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## Creativity as a Part of the Post-Pandemic Architectural Education: A Brief Discussion

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### Abstract

The current study discusses the importance of the creativity in architectural education, with a focus on the challenges and their implications on students, educators, and institutions. This study revisits a vision of an educational model for post-pandemic architecture education and discuss the necessary approaches for educators and educational institutions to foster creativity. This study directly reacts to the demand on the pandemic's effect on conventional education by using an instructional approach. This paper contributes to reconceptualizing of a novel approach that is targeted to tackle architectural education challenges in a post pandemic age through foster creativity models. The proposed creativity models are creative and critical thinking, neutral and positive stress, and objective-based creativity. These models are further developed using a thematic analysis process to be integrated in the educational model.

**Keywords:** Architectural education; Post-pandemic; Creativity; Positive stress; Critical thinking; Creative thinking; Objective-based creativity.

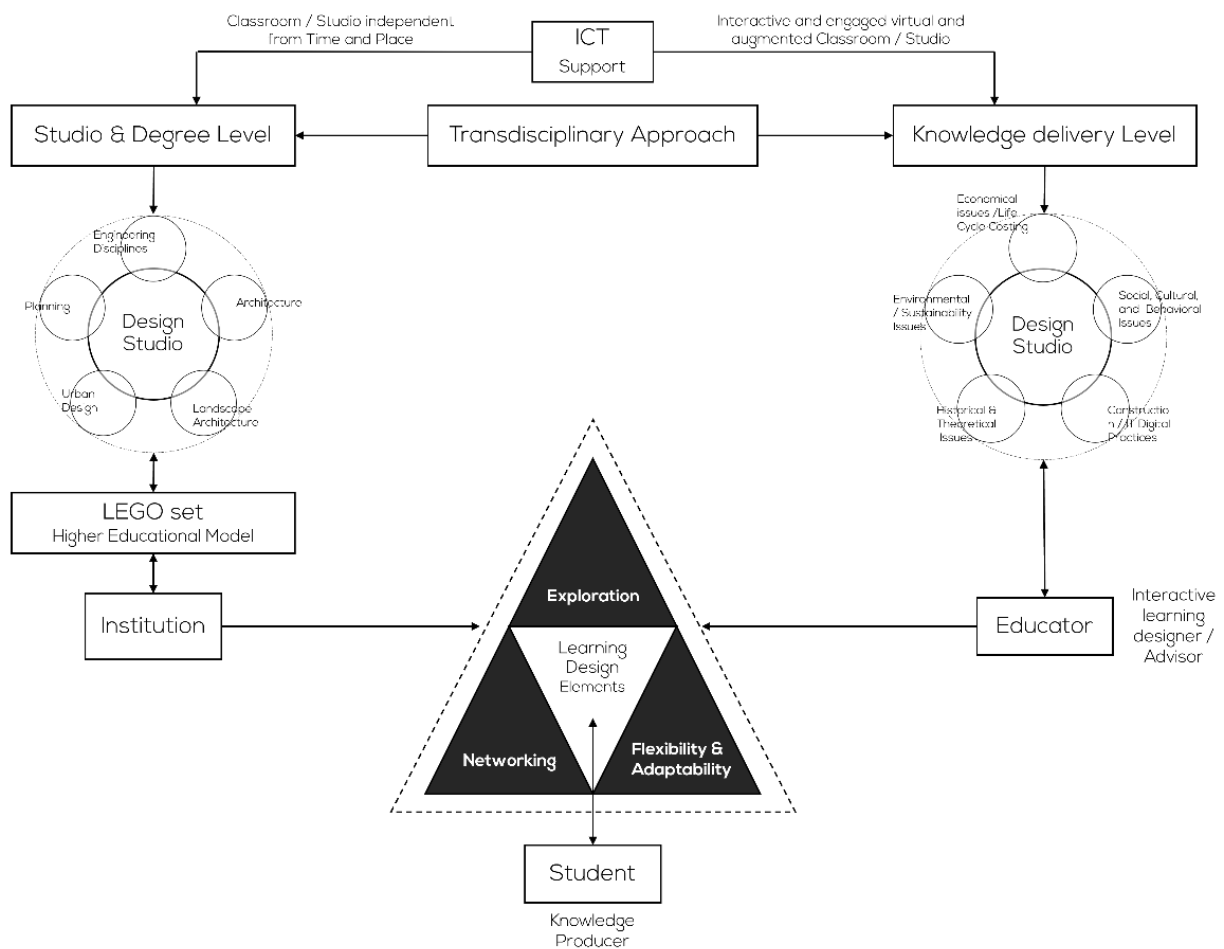
### 1. Introduction and Background

Architecture, the mother of all arts, a valid form of creative art, formation of the “New”. Architectural education is creative in nature, as making, drawing, and modelling and constructing are included in any architectural training [1].

