Compatibility of Student Performance Criteria (KAAB) on Architect's Competency (IAI)

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Abstract — There are 179 architectural tertiary education institutions in Indonesia, and 17 universities have entered into an agreement with the Indonesian Architects Association professional association to organize architectural professional education programs [1]. Of the 17 tertiary institutions, only five universities actually carry out professional education programs for architects and they have various models. The first model, the implementation of the professional program became a unit with the architecture master's program in design and the second model, the professional program was carried out separately after the architectural degree program. Some universities have implemented student performance criteria from the Korean Architect Accreditation Board (KAAB) to measure the competence of their graduates. On the other hand, the Indonesian Architects Association has obtained a mandate based on the 2017 Architect Law, which stipulates that a prospective architect to become an Architect must attend an internship program held by the Indonesian Architects Association. Apprenticeship terms for prospective architects have passed a five-year architectural tertiary education (IAI National Work Meeting, 2019). The internship program is intended so that prospective architects will be able to achieve the competence of architects by working with architect mentors for a duration of 4,000 hours or 2 years.

The question is whether the two architectural program implementation models will be able to achieve the same architectural competence while both have different curricula? And whether student performance criteria applied in architectural higher education will be compatible with the architectural competency standards of the Indonesian Architects Association in disruption era?

This study aims to confirm that the application of student performance criteria can be used as an indicator of achieving architect competency from the Indonesian Architects Association.

The methodology used to find out how much compatibility the application of student performance criteria from the Korean Architect Accreditation Board (KAAB) can be used as an indicator of achievement is to juxtapose it with 13 architect competencies of the Indonesian Architects Association (IAI). In the formulation of architectural competencies (IAI) can be categorized into three groups: (1) skills as an architect; (2) the role of architects and related disciplines; (3) architectural knowledge. While the student performance criteria (KAAB) divided them into four groups: (1) critical thinking; (2) design; (3) techniques and technology; (4) professional practice.

The expected results are the application of student performance criteria from the Korean Architect Accreditation Board (KAAB) in architectural higher education to be able to harmonize the achievement of architect competencies even though the applied educational model has differences in the curriculum. Including differences in tertiary education levels, namely the level of the master's degree in architecture majoring in design which includes architectural professional education and the level of professional architecture programs carried out separately from the architecture degree program.

Keywords: education, competency, architect

I. ARCHITECT'S PRACTICE AND COMPETENCE

According to Vitruvius, the definition of architecture is the art and science of designing buildings. In a broader sense, the architecture includes designing and building the entire built environment, starting from the macro level, namely urban planning, urban design, landscape architecture, to the micro-level of building design, furniture design, and product design. Architecture is not only produced by architects but a multi-disciplinary work involving engineers, artists, and other social experts. Architecture also refers to the results of the design process. Whereas Van Romondt called it architecture is the art of constructing buildings including aspects of planning, construction, and completion of decoration; the nature or shape of the building; building process; buildings and collections of buildings. He focuses on the building objects produced, starting from ideas, planning, and design, to the implementation of construction to make it happen. And Francis DK Ching defines architecture as something that is personal, fun and requires experience [2]. Architecture is the result of human perception and appreciation of space and form. There are three architectural experiences: physical, emotional and intellectual needs. Unlike Ching, YB Mangunwijaya emphasizes architecture from the social aspect of culture [3]. Architecture is a space where human life, which is more than physical but also involves basic cultural institutions. These institutions include the regulation of social life and community culture, which is accommodated and at the same time influences the architecture.

Noting the above meanings shows the role of the architect who stands out in his practice of realizing architectural ideas into architectural forms and spaces. Forms and spaces that are born as architectural works have an impact on one's life, a

group of people and the wider community. In carrying out the practice of an architect, an architect is required to have a competent architect who is recognized by colleagues and society. Architect competence is the skill of an architect who is defined as someone who has a special level of expertise and high knowledge in architectural subjects obtained from the process of education, training, and experience. Architect competence can be seen from three aspects, namely:

- First, the practice of an architect in developing his profession has the spirit of upholding ethics in professional practice. Ethics is an important indicator of professional development in a professional manner.

- Second, the results of the architect's practice in the form of architectural work which is a good process, then good in the sense of true and good in the beautiful sense. Good at conducting planning and design processes that uphold professional ethics. True in fulfilling all regulations and substantive requirements and binding regulations. And beautiful as a qualitative architectural value that is recognized by peers, users, and the wider community.

- Third, the impact caused by the birth of architectural works both for the user directly, the impact on the surrounding micro environment in the neighboring area and the wider macro and community environment.

