## 提升建築師執業素養與職能

## 與談人:劉國隆 全國建築師公會理事長

台灣建築師是屬於專門職業及技術人員服務業的一種,必須接受過正規的專業養成教育及訓練,並經過國家考試或相當資格之衡鑑程序,始能取得執業資格。為提升建築師執業素養與職能,分為教育、考試、執業三大層面探討。

以美國建築師為例,在建築教育方面,視建築學位為專業學位 (Professional Degree),專業學位是需經過國家建築認證單位(NAAB)認證 的教育學程才能授予應考資格。其在美國國內專業學位的學程目標很明 確,就是以訓練建築師為主要目標。台灣的建築教育,在課程編排與美 國雷同,大概分為設計、理論、技術,及實務等四大類,但台灣的建築 教育評鑑不同於美國是由專業的認證單位(NAAB)來評鑑,而是由教育部 來主導。因此為了與國際接軌,中華工程教育學會(IEET)與國際間建築 教育之認證機構簽署了坎培拉協定(Canberra Accord),台灣共有7所建築 系所通過此協定認證,且多半是5年制建築學士學位或4年制學士加上2 年碩士學程。在全國建築師公會理事長劉國隆的帶領下,已與澳洲、美 國、加拿大、英國等經濟體/國家的建築機構洽談有關建築師互惠認證與 雙邊協定,過程中多數國家的教育認可標準為 5 年學士學位,或可依現 有的坎培拉協定作為認證彼此建築教育之標準,唯其多與日本(4年制建 築教育為主)亦有互惠認可的機制。我方認為此範圍限制了台灣大多數 4 年制學校之建築系所,應著重在建築系科目所學之細部課程內容,而非 學制年限。

美國掌管建築師考試的機構 NCARB 要求建築師的養成,視各州規定,必須在取得專業學位後,經過 3740 小時(大概 2-3 年)的實習,實習內容包含 6 大類(業務管理、專案管理、程序分析、專案規劃與設計、專案開發與合約、施工與評估),且完成 Architectural Experience Program (AXP)後,才有資格報名建築師考試(ARE)。這點與台灣的建築系學生的實習有所不同,程序上台灣則是在通過建築師考試後要求 2 年的專業實務經驗。

在考試方面,我國建築師考試採用傳統的筆試和手繪等方式,注重 考生的基本繪圖表達及設計能力;美國建築師考試的內容包括建築策 劃、設計、施工、管理、竣工驗收的全過程,各科考試內容均考核考生 在保護公眾健康、安全和福利等方面的能力,註冊建築師不僅可以承擔 建築設計工作,同時還可以作為建築策劃師、建築諮詢顧問、施工管 理、建築評估師等與建築項目有關的工作。美國新版建築師考試大綱 (ARE5.0) 刪除死記硬背及創新性考核要求,以電腦繪圖方式考核敷地設計與建築物實務設計,減少考試科目和考試時間,增加綜合案例能力考察,注重考生的項目管理、建築成本費用分析能力,強調建築的性能等方面。相較於我國,美國建築師考試純記憶及知識性型考核內容較少,多以案例研究的題型進行考核。

建築師是台灣都市景觀與城市風貌的人文、技術、綜合規劃之專業人士,開業建築師的設計理念、技術施工、整合能力直接影響建築設計質量,進而影響建築產品的質量。綜觀以上之比較,美國註冊建築師養成制度與台灣的養成制度各有優劣項目,國隆期望台灣建築師養成系統與已開發國家能夠多做比較,截取所長,讓台灣建築師們能夠跨足國際競賽,更能為地球環境奉獻台灣建築師的專長,並組成台灣建築國家隊,立足台灣,放眼天下。

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			Incorporating lecture and workshop with US educated and/or licensed architect.	Career Paths The third year level requires a summer intership for one credit. Students are exposed to variious facet of the practice of Architecture	Design How the program instills in students a holistic understanding of the dynamic between built and natural	<b>Design</b> How the program instills in students a holistic understanding of the dynamic between built and natural environments, enabling future architects to mitigate climate change	I, building environmentl control system 2. site planning 3. Design Studio	1. Architecture History 2. Contemporary Design 3. Architecture programming 4. other related classes introducing relevant case study	Fifth year studio is open thesis research + design course. Fourth year is theme related one semester studio that allows students to explore possible innovative research	students are encouraged to work in teams for multiple lecture classes as well as participating in oen call competitions	Students are encouraged to work in teams for all the lectures class; also, all site models are made in teams to allow sstudents to learn to coordinate and support each other.	co-working studio allows studetns to interact with fellow students and faculty members. Also, by having student association allows students to promote their events or projects.	program allows students to understand uniform code compliance that are common in many countries. Particular lecture classes will bring case studies from the US. Site Planning, Architecture System and Contemporary Thoughts
		NAAB Program Criteria (PC) & Student Criteria (SC)	PC1	Pc2	PC2	PC2	PC3	PC4	PC5	PC6	PC7	PC8	PC8
	PC.1	Career Paths  How the program ensures that students understand the paths to becoming licensed as an architect in the United States and the range of available career opportunities that utilize the discipline's skills and knowledge.	<u>ű</u>	<u>a</u>	<u>ā</u>	<u>ā</u>	<u>ā</u>	ā	ā	ā.	ā	ā	<u> </u>
	PC.2	Design  How the program instills in students the role of the design process in shaping the built environment and conveys the methods by which design processes integrate multiple factors, in different settings and scales of development, from buildings to cities.											
	PC.3	Ecological Knowledge and Responsibility  How the program instills in students a holistic understanding of the dynamic between built and natural environments, enabling future architects to mitigate climate change responsibly by leveraging ecological, advanced building performance, adaptation, and resilience principles in their work and advocacy											
n Criteria (PC)	PC.4	History and Theory  How the program ensures that students understand the histories and theories of architecture and urbanism, framed by diverse social, cultural, economic, and political forces, nationally and globally.											
NAAB Program	PC.5	Research and Innovation  How the program prepares students to engage and participate in architectural research to test and evaluate innovations in the field.											
2	PC.6	Leadership and Collaboration  How the program ensures that students understand approaches to leadership in multidisciplinary teams, diverse stakeholder constituents, and dynamic physical and social contexts, and learn how to apply effective collaboration skills to solve complex problems.											
	PC.7	Learning and Teaching Culture  How the program fosters and ensures a positive and respectful environment that encourages optimism, respect, sharing, engagement, and innovation among its faculty, students, administration, and staff.											
	PC.8	Social Equity and Inclusion  How the program furthers and deepens students' understanding of diverse cultural and social contexts and helps them translate that understanding into built environments that equitably support and include people of different backgrounds, resources, and abilities.											

