

Architect's self-readiness for strengthening creative rationality and its implementation in design learning for architecture as livable space

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Abstract. This research departs from the desire to gain learning from the rationality in designing of architects who have produced extraordinary creative works. Through a qualitative study of the designing practice by research-participant architects, the researcher describes the architect's mental readiness to strengthen his rationality in designing. This research uses multiple case studies with case units of mental processes of designing architects at the conceptual design stage, involving 16 research-participant architects. The main data were explored through in-depth retrospective interviews, analyzed using qualitative content analysis techniques. Research reveals that to strengthen their rationality in designing, architects build cognitive and psychological readiness. Cognitive readiness contributed dominantly, including readiness for complex thinking, alternative thinking and utilizing knowledge in memory. This readiness is built utilizing internal conditions formed from experience, education, and learning from the environment. The implementation of these findings in architectural design learning leads to start learning by conditioning students to be ready to use ratio in designing. Readiness is built by taking advantage of personal internal conditions so that the results are very diverse. Learning to design architecture must be designed inclusively to reach this diversity. Design assignments are required to be very open, which allows each student to develop the most suitable project to develop and express his potential to the fullest. This kind of task model has not been applied to every level of learning in our architectural education system.

1 Introduction

Nowadays scientific inclusivity has become an important issue because every field of science opens itself to other fields of science to find new dimensions [1, 2]. The world of education also leads to inclusiveness, which is to provide learning for anyone without restrictions on certain scientific bases, so that interactions between fields of science occur. One of the strategic keys to achieve this inclusiveness is transformative learning to build rational critical

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thinking skills [3, 4]. Through rationality, everyone can build an idea, making their actions easy to grasp the underlying meanings and values, and easy to learn, reflect and transform in new contexts [5, 6]. The rational learning method does not require special talents so that its position is very important if we want to meet the diverse needs of students in inclusive education [7].

Architectural education in Indonesia is currently not inclusive because to access it, it is required to have certain scientific bases such as from the exact and natural sciences, even with certain talents such as a strong spatial imagination. Design studio learning as the backbone of architectural education in universities needs to focus more on strengthening the rationality of design thinking in order to reach students with basic abilities and orientations for diverse learning needs. Design thinking is interpreted as an interactive problem-solving understanding process combining analysis and experience, which when proceeding optimally requires the involvement of rationality [8]. The process of building rationality in designing requires the support of knowledge stores that are relevant to the design problems encountered [9].

The practice of designing among architects shows that there is quite a large load of ratio both when doing it individually, especially when entering the stage of involving clients and other parties. When the creative process enters the realm of collaboration, what is built is not only a psychologically comfortable relationship, but also important is building a common understanding through the exchange and rational processing of information. The more complex the problem of architectural projects, the more parties involved in the collaboration so that the demands for rationality in the design process become stronger. In addition, the complexity of project issues requires individual architects to understand more carefully and measurably through ratio processing so that they gain confidence in being creative and more careful in making design decisions.

The research that underlies this paper is an exploratory research on the conceptual design process of architects with extraordinary creative works. The conceptual design stage is the focus of choice because it is the design stage that has a major impact on the final result [10, 11]. Based on the study of the role of rationality in architect's thinking in the practice of designing, this paper focuses on formulating the internal conditions prepared by architects to strengthen rationality in creative design. This formulation is the basis for preparing inclusive learning in architectural design that emphasizes rationality.

2 Method

The research departs from the key question of how architects' condition themselves to strengthen their rationality in designing creatively. Rationality in the creative process is a complex research subject because it includes various interrelated aspects, so that research investigations are carried out qualitatively-constructively. The architect's rationality in designing is investigated and described through case studies. In order to be able to interpret well, the researcher compared several architects so that several case studies were explored collectively. The case study unit is the mental process of preparing the architect himself to strengthen his rationality in designing at the conceptual design stage. Data and information were explored through in-depth retrospective interviews. The participant architects in this study were 16 Indonesian architects who produced works that won national and/or international architectural awards, with the characteristics as presented in Table 1. Through architects with extraordinary creative works, it is hoped that the process of designing extraordinary creative values will be explored [12].