And then, who is referred to as an architect in Indonesia? Someone is called an architect when he practices the architect according to the provisions of the applicable legislation. The Architect Law (No. 6 / 2017) states that the Architect is someone who does the Architect's Practice [4]. And the Architect's Practice is the implementation of activities to produce architectural works which include planning, designing, monitoring, and / or assessing buildings and their environment, as well as those related to regions and cities. In implementing the Architect's Practice, an Architect was able to show written evidence in the format of the Architect Registration Certificate (STRA) which he obtained as a form of state recognition of his competence. The learning process for 'prospective architects' must take architectural higher education for five years, as stipulated in the International Union of Architects (UIA) which requires a five-year curriculum in architectural higher education. The learning process in architectural higher education relies on architectural studio-based learning. Someone who has completed a higher education architect with an academic title 'Architect' (abbreviated as Ar.) still has to take a two-year internship program with the Mentor Architect carried out by Indonesian Institute of Architects (IAI). Achievement of competencies carried out through the process of architectural higher education is stipulated in the formulation of learning outcomes. An architectural higher education curriculum that refers to the accreditation body of international architectural higher education, such as the Korean Architects Accreditations Board (KAAB), they determine the formulation of Student Performance Criteria (SPC).

The study method is based on the UNESCO mandate for the architectural education that will integrate the KAAB criteria on the IAI competency as a compatibility approach. The policy data of the architect competencies was obtained from the Architect Law in 2017 while the SPC components was obtained from the KAAB criteria and guidelines for professional degree programs in architectural education.

Globally, the architecture education mandate of the UNESCO is used as a basis for the compatibility analysis between IAI competencies and the KAAB criteria. The analysis steps carried out in this study are: 1) stipulating the UNESCO mandate, 2) Clustering the IAI professional aspects based on the 13 units of architectural competencies, 3) Grouping the KAAB aspects of the SPC, and 4) integrating the IAI aspects and the KAAB aspects based on the UNESCO mandate for the architectural education [5]. The integration constitutes a compatibility of the architectural educations based on the UNESCO mandate that meets the professional competencies of the IAI and student performance criteria of the KAAB.

II. IAI ARCHITECT COMPETENCE

Referring to the Architect Law which states that Professional Organizations that accommodate the architect profession in Indonesia are the Indonesian Architects Association (IAI), the architectural competency formulations discussed in this study are architect competencies formulated by IAI. 13 units of architectural competence are categorized into three aspects, namely: (1) Skills as an Architect; (2) The role of architects and other related disciplines, and (3) Knowledge of architecture.

A. Skills as an Architect

The first aspect of skills as an architect includes the ability to produce architectural designs and master the skills needed to meet building requirements. The ability to produce architectural designs must meet aesthetic measures and technical requirements, and those intended to preserve the environment (IAI Competency Unit number 1) [5]. While mastering the skills needed to meet building requirements is measured by building users in terms of development costs and regulatory constraints (IAI Competency Unit number 11) [5].

In the aesthetic theory of building architecture, several aspects are known, including proportion, rhythm or rhythm, composition, balance, contrast points or attention, scale, and unity. Proportion is the suitability of the dimensions of architectural elements with the surrounding environment and also the functions and aspects of other architectures such as location, position, and dimensions of other objects. Rhythm has two patterns, namely static rhythm and dynamic rhythm. Composition in architectural design is structuring all elements so that the groove becomes more comfortable to feel. The balance in architectural design can be achieved through symmetrical balance and asymmetrical balance. Symmetrical balance is a natural balance that visually has become a habit of anatomy of the human body, while asymmetrical balance is an effort or engineering to feel the balance by composing certain compositions and proportions. Contrast is usually done by making certain elements of the whole become more able to feel its presence and other elements as if it were the background. Scale involves comparison of space or period of building with the environment in which it is located. The scale of space and building can be psychologically felt psychologically, a person can feel small, normal (human scale) or feel great when between space and buildings. Unity is an effort to give harmony to each element in architectural design can be done with various things such as the use of colors, shapes, patterns, materials to certain design styles.

The technical requirements and building regulations related to building construction are intended to achieve the feasibility of building functions as measured by the reliability of buildings, namely requirements for safety, health, comfort and convenience. And what is more related to design skills is to produce buildings that are environmentally friendly. The concept of environmentally friendly buildings is the creation of construction starting from the planning, implementation, and use of construction products that are environmentally friendly, efficient in using energy and resources, and cheap, and paying attention to health, comfort of residents who all adhere to sustainable rules.

