution and other political instability, the Beaux Art shifted to the more artistic aspects of the design through the celebration of the great architectural project in Rome and some innovation to contextualize for France. The Beaux Art style was regenerated by other architects across the world through the unique style of the design of the building. This style was constructed based on the bureaucratic perspective to show development, power, beauty, and glory through architectural projects. Artistic aspects of the design were the core value of design and the school and patrons celebrated this style. Knowledge of the students was formed based on patron-oriented atelier activities through lectures, drawings, and sketches based on the glory projects. This structure of knowledge was more fitted to the apprenticeship activities in private offices.

Polytechnique schools were organized by the military and governments to provide basic knowledge and skills for the students through 3 years of study in science, technology, and practices. After 3 years, the students should be spent 2 extra years in the specialized Polytechnique to be graduated in a specific discipline. The foundation of the Polytechnique was based on the industrialization process and demands for engineers, practitioners, and operators of the machines in factories. The

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Polytechnique (s) constructed a system of categorization of courses based on basic, fundamental, and applied topics-modules such as mathematics, mechanics, chemistry, physics, and construction. In the architecture programs, they applied the system of education close to construction based on the innovation of building technology, function, and materials, particularly metal and glass. The system of education was constructed based on disciplines and principles in design. This discipline resulted in a modular system of construction for houses, factories, and public buildings, particularly schools and hospitals. The topic was established on the basic, fundamental, applied, and advanced that were translated into projects 1, 2, 3, and so on depending on the level of complexity of the projects. The philosophical foundation of Polytechnique was enjoyed rationalism, empiricism, and functionalism in education. The Polytechnique (s) applied teacher-center based education due to the military structure and some strict regulations on the campuses.

Bauhaus was an orientation toward the craft, labor, and socialist movements in Europe. The education in Bauhaus was drafted based on the basic design, workshops, theories, and product projects or prototypes. This process shifted the main activities from classes or ateliers to workshops for materials and sites. So, the workshops are named after topics such as metal, weaving and fabric, wood, clay, and so on. These titles also applied to architecture and construction courses such as houses, schools, and factories. The students and tutors worked together to produce final products for markets and industries. Working together created an atmosphere of equality and brotherhood in the school under socialism theories and collaborations with the Vkhutemas as a new trend in student-teacher relationships. Bauhaus improved the connection between art and craft through constructivist artists and architects to manifest modernism. The results of WWI changed all permanent ideas and put into question the social, economic, and political structures. Modernism and craft respond to the need to change lifestyle. Modernism took place as the ultimate purpose of Bauhaus to be different from the past and be modern in real time for art, design, and architecture.

Despite some similarities and many dissimilarities in those schools, this research discovered four factors that have been effective in the shaping of the educational styles in the three schools including philosophical and ontological foundation, epistemology of knowledge, architecture projects and context, and architects' belief and ideology. Figure 2 represents this relationship. An architecture school is the result of interaction between
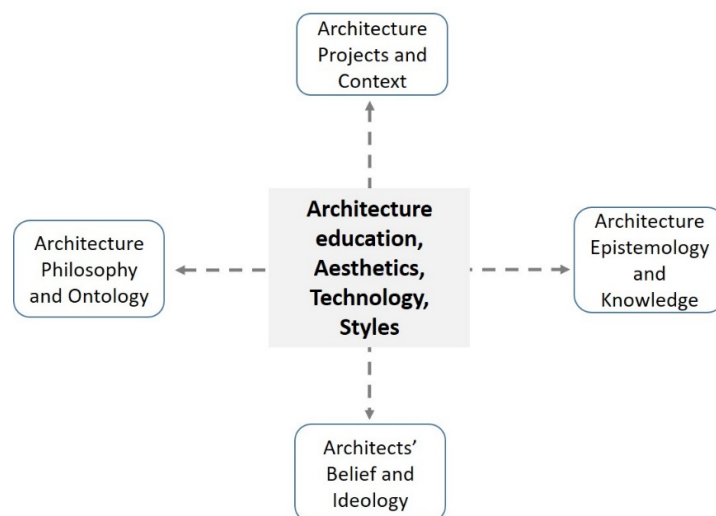