Table 1. Characteristics of participant architects

Code of participant	Career start year	Formal learning input (architectural higher education)						Influential / effective non-formal learning input		Level and year of award	
		S1		S2		S3		Family environment	Social environment	national	international
		dom	ovs	dom	ovs	dom	ovs				
P-1	2005	v						-	Academic and professional association		2019
P-2	1976		v		v		v	Human values and social care in the family	refugee slum life	1991	1989
P-3	1996	v			v			The value of art-culture and love for the environment	Academic and professional association	2011	2016
P-4	1982	v			v			Rural agrarian life	Association among academics and artists	2002	2010
P-5	1996	v						Business family environment	Association of professionals & business-man	2012	2012, 2014
P-6	1982	v						-	Professional association	2005, 2011	2012, 2013
P-7	1999	v						Democratic family life	Academic and professional association	2014	2016
P-8	2012	v						Antithesis of architectural scholar father's view	Association of professionals and business-man	2017	2019, 2020
P-9	1984	v						Father's professional value as an architect	Professional social environment	1996, 2005	
P-10	1992	v						Cultural values and work ethic in the family	Association of professionals and business people	2002, 2005, 2018	2004
P-11	2000	v						-	Non-professional social intercourse		2020
P-12	1997	v						-	Professional association	2015	
P-13	1986	v			v			-	Professional and academic association	1996	
P-14	1995	v						The daily life of an architect's family	Professional and academic association	1999, 2002, 2008	
P-15	1978	v						Family religious values	Professional and academic association	2011	
P-16	1986	v						Father as an educator architect	Professional and academic association	2008, 2011, 2015	2013

Notes: dom: domestic; ovs: overseas

The main data and information are the results of in-depth retrospective interviews with participant architects regarding life experiences that influenced them to pursue the profession as architects and experiences of self-preparation to strengthen their rationality in designing creatively at the conceptual design stage. Supporting data to validate the main data are writings about themselves, the work and thoughts of the participant architects written by themselves or by others. As part of the research phase, a literature study was conducted on rationality in the mental process of designing and on rationality in the cognitive process of conceptual design. A holistic exploratory study was conducted to describe the architect's readiness to strengthen his rationality in designing creative, in order to answer research questions. The research procedure was carried out in an iterative cycle: reporting - processing - analysis - verification - interpretation - reflection.

Textual data from interview transcripts were verified with supporting data, analyzed using grounded theory qualitative content analysis techniques as the system in NVivo software [13]. The textual data of individual architects is seen as a single unit, analyzed thematically and qualitatively [14] to find the meanings and their interrelationships which are traced from a series of statements by the participant architects revealed in retrospective interviews. Thematic analysis was carried out using a “bottom-up” coding strategy, which was taken from empirical facts from interviews [15], combined with theoretical verification to determine the suitability and differences between empirical facts and relevant theories. This knowledge becomes the basis for empirical and theoretical overlays. Comparison and interpretation of the equivalence of phenomena between individuals is carried out without waiting for individual studies to be completed.

3 Findings and discussion

3.1 Findings

The results of this study reveal that to strengthen rationality in designing creatively, participant architects need three categories of self-readiness efforts, namely: (1) develop psychologically conducive conditions; (2) develop cognitively conducive conditions; (3) build internal motivation to be creative. The three efforts that are very important for the creative process of work, that the participant architects were built from various concepts, themes and dimensions of thought, which can be briefly structured as presented in the Table 2.

Table 2. Content structure of open retrospective interviews with participant architects that are relevant to architect's self-readiness to build design rationality.