Skills as an architect also require the ability to prepare a design program and understand the problems of human, building and environmental behavior. Prepare a design program starting from understanding the search method to preparing a design program for the overall design project (IAI Competency Unit number 8)[5]. On the other hand, understanding the problem of human behavior, buildings and the environment means understanding the relationship between humans and buildings and between buildings and their environment, also understanding the importance of connecting spaces formed between humans, buildings and their environment for human needs. and human scale (IAI Competency Unit number 5).

The method of seeking design problems and approaches to solving architectural problems is an inherent part of the architectural design program. According to Aditjipto [6], the nature of mental processes in producing forms does not differ from one person to another, in fact, there are differences from one person to another in the procedure or process in the design, which is caused by 'ideology' formed. The biggest role in the formation of 'ideology' is the personality and thinking process of someone who is different from someone to another person. Architectural design methods are influenced by 'ideology' in the process of designing differently for each architect to produce integrated and comprehensive architectural works. In detail, the process then understands one by one the problems of human user behavior and the characteristics of space and buildings that accommodate their functional activities. In addition, the impact on the surrounding environment also needs to be understood.

Knowledge of physical and physical buildings must be mastered by an architect. Mastering adequate knowledge about physical and physical problems, technology and building functions so that they can be equipped with internal conditions that provide comfort and protection of the local climate (IAI Competency Unit number 10). Comfort includes thermal comfort, visual comfort and audio comfort. These three elements of comfort are influenced by external factors, namely the micro-climate situation and the atmosphere in which the building is located. The skills of an architect are also required to understand the world of the construction industry, especially related to the utilization of construction industry results that affect the design process carried out. Mastering adequate knowledge about industry, organization, rules, and procedures relating to the process of translating design concepts into buildings and the process of integrating layout plans into comprehensive plans (IAI Competency Unit number 12).

B. The Role of Architects and Related Sciences

Architects in producing architectural works always involve other parties with other related disciplines. The face of architectural buildings produced in city space will affect the face of the city. Therefore an architect must understand urban problems and environmental carrying capacity. Adequate knowledge of urban planning and design and the skills needed in the planning process (IAI Competency Unit number 4) are important prerequisites. Likewise, adequate knowledge of how to produce designs that are suitable for environmental carrying capacity (IAI Competency Unit number 6) is important to master.

City as a physical environment has various aspects that can develop, elevate, and create special characteristics of the city itself, such as historical, cultural, geographical, and other factual aspects that provide a city identity. City identity will be different from other cities. According to Kevin Lynch, identity is a 'sense of place', where people can realize or remember places with clear, unique, or distinctive characters.

One physical aspect that can give an identity or 'face' of a city lies in a building. Cities, especially those that develop without planning (unplanned cities) certainly save a diversity of aspects of history, culture, and users. In heterogeneity, cities must have special rules in the development of physical aspects such as buildings to meet these various needs.

This is where the role of an architect in using building design expertise in developing urban faces. It is conceivable, if an architect designs a building without following the rules of urban planning and without sensitivity to values and urban problems, there will certainly be chaos in city identity, caused by many architects who want to show them the ego by creating contrasting works, regardless of the context of the environment and urban values.

The next consideration is the carrying capacity of the environment, where architectural works always require environmental carrying capacity, clean water, electricity, communication networks, and various other utilities. The carrying capacity of the environment is the limit on the growth of a population, where the population cannot be supported by existing facilities, resources, and environment. Or shorter can be explained as the limits of human activities that play a role in environmental change. This concept assumes that there is certainty of environmental limitations based on development [7]. Architects become a very important part as stakeholders of the physical development of the built environment.

Another important problem is the physical ability to build structures to support building functional space and how to manage its construction. Understand the problems of structure, construction, and techniques related to building design (IAI Competency Unit number 9). Mastering adequate knowledge about project funding, project management and control of development costs (IAI Competency Unit number 13).

Structures are the parts that make up buildings such as foundations, sloof, walls, columns, ring balks, easel frames, and roofs. In principle, structural elements function to support the existence of non-structural elements which include visible elements, interiors, and architectural details to form a unity. Every part of the building structure also has its functions and roles. Another use of building structures is to continue

building loads from the top of the building to the bottom of the building, then spread to the ground. Structural design must ensure that parts of this structural system can allow or bear the gravitational force and load of the building, then support and channel it to the ground safely. There are three parts of the building structure including:

- Bottom structure (substructure) is part of a building that is located below the surface of the ground. This basic structure includes the foundation and sloof.

- The middle structure is a part of a building that is located above the ground and under the roof, and is suitable for human habitation. What is meant by the middle structure includes walls, columns, and ring balks.

- The upper structure (superstructure) is the parts of the building that are formed extending upward to support the roof. The building structure includes the frame and easel frames.