*Figure 2:* the relationships between the architectural aspects

society's ideas, beliefs, and demands that are manifested through curriculum, program structure, and activities in theoretical and practical activities. While traces of the Vitruvian components including firmness, commodity, and delight still could be recognized in architecture education, those components have been changed, transformed, or developed by time and location. Architecture education still is a hot topic to see as market-driven oriented, inner-driven oriented or social-driven oriented.

Architecture's design projects, processes, and education respond to environmental requirements, social needs, cultural beliefs, and technological progress due to time and location. Education in architecture demonstrates the philosophical foundations and methods of acquiring knowledge through the curriculum, program structure, and modules. The actions of instructors have been following some instructions based on a dictated structure, personal learning styles, or self-exploration to discover effective methods in teaching activities. The important result of this paper is to expose the relationships between philosophical thoughts and teaching activities in design studios as the manifesto of the beliefs and values. The style of teaching is a culture that is formed through every day activities by instructors. Therefore, due to the wide range of schools of architecture, the variety of educational styles refers to the differentiation in those foundations. Nonetheless, this variety creates an opportunity to expand the domains of knowledge through collaboration rather than restriction.

**References**
Adams, A. (2008). *Medicine by Design – The Architect and the Modern Hospital 1893-1943*. Minneapolis: University of Minnesota Press.

Adaskina, N. (1992). The place of Vkhutemas in the Russian Avant-garde. In G. Musium, *The Great Utopia: The Russian and Soviot avant-garde 1915-1932* (pp. 284-293). New york: Guggeneim Musium.

Ameriks, K. (2006a). Introduction: Interpreting German Idealism. In K. Ameriks, *The Cambridge companion to German idealism* (pp. 1-17). Cambridge University Press.

Ameriks, K. (2006b). The critique of metaphysics: The structure and fate of Kant's dialectic. In P. Guyer, *The Cambridge Companion to Kant and Modern Philosophy* (pp. 328-365). Cambridge University Press,.

APA, A. (2006). *Planning and Urban Design Standards*. New Jersey: John Wiley and Sons Inc.

Armstrong, C. D. (2016). French architectural thought and the idea of Greece, eighteenth and nineteenth century French views on Greek architecture. In M. M. Miles, *A Companion to Greek Architecture* (pp. 487-508). New York: John Wiley & Sons, Inc.

Barker, C. (2005). *Cultural Studies: Theory and Practice*. New Delhi: Sage.

Bauhaus. (2024, 10 26). Bauhaus Kooperation . Retrieved from Adolf Meyer: https://bauhauskooperation.com/wissen/das-bauhaus/koepfe/biografien/biografie-detail/person-1442#:~:text=From%201903%2C%20he%20attended%20the,in%20his%20studio%20in%20Berlin.

*Baur, M., & Dahlstrom, D. O. (1999). The Emergence of German Idealism.* The Catholic University of America Press.

Bently, I., Alcock, A., Murrian, P., McGlynn, S., & Smith, G. (2003). *Responsive*

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

375

*Environments: A Manual for Designers* (3th Edition ed.). Oxford, UK: Architectural Press.

Berman, M. (1988). *All that is Solid Melts into Air: The Experience of Modernity* (3 ed.). New York: Penguin Books.

Bockstaele, P. (2004). The mathematical and the exact sciences. In W. Ruegg, *A History of the University in Europe: Universities in the Nineteenth and Early Twentieth Centuries (1800–1945)*, (pp. 493-517). New York: Cambridge University Press.

Bockstaele, P. (2004). The Mathematical and the Exact Sciences. In W. Ruegg, *A History of the University in Europe: Universities in the Nineteenth and Early Twentieth Centuries (1800-1945)* (pp. 493-517). Cambridge University Press.