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Architects, in contrast to artists they transform abstract to fact, and they inspire us with space and light quality ideas despite all the constrains of engineering, energy efficiency, and economic data integrated. Architecture discipline is a collaboration of design, planning, and construction of the built environment [2]. In comparison, painting is one type of art that can relate to architecture. The inspiration of architects to design their architecture from layouts and colours of works such as Mondrian and Picasso, in terms of building’s facades and floor plans that were inspired by the physical forms found in their paintings [3]. Another form of similarities was discussed by [3] as Dalí’s time plate resemble the geometry and flexibility of building form that of Aliyev Center for Zaha Hadid. Architectural education and architectural design in specific are composed of two opposites processes, science and artistic processes are considered fully opaque in nature and the other is completely transparent [4]. As for architecture students has two types of requirements related to knowledge and creativity [3]. According to [5] challenges that require the learning process to focus on creativity are the increase competitiveness due to globalization, the increase of information speed and change due to information technology, increases the flow of labour force due to expanded labour market, and the emergence of the creative new industries.



**Figure 1:** Model for architectural education learning design in post pandemic digital age [8].

Robert W. [6] discussed that It’s not possible to explain creativity by one statement, as creativity has many definitions each related to discipline. Creativity and creative thinking generally take place within a good base of knowledge; however, knowledge doesn’t conduct creativity every time. It’s not a must that the architecture

student who has obtained knowledge can create creative and innovative designs [7]. By this means, fostering creativity is important task that educators and institutions of the architecture discipline need to tackle. Accordingly, Architectural education had some other challenges that were discussed by [8]. That study suggests that the learning design elements is in the centre of the educational triangle of networking, exploration, and flexibility and adaptability. This triangle is promoting efficiency addressing current and future issues of architectural education, interactions between students on local and global scale, interactions between students with adaptable/flexible learning design elements and exploring new bodies of knowledge along with exploring career opportunities. In addition, Information, and communication technologies (ICT) usage must be leveraged to create fundamentally flexible and adaptive educational experiences and programs as illustrated in Figure (1). While these aspects were discussed according to the opportunities presented by Salama and Crosbie [9, 10], we argue that creativity is an aspect of architectural education that is important to address when reimagining architectural education in the post pandemic age. Moreover, fostering students' creativity is one of the most important aspects that educators and educational institutions should integrate in the learning processes and content.

According to the study's research questions, preliminary data classifications are proposed. However, throughout the categorization phase, some topics changed to make room for fresh subcategories of the original themes. Inductive data categorization was employed in this study's data extraction from the relevant literature. The first study question focuses on the effects of three primary categories of creativity: objective-based creativity, neutral and positive stress, and creative and critical thinking. In regard to architectural education in the post-pandemic digital era model, the second study question seeks to define the importance of fostering creativity models. In light of this, this study aims to investigate the theoretical foundations of these models in relation to studio, degree, and knowledge delivery levels in architectural education and to offer proof of the potential for changing the paradigm in this area. Based on the prospects given by these models, we anticipate that the outcomes will contribute to the renovation of the model for architectural education learning design.

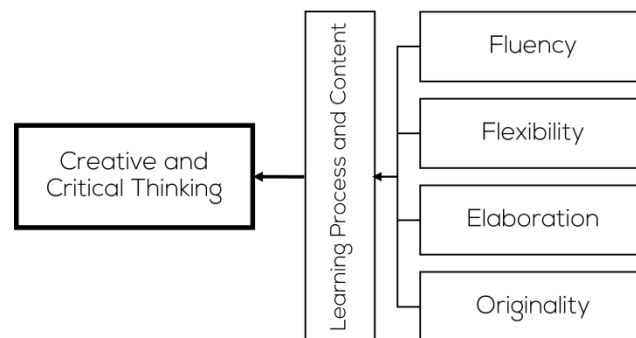
## **2. Data Gathering**

This study will investigate three models that could foster creativity, these models are related to embracing creative and critical thinking, using strategies to reduce negative stress factors on students, and implementing objective-based creativity to the architectural education learning design.