In the construction of construction projects, there are three objectives to be achieved, namely time, cost, quality. These three targets attract interest, so that these three goals need to be properly controlled to get very satisfying results according to their needs. The problem of real control concerns productivity in the workplace. Work productivity is influenced by many factors that can be known as worker characteristics, working conditions and unproductive activities. The characteristics of the workforce include age, expertise, workforce experience, leadership, and workforce motivation. Working conditions in the character of the project include the size and complexity of the work, accessibility of work locations, availability of labor, use of equipment, contractual agreements, both on location, local cultural characteristics, especially in foreign locations. Non-productive activities include: indirect labor is needed to maintain the progress of the project so that workers are unemployed, repetitive work for repairs becomes unsatisfactory work, temporary jobs stop because the weather is not good or lack of costs, stop working due to union activities, reasons for not attending includes working late and returning quickly, days and strikes. The impact of unproductive project activities will cause delays, high costs and affect the quality of construction.

In addition to physical considerations, in practice architects also consider community social factors. Understand the professional aspects in the field of Architecture and realize the role of architects in society, especially in the formulation of a reference framework that takes into account social factors (IAI Competency Unit number 7). An integrated sociological approach needs to be carried out in the architectural design process, which involves: laws, norms, values, culture, culture, goals and subjective awareness both at the macro and micro level. The sociology approach integrated with architectural design produces works that are satisfying for the community. Because in the end the physical work of architecture was used, judged by society. An integrated sociological approach cannot be separated from society. Society cannot be separated from culture which has three forms of culture, namely: manifestations of systems of ideas, forms of social systems (activities), and physical forms [8], and each form of culture is interrelated. When architects help communities in formulating design guidelines (terms of reference), they need to rely on their knowledge in understanding the context of the user community and its scoping community.

C. The Architectural Knowledge

For architects, architectural knowledge needs to be understood, especially regarding the history of architecture and its development. In the design process, whether the architect includes considering the historical aspects of architecture or not, depending on the context of the problem. Therefore architects need to have adequate knowledge about the history and theory of architecture including art, technology and human sciences (IAI Competency Unit number 2). In other capabilities, the architect must also master the knowledge of art and its influence on the quality of architectural design (IAI Competency Unit number 3).

Architecture is born from the dynamics between needs (the needs of conducive environmental conditions, security, etc.), and ways (available building materials and construction technology). Prehistoric and primitive architecture is this initial stage. Then humans become more advanced and knowledge begins to form through oral traditions and practices, architecture develops into skills. At this stage, there is a process of testing, improvisation, or imitation so that it becomes a successful outcome. An architect at that time was not an important figure, he just continued the tradition. Vernacular architecture was born from such an approach and is still carried out in many parts of the world. Human settlements in the past were rural. Then a production surplus arises, so that rural communities develop into urban communities. Building complexity and typology is increasing. Technology in building public facilities such as roads and bridges has also developed. The typology of new buildings such as schools, hospitals and recreational facilities also appeared. At the beginning of development, there was no clear division of tasks between artists, architects, or engineers or other related fields of work. At this stage, an artist can design a bridge because the calculation of the structure inside is still common. Along with the incorporation of knowledge from various fields of science (such as engineering), and the emergence of new building materials and technology, an architect shifted his focus from the technical aspects of the building to aesthetics. This is a brief description of why architects need to understand the development of architectural history so that they will be able to put themselves in this data when practicing architects in serving society. At present, architects have become professions protected by the state through the Architect Law. In practice, architects are also regulated through legal norms and ethical norms. Along with the increasing complexity of buildings, architecture has become more multi-disciplined than before. Today's architecture requires a group of professionals in the process. This is the current state of the architect's profession.

From the aspect of art, architecture also experienced extraordinary developments. Architects are required to understand basic art and theory. According to [9] Architecture and Art have the same foundation, this can be shown when Richard Serra developed a design based on the octagonal surface shape in a church in Burgundy. The work is the boundary between objects of art and architecture, it can be said as a combination of architectural approaches through art. The dynamic relationship between art and architecture, between artists and architects, and the use of color and shape of sculpture, and how the attitude of art and architecture. Eugene

Emmanuel Viollet-le-Duc [8], is an architect and writer from France who provides references to future architecture through Art Nouveau. New building materials as a reference for their existence, building materials affect building structure, space voidness, transparency of fields, and tortuous floor plans. Visual composition is simplified into only fields and lines in horizontal and vertical directions, the use of primary colors such as red, blue, and yellow in addition to black and white help. In most works of art, vertical and horizontal lines do not cross directly but reinforce each other. This can be seen from the Mondrian paintings, the Rietveld Schröder House, and the Red and Blue Chairs. Fine art becomes so crowded with various types and problems (Howard, 2000). Art that develops at this time sometimes tends towards progressive thinking and distinctiveness, so that they artists sometimes need limited to unlimited space, from small space (virtual) to large (global) space as a place to show off even to appreciate it. On the other hand, architecture is a science that combines function, robustness, and image as a work of art on display and can also be a functioning building. Like art, architecture always expresses meaning in images and shapes to produce space as its function.