Bokov, A. (2021). *Avant-garde as Method: Vkhutemas and the Pedagogy of Space, 1920–1930*. Park Books.

Boradkar, P. (2010). Design as problem solving. In R. Frodeman, *The Oxford Handbook of Interdisciplinary* (pp. 273–287). Oxford, UK: Oxford University Press.

Bressani, M. (2017). Viollet-le-Duc's rationalism. In H. F. Mallgrave, *The Compansions to the History of Architecture*: *Vol III: Ninetheen-century Architecture* (pp. 227-242). New York: John WIlly and Sons Inc.

Britannica. (2006*). Encyclopedia Consice Britannica*. London: Encyclopedia Britannica, Inc.

Britannica. (2024, 9 25). Philosophy . Retrieved from Britannica:
 https://www.britannica.com/topic/philosophy

Broadbent, G. (1995). Architectural Education. In M. Pearce, & M. Toy, *Educating Architects* (pp. 1-15). London: St Martin's Press.

Brotton, J. (2006). *The Renaissance: A Very Short Introduction*. New York: Oxford University Press Inc.

Bryant, G. (2004). Projecting modern culture: 'aesthetic fundamentalism' and modern architecture. In M. Hvattum, & C. Hermansen, *Tracing Modernity : Manifestations of the Modern in Architecture and the City*. New York: Routledge.

Carley, K. (1990). Content analysis. In R. E. Asher, *The Encyclopedia of Language and Linguistics*. Edinburgh: Pergamon Press.

Carlhian, J. P. (1979). The Ecole Des Beaux Art: Modes and manners. *Journal of Architecture Education* , 33(2), 7-17.

Carmona, M. (2001). *Housing Design Quality: through Policy, Guidance and Review*. London: Spon Press.

Chiarella, D. (2005). *The History of Urban Planning and Cities*. Lulu.com; null edition.

Ching, F. D. (2015). *Architectural Graphic* (6 ed.). New York: Willy.

Craven, J. (2019, November 11). Discover the beauty of Beaux Arts: Exuberant and classical Architecture inspired by France. Retrieved July 15, 2021, from
https://www.thoughtco.com/what-is-beaux-arts-architecture-178195

Creswell, J. W., & Creswell, D. J. (2018). *Research Design, Qualitative, Quantitative, and Mixed Methods Approaches*. London: SAGE Publications, Inc.

Crosland, M. (1992). *The French Academy of Sciences: As a Patron of the Medical Sciences in the Early Nineteenth Century*. Cambridge University Press.
https://doi.org/10.1017/CBO9780511563713

Cross, A. (1983). The educational background to the Bauhaus. *Design Studies*, 4(1), 43-52.

Crowe, N., & Laseau, P. (2011). *Visual Notes for Architects and Designers* (2 ed.). Wiley.

Crumley, J. S. (2009). *An Introduction to Epistemology*. New York: Broadview Press.

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in
Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

376

Cunningham, A. (1980). Educating Around Architecture. *Studies in Higher Education*, 5(2), 131-147.

Curtis, W. J. (1982). Walter Gropius, German expressionism, and the Bauhaus. In W. J. Curtis, *Modern Architecture since 1900* (pp. 118-131). Oxford: Phaidon Press Limited.

Dennen, V. P. (2004). Cognitive apprenticeship in educational practice: Research on scaffolding, modeling, mentoring and coaching as instructional strategies. In D. Jonassen, *Handbook of Research in Educational Technology* (pp. 813–828). Mahwah, NJ: Lawrence Erlbaum.

Denzin, N. K., & Lincoln, Y. S. (2018). *The SAGE Handbook of Qualitative Research* (5 ed.). Los Angeles: SAGE Publications, Inc.

Doyle, S. (2016). *Bringing Bauhaus back: Digital architecture + contemporary craft. Architecture/Practice: Pre-Modern Training For a Postmodern Practice* (pp. 1-7). Iowa: the Architecture at Iowa State University Digital Repository.