Self-readiness category	Dimensions of self-readiness	Internal-aspect theme	Concepts of interview expressions
Psychological conditions for architect's creativity	Self-openness builds relationships	Positive self-perception	Highly committed to the task, dare to be different, dare to take risks, open and tolerant, dare to take pioneering.
		Ability to take advantage of a conducive environment	Special environment: family environment, social environment, cultural environment.
	Courage to take initiative	Self-confidence	Optimism, endurance, persistence
		idealism	Commitment to the value of empowerment, the value of preservation, the value of professionalism.
	Foresight to capture learning from the environment	Interest	Art-making, empowerment of small communities, local specialties, nature, traditional architecture, special projects.
		Responsiveness to the family environment	Internalization of: design philosophy, design behavioural norms.
		Responsiveness to the natural environment	Inspiration for: design ideas, design approach.
Cognitive conditions for architect's creativity	Complex thinking readiness	Responsiveness to the social environment	Adaptation for: designing strategy, design thinking.
		Collaboration ability	Opening the interaction of togetherness, equality, kinship, accommodating and tolerant.
		Persuasion ability	Build communication: argumentative, proactive, or exploratory.
		Critical-constructive thinking ability	Explore the unconventional to try out the possibilities of new unconventional design solutions.
	Alternative thinking readiness	Analytical thinking ability	Unravel complexities, think integratively, and explain and argue ideas.
		Open-reflective thinking ability	Reflect on data and information, and explore widely on various sources of ideas.
		Foresight to seize opportunities	Take initiative and persuasion, and be responsive to learning opportunities.
	Readiness to use knowledge in memory	Problem-solving skills	Collaborative brainstorming, divergent thinking, exploration of design experiences, critical review of design precedents.
		Imagination power	Develop a description of sensory experiences, unexpected creative experiences, or re-enact experiences from different points of view.
		Utilization of knowledge from education	Recalling memorable learning memory, interesting learning subjects, impressive learning interactions, accumulation of educational outcomes.
Motivation for architect's creativity	Motivational predisposition to form design-belief	Utilization of knowledge from experience	Recalling accumulated experiences and memorable experiences.
		Outward expression	Self-expression, professional expression, professional existence.
		Inward reflection	Build care, commitment, design comfort.
	Motivational predisposition in design decision-making	Outcomes and achievements	Realize prime artifact quality, satisfaction and satisfying, comparative advantage, competitive advantage.
		Decision reference	Construct a decision base that is easy to communicate, transparent, accountable.
		Decision-content performance	Realizing decision content that is: effective, guarantees development, provides comprehensive solutions.

3.1.1 Psychological conditions for architect's creativity

The excellence of design creativity among the participant architects was achieved by the readiness of the psychological condition to be creative. This condition is reflected in: (1) self- openness in building relationships with other parties; (2) the courage to take initiative, and; (3) foresight to capture constructive learning from the environment.

Self-disclosure builds relationships, is strived by participant architect when the design process involves other parties so that there is a collaboration of thoughts both on technical, managerial and psychological matters. In collaboration, the participant architects build psychological relationships armed with positive self-perceptions and foresight in utilizing a conducive environment, in order to gain mutual understanding to encourage creativity. Positive self-perception is reflected in various expressions such as being highly committed to the task, daring to be different, daring to take risks, being open and tolerant, and daring to take the pioneering. A conducive environment that is relevant to the creativity of the participant architects is a non-physical environment including family, social, and cultural environments. The family environment for some of the participant architects became the main factor that fostered their interest and belief as architects. The social environment that encourages design creativity among participant architects is very diverse, including the social environment in the world of education, the world of professions, certain communities such as artists, even the poor, that all of which present a certain concern and wisdom. The cultural environment is a conducive environment for learning as well as design inspiration for several participant architects.

The courage to take the initiative to design among the participant architects was supported by the psychological condition of self-confidence, idealism and a strong interest in creating something new. Self-confidence in being able to complete tasks successfully, is formed by various internal and external conducive conditions that are expressed as optimism and resilience to face the challenges of design problems. Idealism that related to ethical attitudes to express the moral values that are believed by participant architects in designing, among them are the values of empowerment, preservation, and work professionalism. Interest gives enthusiasm and fun energy so that designing becomes effective and creative. The interests of the participant architects varied, including art-making, empowerment of small communities, local specialties, nature, and traditional architecture.

Foresight to capture learning from the environment, is a self-condition that spurs the acceleration of the accumulation of knowledge in memory to support rationality. Extraordinary events and memorable experiences of participant architects when interacting with the environment are learnings that are easily internalized into knowledge in long-term memory. The learning resources of the participant architects from the environment outside of formal education include the daily environment and the family environment. Learning forms self-potential through complex interactions of one's internal aspects with the surrounding environment. The important moments in the life of the participant architects really colored the construction of design thinking. Experiences in family life in childhood and adolescence are recognized by several participant architects as influencing design behaviour, which is expressed in various forms, including the choice of ideas, perspectives, and design approaches. The experience of social interaction also has an influence on design thinking. The philosophical foundations for designing some of the participant architects are embedded form family life. Family values and norms influence the attitude of the participant architects in designing.