III. CRITERIA FOR STUDENT PERFORMANCE VERSUS ARCHITECT COMPETENCE

The UNESCO / UIA Charter for Architectural Education [9] mandates that architectural education has two basic objectives, namely:

- Produce professionals and designers / builders who are competent, creative, critical and ethical thinking;

- Produce world citizens who are intellectually mature, ecologically sensitive, and socially responsible.

The Union of International Architects (UIA) has formulated a clear framework for architectural higher education. The architect must be able to respond positively to the challenges facing society in this new century, and he is able to work towards sustainable self-development across diverse cultural heritage.

In relation to the international trend of architectural education above, the Korean Architect Accreditation Board (KAAB) establishes study criteria and guidelines for professional degree programs in architecture. KAAB hopes to develop professionals in the field of architectural design having a level of knowledge that is in line with the dynamics of the architectural industry. They can apply their competencies with creativity, ethical values, and leadership. KAAB criteria and guidelines are equivalent to international standards set by the UNESCO-UIA Charter in Architectural Education and the Canberra Accord. The architecture study program that wants the accreditation process to be carried out by KAAB must be a degree program at a university or institutional collaboration with academic institutions that shows the performance of a qualified education. The period of academic study must be no less than the equivalent of five years of full time study.

KAAB determined the Student Performance Criteria as many as 26 SPC units divided into four aspects, namely: (1) critical thinking skills; (2) ability to design; (3) the ability to master technology and engineering, and (4) skills in professional practice.

A. Critical Thinking

Critical thinking ability is measured by critical power 'understanding of mutual relationship between architecture, science, technology, and fine art' (SPC 01 KAAB). In the study of culture (architecture and art), the fields of science, technology and culture are not seen as something separate and partial, but these three fields are seen as broader, more complex, surround, and influence each other. In the process of creating architecture concocting elements of art, science / technology, human, material, politics, and money [10]. More advanced material processing techniques, material maintenance techniques and the discovery of new materials are very influential in the processes and products of architectural works. And with the discovery of new mathematical approaches in calculating the strength of materials and structural systems, architectural work is becoming increasingly diverse and the use of materials is more efficient. This structural technology has a reciprocal relationship with material technology to produce new art in architecture. Various art rules and their influence on building mass design, interior spatial design, room color, and building design, texture lines in building expressions are explained are the criteria for the work of achieving knowledge of art and its influence on the quality of architectural design. (AC 03 IAI). Aesthetic decisions are taken by expressing views and making choices critically so that they can be reflected conceptually in design is the criterion for work to produce architectural designs that meet aesthetic measures (AC 01 IAI). And the rules and standards issued by related bodies; including those relating to safety, security, convenience, and others, identified, understood and included are the criteria for work to produce architectural designs that meet technical requirements (AC 01 IAI). Various architectural theories and basic ideas and art theories that influence the results of architectural design (AC 02 IAI).

Critical thinking ability is measured by its ability to 'understanding parallel and divergent histories of architecture with cultural diversity' (SPC 02 KAAB). Until now there are still many different views about architecture. The diversity of these boundaries shows the extent of the scope of understanding architecture so that to find out the exact meaning of the term architecture used in a discussion must be known in advance in the relationship what the term is used [11]. The outline of architectural history and its development of how much can be explained and concepts generated from historical input can be arranged as performance criteria for critical thinking skills (AC 02 IAI).

Understanding the unique philosophy and principles of architecture and Indonesian cultural traditions are indicators for measuring critical thinking skills (SPC 03 KAAB). Traditional architecture is a building whose shape, structure, function, decoration and how to make it are inherited from generation to generation and can be used to carry out life activities as well as possible. In the formulation of architecture seen as a form of space and buildings, and they can protect from natural influences such as rain, heat and so on. Space accommodates functions, the current form is given a charge of decorative meanings and fillings of visual decorations as expressions of sensory beauty. Traditional Indonesian architecture encapsulates various forms and technologies that reflect the uniqueness of the region and the richness of cultural heritage. However, behind this diversity, there are general

characteristics that mark traditional Indonesian architecture. Common features in traditional Indonesian architecture are Austronesian ancestral heritage. The term Austronesian refers to a set of languages that are related and used by most people on the islands of Southeast Asia, parts of mainland Asia, Taiwan, and Madagascar. Some regions in eastern Indonesia have different traditions of languages and cultures.