Draper, J. (1977). The Ecole des Beaux-Arts and the architectural profession in the United States: The case of John Galen Howard. In S. Kostof, *The Architect* (pp. 209–238). New York: Oxford University Press.

Drexler, A. (1975). *The architecture of the Ecole des Beaux Arts*. New York: The Museum of Modern Art.

Dreyfus, L. H., & Rabinow, P. (1982). Michel Foucault; *Beyond Structuralism and Hermeneutics*. New York: Harvester Wheatsheaf.

Drisko, J. W., & Maschi, T. (2016). *Content Analysis*. Oxford: Oxford University Press.

Dunham, J., Grant, I. H., & Watson, S. (2011). *Idealism: A History of a Philosophy*. New York: McGill-Queen's University Press.

Dupre, L. (2004). *The Enlightenment and the Intellectual Foundations of Modern Culture*. New Haven: Yale University Press.

Edelglass, S., Maier, G., Gebert, H., & Davy, J. (1991). *Matter and Mind: Imaginative Participation in Science*. Lindisfarne.

EEA. (1999). The Bologna Declaration of 19 June 1999. European Commission .

Elo, S., Kääriäinen, M., Kanste, O., Pölkki, T., Utriainen, K., & Kyngäs, H. (2014*). Qualitative Content Analysis: A Focus on Trustworthiness*. SAGE Open, 2(1), 1-10.

Ezzy, D. (2002). *Qualitative Analysis: Practice and Innovation*. Sydney: Allen & Unwin.

Fallace, T. (2017). Reading Democracy and Education in the Context of World War I. Democracy & Education, 25(1), 1-7. Retrieved from Reading Democracy and Education: http://democracyeducationjournal.org/home/vol25/iss1/5

Fields, D. W. (2000). *Architecture in Black: Theory, Space, and Appearance*. New York: Bloomsbury.

Fleischacker, S. (2013). *What is Enlightenment? Kant's Questions*. New York: Routledge.

Fox, S. (2013). Architecture School: Three Centuries of Educating Architects in North America. *Journal of Architectural Education*, 67(2), 304-305. https://doi.org/10.1080/10464883.2013.817180

Frampton, K. (1992). The Bauhaus: Evolution of an Idea 1919–32. In K. Frampton, *Modern Architecture: A Critical History* (3 ed., pp. 123-129). New York: Thames and Hudson, Inc.

Franz, J. M. (1994). A Critical Framework for Methodological Research in Architecture. *Design Studies*, 15(4), 433-447.

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

377

Frayling, C. (1993). Research in Art and Design. *Royal College of Art Research Paper*, 1(1), 1-5.

Frijhoff, W. (1996). Patterns. In H. d. Ridder-Symoens., *Universities in Early Modern Europe, 1500-1800* (pp. 43-106). Cambridge : Cambridge University Press.

Frijhoff, W. (1996a). Graduation and Careers. In H. d. Ridder-Symoens, *Universities in Early Modern Europe, 1500-1800* (pp. 355-415). Cambridge : Cambridge University Press .

Frisby, D. (2004). Analysing modernity: some issues. In M. Hvattum, & C. Hermansen, *Tracing Modernity: Manifestations of the Modem in Architecture and the City* (pp. 3-22). New York: Routledge.

Garric, J.-P. (2017). The French Beaux-Arts. In M. Bressani, & C. Contandriopoulos, *The Companions to the History of Architecture, volume III, Nineteenth Century Architecture, part I: Historicism, the Beaux-Arts, and the Gothic* (pp. 1-15). New York: John Wiley & Sons, Inc.