3.1.2 Cognitive conditions for architect's creativity

Creativity in designing of participant architects is inseparable from the support of cognitive conditions related to the ability to think by utilizing the wealth of knowledge and experience in memory. This ability has an internal impact on the development of: (1) complex thinking readiness; (2) alternative thinking readiness, and; (3) belief in the power of knowledge.

Readiness for complex thinking, namely scientific problem-solving thinking, is carried out by participant architects by utilizing persuasion and collaboration skills (relevant to belief formation), as well as critical-constructive, analytical, and open-reflective thinking skills (relevant to decision making). Collaborative capabilities are useful for participant architects in building the confidence of clients and other parties. They collaborate in diverse interactions, such as togetherness, equality, kinship, as well as being accommodating and tolerant, all of which are to unite diverse perspectives of thought in order to gain a common understanding of design issues. Persuasion, is a way for participant architects to convince clients and others with argumentative, proactive, or exploratory communication, to voluntarily change attitudes for the better. Critical-constructive thinking to build a satisfactory solution is an attempt by participant architects to improve the quality of thinking by reflecting it through analysis and assessment. Some of the participant architects with their ability to think critically and constructively explored unusual things, to get new design solutions. There are also those who strengthen their design skills by studying and criticizing various excellent architectural works. Analytical thinking, which is the cognitive ability to process various data and information in order to gain a comprehensive understanding of something, was expressed by the participant architects by breaking down the complexity of design cases to make them easier to manage, integrative thinking to achieve comprehensive design solutions, and explaining and arguing ideas so that they are easy to understand and accepted by the client. Reflective-open thinking which refers to thinking considering alternative views, different perspectives, new evidence, and prioritizing flexibility and not dogmatic, expressed by participant architects by reflecting on data and exploring various sources of ideas to get design novelties and avoid things that are already a lot people do.

The readiness of alternative thinking, namely thinking to produce various ideas to answer design problems is something that participant architects prepare to strengthen their rationality in the creative process of designing. This process requires the provision of intelligence and a wealth of memory. The intelligence aspects of the participant architects used in alternative thinking are foresight to seize opportunities, problem-solving skills, and the power of imagination. Foresight to recognize opportunities, useful to build rationality in designing through initiative and persuasion, as well as utilizing learning opportunities. The participant architects took the initiative and persuaded them for design opportunities through the submission of project proposals. Opportunities to learn to hone the foresight to seize opportunities can be obtained by being involved in large-scale projects in various roles, or being involved in design projects from a different perspective, or using a new approach. The problem-solving thinking skills of the participant architects were expressed in effective design thinking ways to solve problems with appropriate solutions. Participant architects express this by: collaborative brainstorming of the design team, or developing communicative rational thinking, or divergent thinking exploring alternative ideas, or conducting critical studies of architectural precedents. The power of imagination which is the ability to present a picture of previous experiences, makes participant architects able to explore and mature ideas, interpret the sense of space or expression of form, and transform activities into design formations.

Readiness to use knowledge in memory, as a result of internalizing various information and experiences, is very useful both in the cognitive and affective processes of architects when creating designs. Knowledge from experience and memorable education, becomes a strong reference in creative imagination. The knowledge of educational formations that

becomes a strong reference for the creative imagination of the participant architects comes from memorable learning momentum, interesting learning subjects, impressive learning interactions, and the accumulation of learning during education. Meanwhile, knowledge formed by experience as a strong reference for the creative imagination of the participant architects is a combination of memorable experiences and accumulated experiences. The accumulated experience felt by several participant architects greatly contributed to forming a systematic mindsets, broadening study horizons (divergence of thought) and belief in a choice (convergence of thought) so that they could respond to design problems more quickly. The memorable experiences gained by participant architects during internships, handling their own projects, or studying the precedents of other architects' work, are very valuable to increase confidence and become a source of inspiration when designing.