This general characteristic is the shape of a stilt house with wooden pillar foundations, extension of roof ridges, construction techniques using natural building materials as well as how to arrange typical columns and beams, and the idea of a house as a permanent symbol.

Understand regional, social, cultural, economic, and policy aspects and their mutual relations that affect architecture and cities (SPC 04 KAAB). The stage house can be found in almost every area in Indonesia. Especially in Java and Bali, Indian influence in the Hindu-Buddhist era transformed houses with pillar foundations into houses built on elevated stone slabs. However, relief at Borobudur Temple is proof of the existence of a stilt house on the island of Java in the past. The use of poles as the foundation of an elevated house has advantages in a tropical climate. This pole saved the house from flooding. In addition, cracks on the floor can function as ventilation during hot weather. In addition, small fires under the house are used to repel mosquitoes. Smoke coming out through the thatched roof protects the weeds. Cleaning the house can also be done easily because dust and dirt can be washed through the floor holes. Basements are often used as pet cages and store equipment, and provide a shaded workplace during the day for various activities. In many areas, the pillars of the house are not plugged into the ground but depend on the stone foundation. This gives flexibility to the house so that the house can survive the earthquake. This construction also makes it easier for the owner to move. The house does not need to be destroyed, but it is enough to be moved and moved to a new place. Regional, social and cultural aspects of Indonesia as performance criteria in critical thinking.

Understanding of applying principles and methodologies of relationship between physical environment and human behavior to the spatial design (SPC 05 KAAB) is similar to how to understand the relationship between humans and buildings and between buildings and their environment, also understanding the importance of connecting spaces between humans, buildings and their environment. human needs and human scale (AC 05 IAI). Standards for space requirements are collected, analyzed, and applied in the design. Then spatial planning that meets safety, health, comfort and convenience standards is designed as a performance criterion to achieve critical thinking skills.

Building safety includes building capability requirements to support load loads. The indicator is a stable and stable structure to support loads up to maximum loading conditions. It is intended that if there is a collapse, building users can still save themselves. This includes preventing and overcoming fire hazards, through passive protection systems and / or active protection and building capability requirements to prevent lightning hazards.

Building health requires a ventilation system, accommodating circulation and the need for air exchange to be provided in buildings through openings, both natural ventilation and / or artificial ventilation. Lighting system requirements meet the lighting requirements that must be provided in the building, both through natural and artificial lighting, including emergency lighting. And the requirements of the sanitation system must be provided inside and outside the building. This system aims to meet the needs of clean water, waste disposal, waste water and waste, and channel rainwater. This sanitation system must be easy to operate and maintain, harmless, and not disturb the environment. Then the requirements for the use of building materials must be safe for the health of building users and not cause negative impacts on the environment.

Space comfort, the relationship between space, air conditions in space, appearance, and the level of vibration and noise level, our comfort level is determined by conditions that do not interfere with the use and function of buildings, both from inside the building and from the environment. And ease requirements are the ease of relations to, from, and inside the building, as well as the completeness of facilities and infrastructure in building utilization. These facilities include the availability of facilities, accessibility, easy, safe and comfortable, including for people with disabilities and the elderly.

Understand the principles of sustainable architecture and urban planning for the proper application of natural and artificial resources, and the preservation of historical and cultural resources (SPC 06 KAAB). Related to urban planning, a positive contribution to the existence of buildings in public spaces, especially roads, pedestrian streets, and facilities for people with disabilities. Urban requirements, especially BCR, FAR, GBC, boundary lines, density, height and free distance of buildings have met the requirements and applied (AC 04 IAI). While related to sustainable architecture the idea of energy saving is proposed to be applied in the design (AC 06 IAI).

B. Design

Design skills are measured by the ability to express architectural ideas by design phases using diverse media such as oral, writing, sketch, drawing, model effectively chosen to different circumstances and audiences. (using English language in some design projects) (SPC 07 KAAB). The world of architecture continues to progress very rapidly along with the development of technology and building materials that can realize the dreams of many architects in the world. In several countries, such as China, Japan, Dubai, and others, they began to develop very innovative designs, so that they emerged from existing structural paradigms with a form of building mass not limited to geometric benchmarks. This is supported by scientific advances in technology in the form of computer devices such as *AutoCAD, 3D-Max, Rhinos, Lumion, Google Sketch-Up, Tekla* and *Revit Architecture* and so on that can help Architects develop ideas and help in the process so that work can be done more easy and fast. The architect can easily explain and apply the concepts of color, material, composition, proportion, rhythm, and scale (AC 01 IAI).