Getty. (2024, 10 27). The Getty Research Institute. Retrieved from Bauhaus : https://www.getty.edu/research/exhibitions_events/exhibitions/bauhaus/new_artist/history/principles_curriculum/

Given, L. M. (2008). *The SAGE Encyclopedia of Qualitative Research Methods*. Thousand Oaks, CA: SAGE Publications, Inc. https://doi.org/10.4135/9781412963909

Goldschmidt, G. (2002). One-on-One': a Pedagogic Base for Design Instruction in the Studio, in. In D. Durling, & J. Shackleton (Ed.), *Common Ground - DRS International Conference* (pp. 1-11). London: DRS International Conference. Retrieved from https://dl.designresearchsociety.org/drs-conference-papers/drs2002/researchpapers/

Gomez, A. P. (2003). *Hermeneutics as Architectural Discourse*. Singapore: Department of Architecture, National University of Singapore.

Griffin, A. (2022). *The Rise of Academic Architectural Education: The Origins and Enduring Influence of the Acadâemie d'architecture*. New York: Routledge.

Grimm, S. R. (2011). Understanding. In S. Bernecker, & D. Pritchard, *The Routledge Companion to Epistemology* (pp. 84-94). New York: Routledge.

Groat, L., & Wang, D. (2002). *Architectural Research Methods*. New York: John Wiley & Sons INC.

Guagnini, A. (2004). Technology. In W. Ruegg, *A History of the University in Europe: Universities in the Nineteenth and Early Twentieth Centuries* (1800-1945) (pp. 593-). Cambridge University Press.

Guyer, P. (2006). Kant's ambitions in the third Critique. In P. Guyer, *The Cambridge Companion to Kant and Modern Philosophy* (pp. 642-698). New York: Cambridge University Press.

Hall, P. (2014). *Cities of Tomorrow: An Intellectual History of Urban Planning and Design since 1880* (4 ed.). New York: John Wiley & Sons Ltd.

Hancock, J. (1995). The interpretive turn: Radical hermeneutics and the work of architecture. ACSA Annual Meeting History Theory Criticism, (pp. 183-188). New York.

Harvard, A. H. (2013). *History of Modern Art: Painting, Sculpture, Architecture, Photography* (3 ed.). New York: Pearson Education, Inc.

Holzhey, H., & Mudroch, V. (2005). *Historical Dictionary of Kant and Kantianism*. London: Scarecrow Press, Inc.

Jin, H. (2021). Deconstructive Hermeneutics of Nature and Culture: Thinking After Derrida. *Space and Culture*, 24(4), 679-696. https://doi.org/10.1177/1206331219828287

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

378

Jones, D. (1981). Architecture as a Discipline of the Humanities. *Journal of Architectural Education*, 34(4), 18-23. https://doi.org/10.1080/10464883.1981.107586 65

Jones, M. W. (2015). Greek and Roman Architectural Theory. In C. Marconi, *The Oxford Handbook of Greek and Roman art and Architecture* (pp. 62-94). New York: Oxford University Press.

Kant, I. ((1999) [1784]). An answer to the question: What is enlightenment? In M. J. Gregor, *Practical Philosophy. The Cambridge Edition of the Works of Immanuel Kant* (pp. 11-22). Cambridge, UK: Cambridge University Press. https://doi.org/10.1017/CBO9780511813306.005

Karatani, K. (1995). *Architecture as Metaphor: Language, Number, Money*. Cambridge, Massachusetts: The MIT Press.

Kavuran, T., & Dede, B. (2016). The roles of art educationalists to realize the aims of the art education: Bauhaus case. *Global Journal of Arts Education*, 6(4), 126-132.

Kemmis, S., & Groves, C. E. (2018). *Understanding Education: History, Politics and Practice.* Singapore: Springer Nature Singapore Pte Ltd. https://doi.org/10.1007/978-981-10-6433-3

Koskinen, I., Zimmerman, J., Binder, T., Redstrom, J., & Wensveen, S. (2011). *Design Research through Practice*. New York: Elsevier, Morgan Kaufmann.

Krippendorff, K. H. (2003). *Content Analysis: An Introduction to its Methodology* (2 ed.). New York: Sage Publications.

