Crafting in context: Expanding the critical role of materiality and craftsmanship in Bauhaus education

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Abstract
This paper discusses the Bauhaus pedagogical principles on materiality and craftsmanship and explores further possibilities to extend such principles in architectural design education. The critical role of craftsmanship in the Bauhaus curriculum is manifested through various workshops that exposed the students to the experience of interacting with different types of materials and techniques. The workshops reflected the critical role of craft and materiality in the formation of students’ creative design ability. Drawing on the critical role of craftsmanship and materiality in Bauhaus education, we attempted to extend the value of such learning process, by contextualizing the principles into the process of learning through traditional craftsmanship. This paper illustrates the learning approach to materiality and craftsmanship through the making exercises based on Indonesian indigenous crafts. The craft workshops offered in Bauhaus mainly dealt with modern industrial materials and techniques. When craft learning is contextualized into indigenous context, different kinds of materiality emerge as a result of indigenous materials and techniques. The experience of dealing with a variety of materials used in Indonesia indigenous craft such as earth-based materials (soil, clay, sand, stone) and plant-based materials (grass, leaves, tree bark, tree sap) offer the students opportunities to understand the properties of materials and different techniques involved in the production of craftworks. The process of making becomes the process of interacting intimately with the materials, enhancing the sensibility and extending the vocabulary of the making, which are all important in the formation of design ability and creativity.

Keywords: materiality, craftsmanship, indigenous
Architecture, materiality and craftsmanship

“We all must return to craftsmanship!”1

In his 1919 manifesto, Walter Gropius called all architects, painters, and sculptors to embrace craft as an essential source of creative imagination. He called for a new structure that reunifies architecture with the practice of art and craft. This idea became the basis for Bauhaus curriculum in which every student must learn a craft, as he believed that the proficiency in crafts could lead to a sensible harmonious design.

It has been the common goal of the three directors of Bauhaus to convey both technical knowledge and craft skills as a comprehensive knowledge of design2 which could be achieved through the exploration of material. A variety of workshops - from sculpting, woodcarving, ceramic, metal, cabinet making, glass painting, engraving, to weaving - were offered as the fundamental form of artistic production. The workshop as the medium to acquire craft skills by interacting with various materials and techniques indicated the importance of material and materiality in the Bauhaus curriculum.

The position of material and craft learning as the central role of architectural education in Bauhaus was based on the belief that architects with craft and material knowledge would establish a strong sense of unity and awareness about a part to whole relationship on the design. Such knowledge would lead to the unity of interior and exterior and the matching schemes of all the elements.3

The importance to engage, to respect, and to have a sensibility towards material was highlighted in the teaching approach in Bauhaus such as that delivered by Moholy-Nagy. The engagement with the material is important as it develops material knowledge, which entails the possibility of handling, tectonic application, working with tools and machines.4 Such experience strengthens the sensibility and connection between the makers and the objects or system they created together with the relevant processes, tools, and techniques. Craftsmanship plays a role as the core of the pedagogical principle in Bauhaus. The experience of working with craft enables one to explore the relationship between material, tools, body movement and thought.5 The practice of craft becomes the acquisition of knowledge about materials, and working with
materials becomes a form of knowledge on materiality as the foundation of overall architectural knowledge.

As Moholy-Nagy explained about the teaching of the *Vorkurs* at the Bauhaus, “By working with different materials he discovers step by step their genuine possibilities and acquires through knowledge their structure, texture, and surface treatment. Also he becomes conscious of volume and space, fundamentals in three-dimensional design”. Moholy-Nagy believed that material as an object of study could exhibit many properties, entail various processes and techniques, and allow direct engagement with sensorial sensations. The extensive knowledge about materials, together with the relations to the tools and functions entailed, enables the production of genuine high quality of work.

The role of material in the education of architecture is critical due to the role of material in materialising the form so that it becomes concrete in our world of matter. The discussion on material refers to the visible and touchable properties, and architecture as a concrete matter cannot be free from the physical and objective sensuousness of its material. The direct connection between material and form in architecture is manifested through the role of each material with its own character which could perform in a specific way in materialising form, and material may appear as such - both as the surface and as the structural form. This discussion about material as such in architecture indicates that architecture is an assemblage of material that enables the construction as well as the experience and the sensation, and the exercises given to the students Bauhaus include both interpretations of materials.