Location planning is needed to be able to analyze and evaluate the social context and environmental factors of the site and apply to site planning including the design of the outer space (SPC 10 KAAB). In location planning, such as in tracking other problems and solving architectural problems, a

rational and critical process is needed. According to Snyder [12], location analysis requires systematic attention to three main contexts:

- Context of space from the site (natural and artificial)
- Context of behavior (patterns of socio-economic activities from location and locality, with government policies that affect site development)
- Perception context (perception and use of space)

The target of site planning is to implement and manage space settings with related visual images, according to the capacity and needs of the site - behavioral needs and user loyalty. Buildings that do not add pollution to the surrounding environment consist of tangible things such as toxic and intangible waste such as the face of the environment or street pictures (AC 05 IAI).

Design capabilities are measured by the ability to design buildings to meet the various requirements of all user groups including people with disabilities for their accessibility and safety (SPC 11 KAAB). Disability is a problem that (must) be very 'familiar' to the general public because it is part of the human condition and has a high prevalence. Almost every individual has experienced disability in one phase of his life. For people who reach a long age, they tend to experience difficulties related to their physical and social functions. Likewise for users who have physical limitations.

Ability to design buildings based on the principles of safety, fire protection and exit (SPC 12 KAAB). Safety principles for fire hazards include the reliability of buildings that emphasize structural safety and fire. Analysis of user expansion must be done carefully to ensure planning of evacuation routes for general disaster events and fires specifically. Ability to understand and integrate building systems such as structures, building envelopes, mechanical and electrical services in design projects (SPC 13 KAAB). Building as a whole is an integrated system to achieve decent success for functions.

The ability to define conceptual adaptive reuse design strategies for designing building renovations in response to problems such as social evolution, environmental values, and sense of place (SPC 14 KAAB). Reuse of old buildings with new functions is one of the real forms of how the renovation of old buildings is done with social, economic and other purposes. The problem of preserving cultural heritage buildings is to build a civilized balance between the economic and conservation dimensions that have a cultural dimension. The economic dimension tends to be personal, stupid, egocentric, and centrifugal. While the cultural dimensions are public, hierarchical, philanthropic, and centripetal. Service users have explained the importance of having a building design that follows the carrying capacity of the physical and social environment, especially regarding the carrying capacity of land, vegetation, pollution and density including cultural heritage buildings (AC 06 IAI).

Ability to understand the principles of urban planning, to critically assess existing city plans and problems relevant to applied in architectural design (SPC 15 KAAB). Direct and indirect relations in the city context are the face of urban architecture. The limitations of urban land and the growth of urban space due to the growth of the economy often run

unbalanced which results in a decrease in the quality of urban space. Positive contributions from the presence of buildings to public spaces, especially roads, pedestrian streets and facilities for people with disabilities can be adequate performance criteria for urban planning and design and the skills needed in the planning process (AC 04 IAI).

Ability to design based on program education goals; identify problems and propose solutions, and to produce drawings and design documents in various formats (theses, reports, panels) at all stages of design (SPC 16 KAAB). To provide solutions to substantive problems, he must rely on the basic power of mastery of the intended norms so that the interests of the community as required by the provisions of regulations and legislation are met (AC 07 IAI).

C. Engineering and Technology

Understanding the principles of strength, basic theories and various building structure systems and their application in design (SPC 17 KAAB) correlates with understanding the problems of structure, construction, and techniques related to building design (AC 09 IAI). The concepts of various types of structures and constructions to be applied in buildings are explained and the types of structures and constructions are determined and the strengths and weaknesses assessed and recommendations made about functional requirements can be performance criteria.

Understanding the basic principles of thermal, light, acoustic, indoor air quality, energy management and the method of applying environmental control systems (SPC 18 KAAB) correlates with the mastery of adequate knowledge about physical and physical problems, technology and building functions so that they can be equipped with internal conditions that provide comfort and protection against local climate (AC 10 IAI). The way to handle lighting and airing in the building and the basis for consideration of the applied acoustic system can be the design performance criteria. Then the selection of materials and technology of building materials for the protection of buildings against climate and weather.

Understanding the basic principles and methods of implementing appropriate building systems such as mechanical, electricity, data and fire protection services (SPC 19 KAAB) needs to be supported by understanding structural, construction and engineering issues related to building design (AC 09 IAI). Mechanical, Electrical, Electronic and Plumbing systems are created and assessed for their strengths and weaknesses; and recommendations are made about functional requirements to be performance criteria. While understanding the use and application of various digital technologies in the design process (SPC 20 KAAB) can support the design process that results in efficient building planning. So that the mastery of adequate knowledge of project funding, project management and substantive control of development costs must be mastered where ways to control project costs are indicated by stages (AC 13 IAI). Still in the same context, understanding the nature and application of building materials, and building component construction methods (SPC 21 KAAB) is needed for cost efficiency.