3.1.3 Architect's creativity motivation in designing

In cognitive theory, motivation is considered as one of the significant aspects that affect creativity. An important substance that determines the outcome and achievement of motivation is the disposition of motivation, which is a combination of beliefs in a certain form, and the content or subject referred to by these beliefs [15]. In the context of this research, the important factors that shape the motivational disposition in the design creativity of the participant architects are the rationality of built beliefs (predisposition of design belief motivation) and the content of the decisions taken (predisposition of motivational design decisions).

The motivational predisposition to design beliefs, is rationality that leads to motivational content that drives to design acceptance beliefs. When designing, architects practice ratios to build design beliefs both for themselves and for others that lead to certain motivations. Among the participant architects, each leads to motivational content that is expressed outwardly (such as self-expression, professional expression, professional existence), or which is reflected inward (such as concern, commitment, designing comfort), or in the form of outcomes and achievements of design (such as prime artefact quality, satisfaction and satisfying, comparative advantage, competitive advantage). Self-expression for some of the participant architects needs the support of appreciation from the architectural domain and the wider community. Expression of professionalism for some of the participant architects is an effort to think about designing the best for achievement-oriented choices, such as achieving design performance, achieving the application of values, or achieving certain targets. Concern for certain conditions directs participant architects to design with specific orientations such as community empowerment, sustainability of natural potential, cultural sustainability, and preservation of traditional architecture. Commitment to the design tasks he received led several participant architects to focus on building synergies with clients and other parties, as well as completing the design as well as possible. Convenience in designing is sought by participant architects, among others, by emptying the mind when exploring client aspirations, building personal relationships with clients, seeking conformity with the values of clients, or building mutually open relationships with clients. The quality of prime artefacts according to the design is expressed in various achievements, such as the effectiveness of space and cost utilization, visual excellence, and careful constructability. Self-satisfaction and satisfying the parties is sought through aligning their thoughts with the aspirations of clients and users, bringing together various stakeholder interests, or presenting the right spirit of space for users. The achievement of comparative advantage is pursued by participant architects in various manifestations, such as uniqueness and extraordinary, novelty by deconstructing existing ones, segmentation of unusual or special projects, elevating local values and client uniqueness, prioritizing landscapes over architecture. Competitive advantage is expressed through a special approach, commercial value, and spatial value, that

becoming the motivational content of designing participant architects. Professional existence is carried out with various efforts, such as designing with totality giving all the best capabilities, building superior architectural quality, maximizing efforts and results within various existing limitations.

The predisposition of motivation in design decisions is the initiation of participant architects in making design decisions using a series of logical arguments utilizing internal aspects such as knowledge or experience. This rational process has a major influence on the formation of decision-making motivation, for example so that design decisions are easy to communicate, transparent, accountable, effective, ensure development, and provide comprehensive solutions. Every motivation requires certain predispositions (criteria) of certain condition that strengthen it. Easy to communicate, requires certain conditions, such as the establishment of a rational explanation, the establishment of close interactions (rapport), and the use of appropriate communication media. Transparency of design decisions, namely the process is clearly informed to the client, strived by the participant architects through the development of the right logical thinking structure so that it is easy to understand. Design effectiveness manifests as broad-spectrum design performance or specific problem-focused performance in depth and detail. Accountable design, which is a design that is clearly informed so that it can be evaluated, needs to be supported by a data-based rational analytical process with clear thinking principles. Constructability is realized through a detailed design simulation process, calculation of the right builders' abilities, and careful exploration of structures and constructions. Design results to be comprehensive solutions are achieved by developing certain thoughts, such as theory-based and empirical thinking, results-oriented thinking with a broad impact, thinking leading to broad-spectrum solutions, and thinking oriented to comprehensively complying with regulatory and standard requirements.

3.2 Discussion

The architect's self-readiness to strengthen rationality in designing includes the readiness of psychological, cognitive, and motivational conditions. All of them are built from strengthening various internal aspects so that they are able to have a positive attitude and make effective decisions to support their creativity in designing. In this self-readiness, the architect establishes a link between internal conditions, motivation and rationality in designing what he wants to build.