It is important that the design process in the studio should involve material, as the material could be used as critical tools for research that integrates material handling and theory. However, it is also a challenge to include material exploration in studio practice as it is often considered as a messy process and suggest health and safety issues. Nevertheless, as highlighted by Moholy-Nagy, material handling should form an essential part of architectural education as from material one could learn about the vocabulary of experience, the properties of material, tools, and techniques along with the intellectual development and creativity.
Materiality learning in Bauhaus

Knowledge about materials began with the understanding of their aspects and properties. Moholy-Nagy proposed four terminologies for understanding the material properties: structure, texture, surface aspect, and mass. Structure refers to how the material is composed; texture refers to the outward surface; surface aspect refers to surface treatment that may affect the sensory perception of surface; mass refers to the arrangement and composition when materials are shaped into something else. Knowing this basic terminology helped the student to structure their understanding of material properties. Albers also highlighted the importance of considering particular properties of materials to identify their potential to be shaped into design product.

Awareness towards material was established through the understanding of the entailed processes and techniques. Certain kind of material is attached to the certain processes of production; it requires particular techniques and specific tools, in order to be shaped into a particular product. Some exercises developed by Moholy-Nagy in Bauhaus were intended to establish an understanding of the fundamental relationship between man, materials, tools and techniques through various processes of surface treatment and material handling using various tools and machines.

Moholy-Nagy also believed that direct engagement with materials offered the basic sensory experiences that could benefit the intellectual development and transformation of the students. It was his vision to develop sensory competence not only focused on visual, but also tactile. This was achieved through tactile exercises where students encountered various sensory experiences such as “pressure, pricking, rubbing, pain, temperature, and vibration”. Learning through material making and handling in the workshop provides the best stimulus for curiosity and individual findings. The nature of the learning process that involves exploration and direct engagement to materials, tools, and techniques elevates the sensibility towards material and at the same time improves skills and technological knowledge attached to the material.

Learning through the material is also learning about the use of resources. Moholy-Nagy argued that “In the Bauhaus one also learned to respect these materials, and every gram saved – with no loss of effect – was often seen as a small victory for inventiveness”. Albers also stated that the exercise with the
material is “a strictly analytical training in awareness and creativity, intended to lead to individual originality in professional practice with the most economical use of resources”. Therefore, learning through material could promote creativity and cultivate the awareness and sense of responsibility to a bigger context by seeing material as a resource.

The awareness and understanding of the material were delivered throughout the whole curriculum structure of Bauhaus. The students experienced Vorkurs in the first year that prepared the students with the foundation of understanding materials and their properties, as well as techniques and tools involved in crafts. After Vorkurs the students moved forward to specialised workshops that aimed to integrate crafts and industry based on the previous understanding of the crafts and materials. In the metal workshop, the students created prototypes for mass production based on the understanding of the material and machine peculiarities. In the ceramic workshop, students were encouraged to pay attention to the plasticity of clay when handling it to create shapes that served a particular function. In the weaving workshop, students learned to create compositional patterns based on contrasts and variation of the visual weights of the material. These are some examples of learning in Bauhaus education that was aimed at establishing various material skills and knowledge that was critical for the education of an architect.

**Contextualizing materiality learning: The making of indigenous craft**

This paper explores further possibilities to extend the materiality learning in the context of indigenous crafts that were practiced by architecture and interior architecture students at Universitas Indonesia. This exercise was triggered by our awareness of the richness of local material resources that could be found in different parts of Indonesia. It is a part of our research in exploring how various materials with distinctive features are processed through local craftsmanship, and how society employs their indigenous knowledge to transform these materials into architecture and interior elements with unique properties.

Traditional crafts become an interesting pathway for material learning because they are closely attached to their contexts and cultural practices. Some material practices are related to specific cultural aspects like taboo, raw material extraction, and indigenous tools. We believe that the exploration of the
traditional craft may offer some further insight on materiality as a foundation for architectural learning.

In this exercise, the students explored the making process of indigenous crafts made from earth-based materials and plant-based materials. Earth-based materials may consist of different types of soil, clay, sand or stone, while the plant-based materials may consist of different types of grass, leaves, tree bark or tree sap. Many ethnic groups in Indonesia have developed methods and techniques to utilise these materials to create various craft products both for everyday use and special occasion. The craft-making exercise became a way to raise awareness and appreciation to the indigenous material knowledge that has become an important part of the culture in different parts of the country.