Labaree, D. F. (2008). An Uneasy Relationship: The History of Teacher Education in the University. In M. Cochran-Smith, S. Feiman-Nemser, D. J. McIntyre, & K. E. Demers, *Handbook of Research on Teacher Education: Enduring Questions in Changing Contexts* (pp. 290–306). New York: Routledge & Association of Teacher Educators.

Lacey, A. R. (1996). *A Dictionary of Philosophy*. New york: Routledge.

LaGro Jr, J. A. (2008). *Site Analysis: A Contextual Approach to Sustainable Land Planning and Site Design*. New Jersey: John Wiley & Sons, Inc.

Lang, J. (2005). *Urban Design: A Typology of Procedures and Products*. London : Architectural Press.

Langmead, D., & Garnaut, C. (2001). *Encyclopedia of Architectural and Engineering Feats*. Santa Barbara, California: ABC-CLIO, Inc.

Laroche, D. (2008). *The Relationship between the Beaux-Arts school and the French school at Athens. 100 Years with Danish Architect at l'École française d'Athènes*, Monographs of the Danish Institute at Athens. 13, pp. 11-17. Athens: Danish Institute at Athens.

Laseau, P. (2000). *Graphic Thinking for Architects and Designers* (3 ed.). New York: Wiley.

LDCRT. (2024, 9 22). Louisiana Department of Culture, Recreation & Tourism. Retrieved from The Beaux Art style: chrome-extension://efaidnbmnnnibpcajpcglclefindmkaj/https://www.crt.state.la.us/Assets/OCD/hp/nationalregister/historic_contexts/beauxartsREVISED.pdf

Lerner, F. (2005). Foundations for Design Education: Continuing the Bauhaus Vorkurs Vision. *Studies in Art Education*, 46(3), 211-226.https://doi.org/10.1080/00393541.2005.11650075

Littmann, W. (2000). Assault on the Ecole: Student Campaigns against the Beaux Arts, 1925–1950. *Journal of Architectural Education*, 53(3), 159–166.

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

379

Long, P. O. (2017). Architecture and the Sciences. In A. Payne, *The Compansions to the History of Architecture: Vol I: Renassiance and Barouqe Architecture* (pp. 191-219). New York: John Willy and Sons Inc.

Lupton, E. J., & Miller, A. (1993). *The ABC's of Triangle, Square, Circle: The Bauhaus and Design Theory*. New York: Princeton Architectural Press.

Madanovic, M. (2018). Persisting Beaux-Arts Practices in Architectural Education: History and Theory Teaching at the Auckland School of Architecture, 1927–1969. *Interstices Auckland School Centenary Special Issue*, 9-24.

Marder, T. A. (2017). Vitruvius and the Architectural Treatise in Early Modern Europe. In H. F. Mallgrave, *Companions to the History of Architecture Volume I, Renaissance and Baroque Architecture* (pp. 42-72). New York: John Wiley & Sons, Inc.

Maskivker, J. (2014). Self-cultivation and Moral Choice. *Journal of Moral Philosophy*, 11(2), 131–158. https://doi.org/10.1163/17455243-4681015

Mayring, P. (2000). Qualitative Content Analysis. *Forum: Qualitative Social Research*, 1(2).

Merriman, J. (2010). *A History of Modern Europe: From the Renaissance to the Present* (3 ed.). New York: W. W. Norton & Company, Inc.

Mindrup, M. (2014). Translations of Material to Technology in Bauhaus Architecture. Wolkenkuckucksheim *Internationale Zeitschrift zur Theorie der Architektur*, 19(33), 161-172. Retrieved from cloud-cuckoo.net/fileadmin/issues_en/issue_33/articl e_mindrup.pdf

MOMA. (1976). *The architecture of the Ecole des Beaux Arts.* New York, Washington: The Museum of Modern Art .

Mugerauer, R. (1995). *Interpreting Environments: Tradition, Deconstruction, Hermeneutics*. Texas: University of Texas.

Mumford, E. (2018). *Designing the Modern City: Urbanism since 1850*. New Haven: Yale University Press.