3.2.1 Relation of internal conditions, motivation and creative rationality of architects in designing

Exploration of the architect's design process reveals the relationship between the architect's rationality in designing and its internal aspects, both psychological and cognitive. The cognitive process of practicing ratios in the design of the participant architects involves intensive use of internal aspects so that it can be categorized as a creative rational process [16, 17]. Empirical and theoretical studies show that in the creative process of designing, the architect's psychological condition contributes to the ratio. In addition, the rationality built by participant architects in designing is also related to certain internal motivations. This is in line with Theresa Amabile's componential creativity model [18, 19] which identifies the driving components of creative behaviour including intrinsic motivation as well as other internal components such as expertise and creative personality.

Previous research has placed motivation as one of the most influencing aspects of creativity and the disposition of motivation has a stronger predictive power for creativity than other variables [20]. However, this research among architects reveals that the architect's

internal (mental) condition is more important in contributing to creativity than motivation. Even motivation is influenced by internal conditions, and the disposition of motivation as a determinant of the achievement of motivation is formed by the results of the ratio. The disposition of the architect's motivation in designing is a combination of the rationality of his belief in design thinking and the content of the decisions taken for that thought. The relationship between psychological conditions, cognitive conditions, motivation and rationality in the creativity of architects at the conceptual design stage can be illustrated as shown in Figure 1.

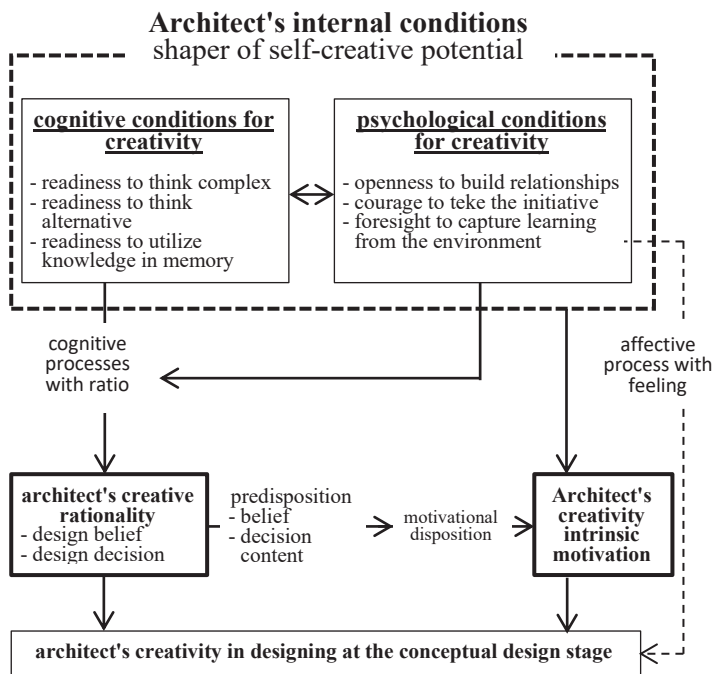


Fig. 1. Schematic of the relationship between internal conditions, motivation and creative rationality in the creativity of architects at the conceptual design stage.

The role and disposition of motivation for creativity varies between domains [21]. The disposition of motivation reflects the emphasis in the domain, so to realize creativity it is necessary to direct the disposition that best fits the emphasis of the domain. In this study, the rationality of the architect's design beliefs leads to the motivational disposition of self-expression, expression of professionalism, expression of concern, commitment to the task, comfort of work, prime artefact quality, architect's satisfaction and satisfying parties, comparative advantage, competitive advantage, and professional existence. While the rationality of decision-making in designing architects leads to the disposition of motivations for ease of communication, transparency-accountability, ease of acceptance by parties, design effectiveness, design buildability, and design usability in providing comprehensive solutions.

Architects' creations in designing will proceed perfectly to produce new concepts with high creativity value, when driven by strong motivation supported by full and quality self-potential [22]. The memory that contains the deposits of various internal aspects, is the main component of the architect's internal state. Related to creativity performance, internal conditions are divided into two categories, namely cognitive potential for creativity and

psychological potential for creativity. In the rationality of designing, the challenge of the design task will stimulate the use of the architect's internal conditions to build motivation and drive the ratio. Architect's rationality will clarify the motivation to design, and both will drive the creative process of designing. The more complex the rationality that is built, the greater the internal aspects of the architect that are utilized as energy for creativity. The more complex the rationality will also clarify the motivational disposition to be realized in designing.