The exercise began with the students’ research on various types of indigenous crafts from different parts of Indonesia, especially those with materials sourced from the earth or plants. Students may choose to explore the crafts that were practised in their own place of origin or crafts from other places that were rare and unique. The students were required to study thoroughly the raw materials, the whole process of making from raw to finished, including the specific methods and techniques of making. Then they attempted to recreate the craft using similar materials, methods and techniques. When the original raw materials were not available, they could replace them with other materials with similar properties that are required for the making process. During the hands-on experience, the students recorded the whole process and then reflected on their experience. Various aspects of materiality emerged throughout the process of making, as described in the following sections.

*Figure 1 Students practising indigenous craft making (photographs by Authors)*
Understanding the raw

The practice of turning raw materials into craft products involves direct engagement with the materials and the use of various tools and techniques in handling the materials. Investigating the raw material means tracing back the origin of the craft that is attached to certain geographical and cultural contexts. Some crafts were emerged as a part of the response towards natural phenomena occur locally. For example, the ash craft was created by utilising the volcanic ash after Mount Merapi eruption, while pelinggih craft utilised local black sand, demonstrating the craft originated from the context.

The raw materials have particular properties, such as structure, texture, colour, consistency, flexibility, etc. The understanding of raw material properties enables the exploration of material handling techniques. The students working with pottery craft understand the ingredients of material and its consistency and came up with pinching as the shaping technique. The making of lupe, a Bima traditional hood, requires an understanding of the leaves structure in order to employ the folding technique to create a leak-proof hood.

The understanding of raw material properties could trigger the exploration of alternative craft materials. The students working with paras stone craft, which is recently becoming rare, learned the properties of the materials then explored various ingredients and composition of materials to create alternative raw material with the same properties. Another example is ketak woven craft made from roots found in Lombok only. By understanding the root properties, they can propose rattan as alternative material that allows similar weaving techniques.

![Figure 2 Variety of craft products originated from various places (photographs by Authors)](image)

Laboratory of material preparation

Each indigenous craft involves material preparation to process the raw material into ready to shape/mould/produce/assemble material. The practice of
preparing the raw materials offers opportunities to understand the properties and behaviour of the materials to form the craft product. By experimenting on the raw material treatment, the students discover the effects on the material properties, which will affect the techniques to be employed. This was explored in the making of *tanah pol-polan*, in which the soil needs to be soaked overnight to achieve certain quality; also in the making of doll craft from corn husk and *wayang suket* from grass, the raw materials need to be soaked with precise duration to create the desired flexibility of the husk and grass. In the making of *ampo*, a snack made out of baked clay, students experimented with the duration of baking and discovered that longer baking time could produce sturdier structure and different textures.

Students also practised various ways of mixing or adding ingredients to the raw material and in the process, investigate the effects on the craftworks or the techniques required. In pottery craft, the addition of red cement made from fine crushed red brick to the clay affects the colour and texture of the craftworks while in *tajau* craft, the addition of cement as a catalyst can shorten the drying process of the craft product.

![Figure 3 Preparation of raw materials for craft making (photographs by Authors)](image)

**Delicacy of techniques and appropriate uses of tools**

The exercise of indigenous crafts also offered opportunities to explore various traditional techniques. Some of the techniques are now rarely practised in the society and thus in threat of being forgotten. So this became an excellent opportunity to revive those techniques and see further possibilities for development.

Some craftworks involve rather delicate techniques in handling the materials. For example, the making of *wayang suket* involved different ways of weaving of the grass to create different intricate patterns that would be applied to different
parts of the puppet. Other crafts also involve different techniques of folding and weaving, and the intricacy of the patterns require a high level of patience and control. Some students practised the forms of craft that involve shaping and carving the material. During the process, they became aware of the importance of the use of the appropriate tools to create the desired results. They also reflect on the importance of hand position while handling and shaping the material because of the hardness of the material and the patterns to be created. This experience promoted their sensibility towards material properties and how these properties relate to the way they should handle and shape the materials, thus developing the awareness on the relationship among hand, mind and material.

![Figure 4 Various techniques of handling materials (photographs by Authors)](image)

**Revealing the myth**

As indigenous crafts are strongly tied to traditional culture, some myths are involved in the practice. In this exercise, the students have the chance to prove some myths related to the craftworks. For example, some students explored the use of buffalo dung in the mixture of clay practised by *Sade* people to create the sturdy floor surface, and the final result indeed was not smelly. Other students tried out the technique of soaking natural stones in chicken blood to bring out the colour of the stone in *lilis lamjang* craft practised by Dayak people.