### **2.1 Creative and Critical Thinking**

Yasser El-Shestawy discussed architectural design with regards the relationship between science and creativity, in which questionable assumption in earlier literature, that the science defined as the act of problem definition in the design process, is more important that creativity defined as the act of problem solving. He argues that should be balance between science and creative aspects of the design process, several famed architectural projects were selected to supports a new culture of architectural innovation and its educational prosper, based on science and creativity balance should be fostered [11]. Architecture student's main task is how to produce creative works. Such discipline with the concern of the creative process, there learning content design should consider four

catalysts, which are fluency, flexibility, elaboration, and originality [5]. Fluency is defined as creation of more ideas for the same problem. Flexibility is defined as the correlation of ideas. Elaboration is defined as adding as much information to an idea, and Originality is defined as the capacity to transcend the ordinary by defining novel ideas. Architect thinks about the product in cycles of thoughts that include all design specifications and parameters, focusing on knowledge and practice gained. This series of actions addressing a design problem is called creative and critical thinking in architectural education [12]. Accordingly, through these catalysts, architectural education should prepare students to acquire theoretical knowledge and use it through creative and critical thinking in practical practice, as shown in Figure (2).



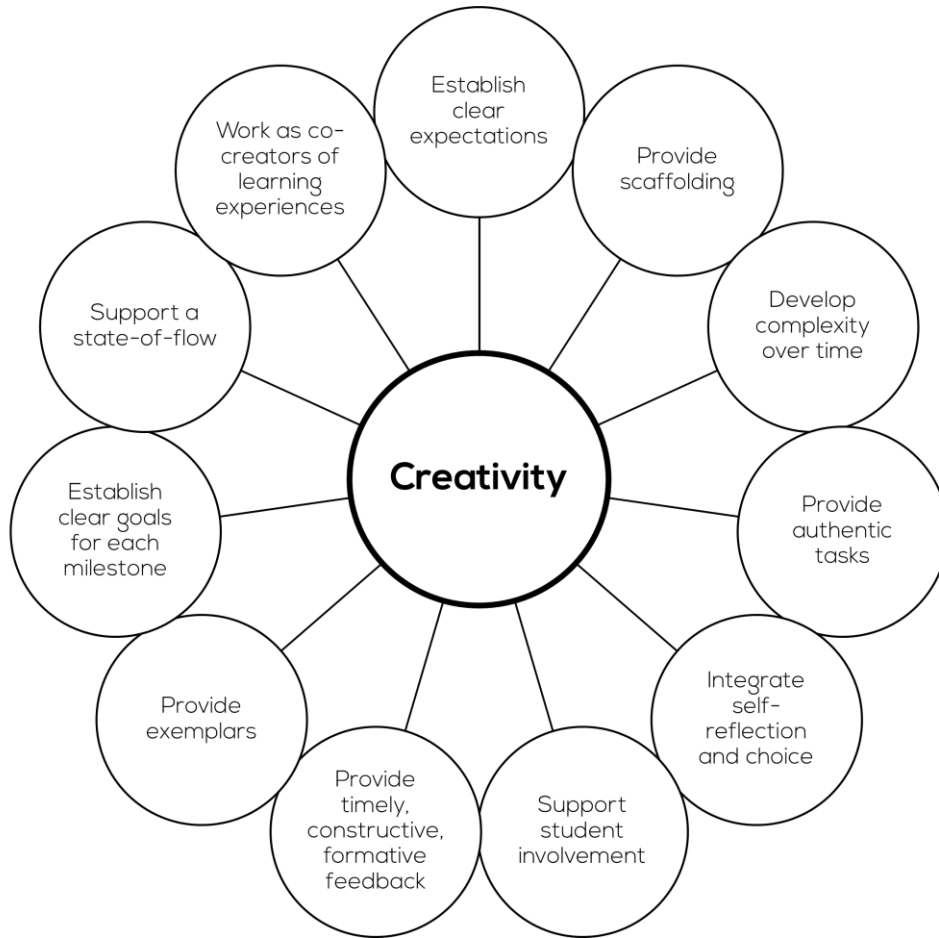
**Figure 2:** Fluency, flexibility, elaboration, and originality in the learning process and content fostering creative and critical thinking, adopted from [5].