Neuman, L. W. (2006). *Social Research Methods: Qualitative and Quantitative Approaches*. New York: Pearson Education.

Norberg-Schulz, C. (2019). Genius Loci: Towards a Phenomenology of Architecture. In *Historic Cities: Issues in Urban Conservation* (pp. 2-31). Los Angeles: The Getty Conservation Institute.

OER, O. (2024, 10 2). Art History. Retrieved from LibreTexts Project: https://human.libretexts.org/@go/page/53120

Pallasmaa, J. (2005). *The Eyes of the Skin: Architecture and the Senses*. Sussex, UK: John Willy & Sons.

Park, S. (2020). Rethinking Design Studios as an Integrative Multi-layered Collaboration Environment. *Journal of Urban Design*, 25(4), 523–550. https://doi.org/10.1080/13574809.2020.1734449

Pedersen, O. (1996). Tradition and Innovation. In H. d. Ridder-Symoens,, *Universities in early Modern Europe, 1500-1800* (pp. 452-487). Cambridge: Cambridge University Press.

Proudfoot, M., & Lacey, A. R. (2010). *The Routledge Dictionary of Philosophy* (4 ed.). New York: Routledge.

Proudfoot, P. R. (2000). Structuralism, Phenomenology and Hermeneutics in Architectural Education. *International Journal of Architectural Theory*, 2, 1-17.

Ramzy, N. S. (2010). Between the École Des Beaux-Arts and the Bauhaus: Modern Architecture as an Outcome of the Enlightenment Philosophy. *Ain Shams Journal of Architectural Engineering*, 2, 53-65.

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?
380

Regier, A. (2016). Johann Georg Hamann Metacritique and Poesis in Counter-Enlightenment. In P. Hamilton, *The Oxford Handbook of European Romanticism*. (pp. 165-183). Oxford: Oxford University Press.

Rescher, N. (2003). *Epistemology: An Introduction to the Theory of Knowledge*. New York: State University of New York Press, Albany.

RIBA. (2014). *Architects and Research-based Knowledge: A Literature Review*. London: Royal Institute of British Architects.

Roche, D. (2000*). France in the Enlightenment*. (A. Goldhammer, Trans.) Cambridge: Harvard University Press .

Royce, E. C. (2015). *Classical Social Theory and Modern Society: Marx, Durkheim, Weber. Lanham*, Maryland: Rowman & Littlefield.

Ruegg, W. (1992). Themes. In H. d. Ridder-Symoens, *History of the University in Europe: Universities in the Middle Ages* (pp. 3-30). Cambridge: Cambridge University Press.

Schatzki, T. (2010). A primer on practices: Theory and research. In J. Higgs, Barnett , S. Billett, M. Hutchings, & F. Trede, *Practice Based Education: Perspectives and Strategies* (pp. 13-26). Rotterdam: Sense.

Schmidt, J. (1996). *What is Enlightenment? Eighteenth-Century Answers and Twentieth-Century Questions*. Berkeley, CA: University of California Press.

Schon, D. A. (1984). The Architectural Studio as an Exemplar of Education for Reflection-in-action. *Journal of Architecture Education*, 38, 2-9.

Schreier, M. (2012). *Qualitative content Analysis in Practice*. Thousand Oaks, CA: SAGE.

Schwinges, K. C. (1992). Admission. In H. d. Ridder-Symoens, *Universities in the Middle Ages*, (pp. 171-193). Cambridge University Press.

Seamon, D. (2015). Hermeneutics and Architecture: Buildings-in-themselves and Interpretive Trustworthiness. In B. Janz, *Hermeneutics, Space, and Place* (pp. 1-13). Springer.

Sennott, S. R. (2004). *Encyclopedia of 20th-Century Architecture*. New York: Fitzroy Dearborn.
Silverman, D. (2010). Doing qualitative research. New York: SAGE Publisher.