Another myth came from Batu Banteng Otanaha, a fort in Gorontalo, which was claimed to be constructed using the mixture of sand and egg white of the *Maleo* bird. The students tried to apply this technique to create a model of wall structure made from corals bonded by the mixture of sand and chicken egg white, which had resulted in a very sturdy structure.
Earth and plants as alternative ingredients

The exercise also gives the students the opportunity to explore the colour properties of earth and plant-based materials and found possible uses of the materials as alternatives to ready-made industrial colour. For example, students applied the practice of creating taro paint in Bali, by crushing finely various stones and bricks as the raw paint materials and experimenting with various mixtures of adhesives to achieve certain colour and consistency. Through the experiment, the students gained knowledge on how to produce a range of colours and different finish qualities. Another example is the making of clay painting by experimenting with the clay mixture by adding charcoal and red soil with different composition. The paint was applied to the surface and then patterned by using various techniques and tools to produce different quality of results. Similar exploration using the plant-based materials was applied in the making of khombouw, a painting made on a tree bark using turmeric, sago starch and charcoal as the paint. The students learned that each ingredient needs to be mixed and applied in a particular way; charcoal needs to be mixed with coconut oil while turmeric needs clay. Due to different consistency, they also require different tools to apply on the surface; turmeric should be applied using the brush while charcoal and sago should be applied by finger.
Extending the understanding of materiality for design knowledge

The opportunity to engage with various materials and techniques of traditional crafts offer important pedagogical values for the students, especially in developing their sensibility to materials and extending their vocabulary of making and materiality. This approach shares the same spirit with Bauhaus as it centres in gaining material knowledge and crafts skills as the foundation of architectural design knowledge. The learning happened through hands-on experiences with material which promote the relationship between the makers and the materials. The learning promotes the understanding of material properties, such as structure, texture, consistency, flexibility, colour, and relate this understanding to the use of appropriate techniques and tools.

The learning process through the making of indigenous crafts expands the understanding of materiality beyond what was taught in Bauhaus, especially by addressing the connection of craft and materiality to the geographical and cultural context. The opportunity to work with raw materials that opens various possibilities for processing, handling and shaping could strengthen the skills of the making as well as expand the vocabulary of techniques and methods. Here indigenous craft becomes the trigger for further development of more possibilities that are important to promote creative design thinking.

Throughout the process of obtaining and preparing ingredients, following the procedure and mastering the techniques, which were often quite difficult and complex, the students gained new insight on the process of making along with the new understanding of materiality. The reflection on the process contributes to the students’ development of knowledge on materiality. The practice of craftsmanship involves three basic abilities: the ability to make a matter concrete, to reflect on its qualities, and to expand its sense.27 These three abilities are developed in an integrated way when students practice working with crafts. The practice promotes the awareness that the process of making should be considered as a whole process, in which the connection between ingredients, process, techniques and methods, and the connection between material, body and thought are all integrated within the attempt to produce the desired craft product.

In addition, by working with indigenous craft, materiality is considered within the particular context of culture, and thus some practices are attached to the
geography of the material origin, the cultural myths and customs, as well as the local tradition that establish particular methods and techniques. Therefore the practice could also offer the possibility to preserve certain material techniques and methods that offer distinctive values alongside the establishment of modern material industry.

4 Moholy-Nagy.
6 Moholy-Nagy, 21.
8 Peter Zumthor, Thinking Architecture (Basel; Boston, Mass: Birkhäuser, 1999).
10 Poerschke.
11 Zumthor, Thinking Architecture.
16 Schmitz.
18 László Moholy-Nagy, Vision in Motion (Paul Theobald, 1947).
19 Schmitz, ‘The Preliminary Course under László Moholy-Nagy - Sensory Competence’.
20 Schmitz, 372.
21 Schmitz, 376.
25 The research findings were exhibition in Tanahku Indonesia, an exhibition on Indonesian earth-based materials. For further description of the exhibition, see: Mikhael Johanes and Arif Rahman Wahid, ‘Tanahku Indonesia: Celebrating the Indigenous Interior’, Interiority 1, no, 1 (January 2018): 79-86, https://doi.org/10.7454/in.v1i1.10
27 Sennett, The Craftsman, 277.