Creative and critical thinking are involved in problem solving and cognitive skill, and they are genuine form that represent creativity, in which encourage individuals to orient their knowledge toward a product in a special way [12]. problem solving is required to tackle new challenges in every discipline [1]. Problem solving involves creative and critical thinking, creative thinking is divergent in approach, in contrast critical thinking is convergent in approach. Improving problem solving, enriching learning experience, and enhancing decision making skills are achieved by applying both approaches in conjunction, dismissing one of them would limit the efficiency and quality of problem solving [13]. According to [14], problem solving, and critical thinking are the top two most important skills ranked of the 21st century in a working environment. Educators can improve their student’s learning capacity, by understanding the relationship between both approaches, and applying these approaches in their educational process [15].

## 2.2 *Neutral/Positive Stress*

Creativity in architecture remain a controversial aspect in architectural education, especially when it comes to teaching and evaluation at a higher level, despite creativity is widely recognized as an important part of the design process [16]. On one hand, emotions are closely intertwined with design studio learning process, in which design education is represented as a process of changing students into designers [17]. Stress is one of the emotions that considered to be an issue facing creativity and creative thinking [18]. Architecture students have been reported to experience significant stress [19], [20]. Understanding student perceptions of stress in creativity-based higher education and the aspects that could trigger neutral and positive stress, would lead to

positive learning experiences. The following strategies illustrated in Figure (3) identified through literature to reduce stress and foster creativity [18].



**Figure 3:** Strategies that could trigger neutral or positive stressful situations and accordingly support creativity, adapted from [18].

On the other hand, by moving to a new learning setting of online/distance and blended models, including engagement protocols, and instructor power reduction are necessary. The style of "carrot and stick" architectural education, punishment and reward through tests, exams, marks, and grades needs to be reconsidered with a focus on genuine learning experiences and new forms of assessment of design projects and assignments [9]. This issue has been the focus of decades of research into the relationship between grades and student motivation [21]. Advocates of gradeless learning seek to promote learning for the sake of learning (so-called intrinsic value), rather than what they regard as a current concentration on studying solely for the sake of grades [22]. The greatest obstacle connected with gradeless learning may be persuading students of the value of learning beyond grades, especially for those who have achieved success through a grade-focused system [23]. Strengths are Reducing stress, taking academic risks, and adapting to university life specially in first year. Also, some weakness and concerns regarding gradeless education according to [23] are poor learning attitudes and behaviors, students concern about how the gradeless system would affect their individual career prospects, as employers will not understand the meaning of gradeless learning or appreciate its value.

### **2.3 Objective-based Creativity**

Creativity evaluation is a work in progress, in which we know much less about creativity and its evaluation than we like to know [24]. When there is no clear concept of creativity in architecture and/or the meanings of creativity definitions are ambiguous, assessing creativity becomes difficult [25]. An issue in the assessment process would result from a lack of awareness of the teaching components of creativity in architectural and design education. The fact that third-year students and their instructors have varied perspectives of creativity definitions, with more disagreement than agreement, creates a problem in the assessment of creativity [26]. The disparities in creativity perceptions indicate a high possibility of a flawed assessment procedure not only among students and teachers, but also among jurors/judges who will evaluate the final product. As a result, evaluating creativity necessitates a set of broad yet specific objectives [27].

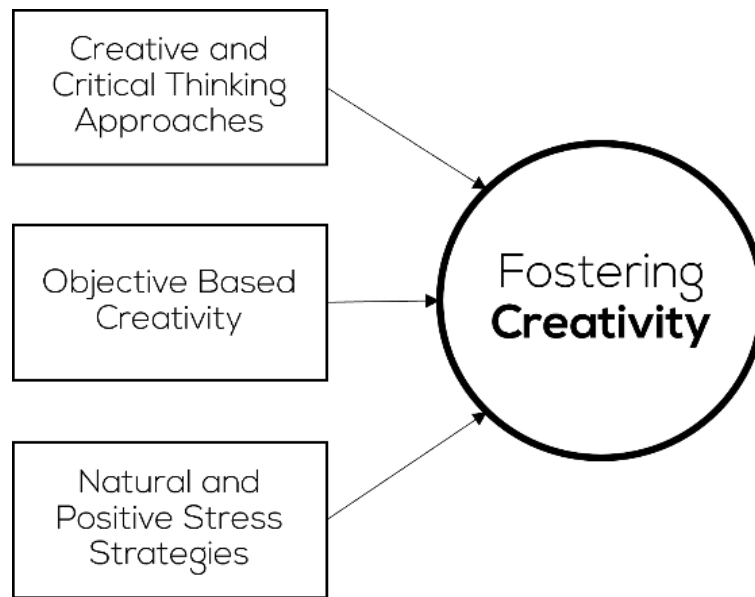
### **3. Discussion**

One of the successful theories that discusses the evaluation process of creativity, the creativity perception difference among jurors would be minimized by implementing objective-based creativity definition. In the design studio, using an objective-based definition of creativity would greatly improve the efficiency of the evaluation process, as having defined and explicit objectives would reduce subjectivity. The use of an objective-based creativity definition in the evaluation process means that the creativity perception gap between various jurors is minimised, as jurors must decide how creatively the students accomplished the project's design purpose despite their differing perceptions of creativity [28].