3.2.2 Architect's internal conditions shaping factors to strengthen rationality in creating

To strengthen rationality in creating, cognitive readiness is needed which includes various components of abilities such as the ability to identify situation patterns, the ability to build solutions, the ability to apply solutions to problems that were initiated, special abilities related to talents/interests, and intelligence which is the capacity to learn from experience and adapt to the environment [23]. Utilizing various experiences as well as education and learning from the environment, the participant architects in this study built various cognitive readiness supporting abilities to strengthen the ratio in designing. The condition of cognitive readiness includes readiness for complex thinking, alternative thinking, and utilizing knowledge in memory. This is in accordance with the findings of various previous studies that cognitive abilities develop increasingly diverse and specific that formed by life experience, work experience, education, learning from the environment, as well as interests and motivation [24, 25].

To strengthen the creative rationality of students in architectural education, design learning can begin with tasks that can be drawn on personal interests, stimulate to recall memory of each other's experiences and knowledge, and invite learning from the environment that is of concern. Assignments are not rigid, but open and flexible to be developed by students themselves. The design task is a guide for each student to construct a design project that he feels is most suitable for him, at a certain level of complexity determined by the curriculum.

3.2.3 Adoptable self-readiness principles for inclusive design learning systems

Education is a process that plays a role in making a person rational, so that philosophically rationality is attached to education. The aim of education should be to encourage students to become rational critical thinkers with the intellectual ability to question the extent to which evidence warrants their belief in knowledge [26, 27]. Rational critical thinkers are driven by reason, have the ability to assess the power of reason in various contexts by utilizing all their potential. The education system must be able to encourage students to explore all their potential. In education, it is unavoidable that there is a diversity of learners, and the role of the education system must be inclusive, namely providing equal opportunities so that each individual can achieve educational attainment according to his potential optimally [28, 29].

The above description directs the development of the education system on two important characteristics, namely rationality and inclusiveness. Research findings that describe how architects' condition themselves to strengthen their rationality in creative design can be input for initiating the development of inclusive architectural design learning in the architectural education system. As illustrated in Figure 1, although psychological readiness contributes to the process of the architect's rationality for design creativity, but the most decisive is the support of cognitive readiness. If the role of higher education in architecture is to produce architects who use their intellect to think critically and rationally in designing, so design learning must begin by conditioning students cognitively to be ready to practice ratios in

designing. The architects of this research participant exemplify three main readiness, namely the readiness to think complexly, think alternatively and utilize knowledge in memory. This readiness is very relevant to each other's internal conditions, which among the participating architects are built from the repertoire of personal experiences, education, and learning from the environment of everyday life.

Internal conditions are very personal, so cognitive readiness to think about designing is also specific for each individual. Therein lies the real challenge of realizing inclusive architectural design learning. Design learning is not only to open rational critical thinking, but what is more fundamental is to stimulate each individual to explore and express all their cognitive potential, including the treasures in memory. The design task only determines the level of complexity, the rest must be designed very openly, which allows each student to develop his own project that is deemed most suitable to develop and express his all potential.

4 Conclusion

This research reveals the results that to strengthen rationality in creative design, architects build a state of readiness both cognitively and psychologically. Cognitive readiness is the main asset for architects to strengthen their rationality in designing, which includes readiness for complex thinking, alternative thinking and utilizing knowledge in memory. All of this is achieved by utilizing internal conditions formed from experience, education, and learning in the daily life environment. These results can be the initial inspiration for the idea of developing design learning which the backbone of architectural education.

Modern education is developed with two important characteristics, namely rationality and inclusiveness. Education plays an important role to direct someone to be rational. In line with this, learning architectural design must begin by conditioning students to be ready to design rationally. This readiness is very relevant to the use of students' internal conditions. Internal conditions are very personal, so that the cognitive readiness of students to think in designing also very diverse. Architectural design learning must be designed inclusively to meet the demands of this diversity. Design assignments are required to be very open, which allows each student to develop the most suitable design project to develop and express their potential to the fullest.

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