Understanding project management and construction management methods to effectively facilitate physical, human, technical and budgetary resources (SPC 22 KAAB) correlates with the mastery of skills needed to meet building user requirements in terms of development costs and building

regulations (AC 11 IAI). In general, the success of a project is measured quantitatively by its success in achieving quality work that is in line with planning, timely and efficient requiring good project management and construction management.

D. Professional Practice

There are four main things in the group of professional practices that are strengthened, namely: (1) Professional Ethics, (2) Building Regulations, (3) Professional Documents, and (4) Management of the Architect Bureau.

Understand the professional ethics, authority, and responsibilities of architects, rights, and duties to clients and society (SPC 23 KAAB). And understand professional documents and design phases such as the initial brief, schematic design, design development, construction documents, and the role of architects in multi-disciplinary collaboration and reconciliation, estimates of construction costs, additional design, construction supervision, and building operations and maintenance (SPC 24 KAAB) Both correlate with the understanding of professional aspects in the field of architecture and are aware of the role of architects in society, especially in the formulation of a reference framework that takes into account social factors (AC 07 IAI). Performance criteria that establish the Code of Ethics and the rules of professional conduct of the architect must be obeyed, the interests of the community as required by the provisions of regulations and legislation are met, and the impact of design on the community is assessed by considering social factors. While construction documents are considered since the preparation of the Reference Framework, form the Planning Work Team to produce Construction Documents that meet the functional interests and user community.

Understanding the management principles and skills needed in the operations of architectural companies such as contracts, financing, business planning, marketing, project acquisition, and general management (SPC 25 KAAB) correlates with entrepreneurial aspects and business ethics learned in the higher education curriculum. In particular, IAI does not emphasize business aspects but rather reinforces professional aspects even though they are not placed in a position to cancel each other but strengthen each other.

Understanding building codes and regulations relating to public safety, property rights, design, construction and practice, and about legal liability and architectural obligations (SPC 26 KAAB) correlates with the mastery of skills needed to meet building user requirements in a variety of controlling construction costs and building regulations (AC 11 IAI). Performance criteria include compliance with building regulations that must be considered in the planning and design process, especially for public safety and applicable legal responsibilities.

IV. DISCUSSION

Referring to the initial question, will the two architectural program implementation models be able to achieve the same architectural competencies while both have different curricula? The answer depends on the composition of the content of the learning material in the curriculum of each higher education institution that applies it. But with the adoption of internationally accredited learning standards, it is possible to substantially have the same performance standards.

The next question is whether the student performance criteria applied in architectural higher education will follow the architectural competency standards of the Indonesian Architects Association professional associations in the era of disruption? From the above research shows the existence of conformity that supports the achievement of architect competencies formulated by professional associations. The matrix that unites the 'architect competency' of the IAI axis with performance criteria correlates with the KAAB axis 'student performance criteria' which produces findings:

1. Skills as an architect can be measured by criteria:

   - The ability to think critically about sustainable architecture and the methodology of the relationship between the physical environment and human behavior with spatial design.

   - Design skills in expressing architectural ideas, exploring 2D and 3D forms, identifying problems, evaluating environmental factors, meeting building user needs and integrating building systems.

   - Technology engineering capabilities by understanding construction management, applying construction methods, and building materials.

   - Ability to practice professionally by understanding building codes, building regulations, and management.

2. The role of the architect and related disciplines can be measured by criteria:

   - Ability to think critically about regional, social and cultural architecture

   - Design skills pay attention to the principles of city planning, reuse of old buildings, safety principles, and prepare construction documents.

   - Ability to understand technology engineering with the application of building systems, building physics, and environmental control and the principles of power and digital applications.

   - The ability to practice professionally by understanding the professional code of ethics and understanding the planning process and design stage.

3. Architectural knowledge can be measured by the criteria of understanding the history of architecture parallel and divergent with the diversity of cultures, philosophies, and the principles of the uniqueness of the architecture and traditions of Indonesian culture and the interrelationships between architecture, science, technology and art.

V. CONCLUSION

The study suggests that the compatibility of Student Performance Criteria (SPC) of the KAAB on the Architects Competency of the IAI is clear. This shows that the integration of the architectural educations based on the UNESCO mandate meets the professional competencies of the IAI and student performance criteria of the KAAB. The near future challenge is that the professional architects based on the compatibility of the KAAB criteria on the IAI are able to

present their ethic and skills that will contribute to the development of Indonesian architects in practices.

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