Educators and architecture educational institutions need to take steps to foster student creativity. Creativity helps students to come up with new ideas, to create solutions to a problem with design and help them to choose the creative ones [3]. They should foster creativity by creating an environment that spark it. This environment should consider the following Models illustrated in Figure (4):

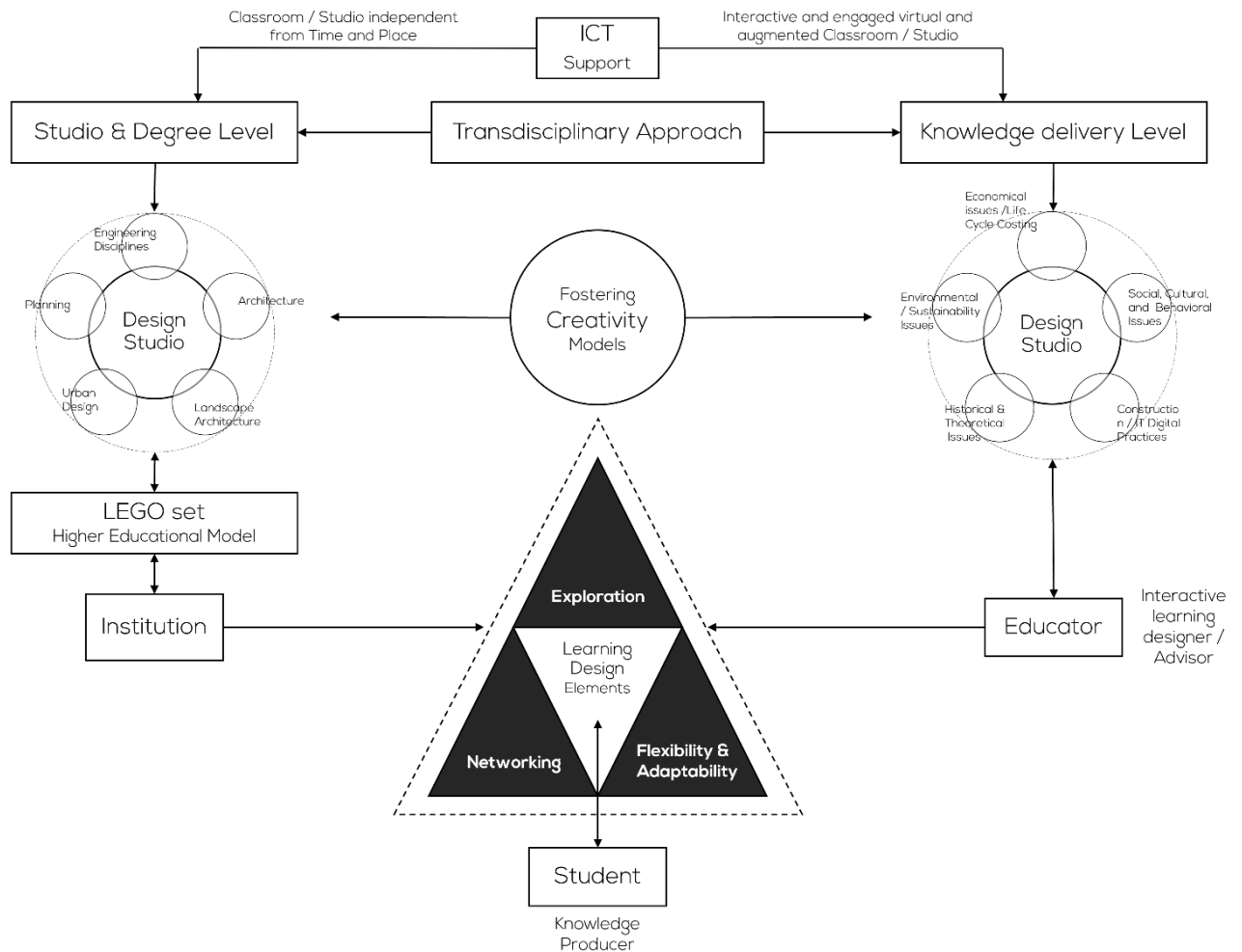
- Embracing creative and critical thinking by applying these approaches in their educational process considering the four catalysts (fluency, flexibility, elaboration, and originality) in learning content design.
- Using strategies that trigger neutral or positive stress.
- Implementing objective-based creativity to the architectural education learning design.