Simone, M. R. (1996). Admission. In H. D. Ridder-Symoens, *Universities in early modern Europe, 1500-1800* (pp. 285-324). Cambridge University Press.

Spirn, A. W. (1998). *The Language of Landscape*. New Haven: Yale University Press.

Stephen, M. F. (1962). *A History of the Sciences*. New York: Collier Books.

Stewart, L. (1992). *The Rise of Public Science: Rhetoric, Technology and Natural Philosophy in Newtonian Britain*. Cambridge: Cambridge University Press.

Tafahomi, R. (2021). An Attempt to Fill the Gap between the Architectural Studies and Conceptualization in Architectural Thesis Design Studio. *Journal of Design Studio*, 3(2), 175-190. https://doi.org/10.46474/jds.1012778

Tafahomi, R. (2022a). Insight into Research Dilemma in Design Studios and Relationships with the Architecture Curriculum. *Journal of Design Studio*, 4(1), 93-112. https://doi.org/10.46474/jds.1102633

Tafahomi, R. (2022b). Developing a Design Framework to Methodize the Architecture Thesis Projects with Emphasis on Programming and Conceptualization Processes. *Journal of Design Studio*, 4(2), 139-161. https://doi.org/10.46474/jds.1176700

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in
Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

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Tafahomi, R. (2023). Tracing Hegelian's Philosophy and Thoughts in Educational Styles of Architecture Design Studios. *Journal of Design Studio*, 5(1), 119-144. https://doi.org/10.46474/jds.1292904

Tafahomi, R., & Chance, S. (2023). Comparing the Meaning of 'Thesis' and 'Final Year Project' in Architecture and Engineering Education. *European Journal of Engineering Education,* 1-26. https://doi.org/10.1080/03043797.2023.224444 1

Tafahomi, R., & Nadi, R. (2021). The Interpretation of Graphical Features Applied to Mapping SWOT by the Architecture Students in the Design Studio. *Journal of Design Studio*, 3(2), 205-221. https://doi.org/10.46474/jds.1019310

Thorpe, L. (2015). *The Kant Dictionary*. London: Bloomsbury Academic.

Tschumi, B. (1996). *Architecture and Disjunction*. MIT Press.

Van de Vijver, A., & Mathijssen, S. (2024). A Philosophical Approach to Talent Development. *Roeper Review*, 46(1), 27-38. https://doi.org/10.1080/02783193.2023.228505 3

Vandermeersch, P. A. (1996). Teachers. In H. d. Ridder-Symoens, *Universities in early Modern Europe, 1500-1800* (pp. 210-255). Cambridge University Press.

Verat, M. (2022). La Petite Histoire des Modeles. Le siècle d'or de la peinture française.

Verger, J. (1992). Patterns. In H. d. Ridder-Symoens, *Universities in the Middle Ages* (pp. 35-65). Cambridge University Press.

Vuillemin, J.-C. (2008). Blondel, Nicolas-François. In L. Foisneau, *The Dictionary of Seventeenth-Century French Philosophers* (pp. 157–161). London: Thoemmes Continuum.

Wang, D. (2006). Prediction in Theoria: towards an Interdisciplinary Range of Theories Related to Architecture. *arq*, 10(3-4), 263-273.

Warman, C. (2016). Pre-Romantic French Thought. In P. Hamilton, *The Oxford Handbook of European Romanticism* (pp. 17-32). Oxford University Press.

Whitford, F. (1981). *Bauhaus*. New York: World of Art.

Whyte, I. B. (2004). Modernity and architecture: The death of modernism. In M. Hvattum, & C. Hermansen, *Tracing Modernity: Manifestations of the Modern in architecture and the City* (pp. 42-55). New York: Routledge.

Journal of Design Studio, v:6 n:2
Tafahomi, R., (2024). A Comparative Study on Philosophy, Epistemology, and Methods of Teaching in
Design Studios in the Beaux Art, Polytechnique, and Bauhaus: Regeneration, Development, or Transformation?

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