These Models would create an important ground for improving the education process of architectural education on knowledge delivery, studio, and degree levels. However, emerging approaches from other fields such as computer science (generative design, AI) can be anticipated to impact on how creativity is fostered in the future [29].



**Figure 4:** Fostering creativity models in architectural education

The model for architectural education learning design in the post-pandemic age is offered after examining current problems and potential in architectural education. This model is based on, improving networking, exploration, and flexibility/adaptation in architectural education, implementing of transdisciplinary approach, and integrating of information and communication technology (ICT) [8]. The transition of this model thought integrating fostering creativity models on both the knowledge delivery level and the studio and degree level of a transdisciplinary architectural education as illustrated in Figure (5) will call for educators and educational institutions to incorporate these models to further overcome the challenges that require the learning process to focus on creativity are the increase competitiveness due to globalization, the increase of information speed and change due to information technology, increases the flow of labour force due to expanded labour market, and the emergence of the creative new industries [5]. These models offer a canvas to actively encourage creativity and innovation in the ways that students approach tasks on knowledge delivery level, which is one of its advantages. Other advantages is through the creation of compelling narratives, development of interesting material, and the learning process in the studio and degree levels. The development of creative thinking and critical thinking in students is necessary for creativity to function as a part of higher-order thinking. Creative and critical thinkers believe that knowledge is produced, not predetermined. They therefore view knowledge as contextual and subject to reevaluation. Creative and critical thinkers consider knowledge creation to occur within social systems, frequently in cooperative circumstances.



**Figure 5:** Updated model for post pandemic architectural education integrating fostering creativity models

*“We should aim to produce moments of crisis and open-ended possibility in which contested histories and a competing range of situated political issues become integral to the critical transformation of the field. This is the first step in the construction of a more democratic learning environment and profession.” [30]*

Although previous experiences should not be ignored, the most crucial first step is to acknowledge the loss of the stable condition. There are numerous potentials to influence architectural education's future. Educators, students, and institutions must carry these potentials forwards [9]. This integration of fostering creativity models aims to add to the answer to the call for critical transformation of the field. The aim remains is to develop and build a modern architecture education framework that is more inclusive, responsive to technological advances, while allowing the thrives of creativity. This is an opportunity that should be pursued by striving to reinvent the future rather than attempting to retreat.



#### **4. Conclusion**

Architecture is well positioned to lead the charge in redefining education as action, using a paradigm that spans knowledge, disciplinary, and academic divides and combines scientific rigour with innovation and intuition [31]. As a result, architects will have the chance to develop the ability to respond to complicated, ever-changing conditions and transform them into emergent, ground-breaking architecture that illuminates a more promising and fascinating future. This study argues by using creative and critical thinking, neutral and positive stress, and objective-based creativity models in architectural education, we can find an answer to how to foster creativity in the architectural education paradigm. Additionally, it presents the benefits of utilizing these models in solving architectural education problems. Those models could be applied to different architectural education levels such as knowledge delivery, studio, and degree. Furthermore, this paper presents a reconceptualization of a novel approach that is targeted to tackle architectural education challenges in a post pandemic age through integrating foster creativity models. This integration provides an excellent preliminary platform for mapping future post pandemic architectural education. Future studies may investigate the possibilities of more model that can foster creativity that is related to architectural education. Finally, this paper presents as integration that possibly reinforces the application of fostering creativity models to solve post pandemic architectural education challenges.

Even while these fostering models cannot be generalized to education in architecture, they offer a promising starting point for planning post-pandemic architectural education. These models for fostering creativity that are offered are based on a theoretical strategy that has not yet been tested empirically. Accordingly, future work will need to undertake a systematic mapping study to conduct additional creativity challenges of architectural education and strategies that can adopt to the post-pandemic model. It will need more investigation to develop a comprehensive implementation framework that fully exploits the advantages of this model for fostering creativity. finally, the path toward reimaging architectural education in the post-pandemic era is still being developed.

#### **5. Declaration of conflict of interests**

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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