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			Building environmental system, urban planning, landscape urbanism, contemporary thoughts expose students to the health topic	Students are encouraged to participate in community design projects by working with the residents on actual design-build projects, interacting with users and understanding the impact of health to people and community		Students are encouraged to understand the business of design in terms of design phase to parametric fabrication and curtain wall design. Therefore, the intricate subdivision of the practice are taught in various classes	program allows students to understand uniform code compliance that are common in many countries. Particular lecture classes will bring case studies from the US. Site Planning, Architecture System and Contemporary Thoughts	Students are encouraged to incorparate bulding code into design. The environemntal control system class incorporates mechanical system and green building design requirement into the class	Architecture System, Structure and form, Construction mamagement classes offer realte theme and topic	Students have several courses that are in the architecture technology realm. It is incorporated with professional lecture series as well as digital fabrication and envelope design.	Architecture System, Structure and form, Construction mamagement classes offer realte theme and topic	From second year studio class on, the classes allow students to learn urban planning, code relevance, structure system, social design and architecture system design to studio classes.	archicture system, construction management and structure and form classes allow students to learn	Students are required to complete a bulding type design from the first year onward. The synthesis of the design and bulding tectonic as well as construction are required for design studio.
		NAAB Program Criteria (PC) & Student Criteria (SC)	SC1	SC1	SC2	Sc2	SC3	SC3	SC4	SC4	SC5	SC5	SC5	908
	SC.1	Health, Safety, and Welfare in the Built Environment  How the program ensures that students understand the impact of the built environment on human health, safety, and welfare at multiple scales, from buildings to cities.	Ø	Iw	O	O	Ø	Ø	Ø	Ø	Ø	O	Ø	
	SC.2	Professional Practice How the program ensures that students understand professional ethics, the regulatory requirements, the fundamental business processes relevant to architecture practice in the United States, and the forces influencing change in these subjects.												
Student Criteria (SC)	SC.3	Regulatory Context  How the program ensures that students understand the fundamental principles of life safety, land use, and current laws and regulations that apply to buildings and sites in the United States, and the evaluative process architects use to comply with those laws and regulations as part of a project.												
NAAB Studen	SC.4	Technical Knowledge How the program ensures that students understand the established and emerging systems, technologies, and assemblies of building construction, and the methods and criteria architects use to assess those technologies against the design, economics, and performance objectives of projects.												
	SC.5	Design Synthesis  How the program ensures that students develop the ability to make design decisions within architectural projects while demonstrating synthesis of user requirements, regulatory requirements, site conditions, and accessible design, and consideration of the measurable environmental impacts of their design decisions.												
	SC.6	Building Integration  How the program ensures that students develop the ability to make design decisions within architectural projects while demonstrating integration of building envelope systems and assemblies, structural systems, environmental control systems, life safety systems, and the measurable outcomes of building performance.												

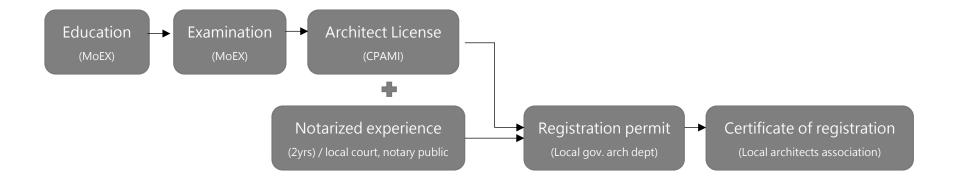
			Architectural planning						Site nla	Site planning & urban design				Building codes &			Architectural structure								近月寺汉八貞刊未糸官央城市 Building structure &									Building environment											
					& design  Architectural planning Architectural design						Site planning & dibari design				n #		pract	ce		Structur Structural behaviors Architectura Structural Architectural							Arc										Buil	ding	MEP &	ontrol	Trends				
EX/	AMIN	NATIC	ON (ARE®) ASSESSMENT OBJECTIVE	APD 1.1 Idenity and clarify design problems APD 1.2 Program analysis	APD 1.3 Building code integration APD 1.4 Building environment and control system	APD 1.5 Architectural structure and building system APD 1.6 Behavior of built environment	APD 1.7 Barriar free universal design and safety APD 1.8 socio-environmental concept APD 1.0 Social analysis	APD 1.10 Respond to design criterias APD 1.11 budget analysis	APD 2.1 Understand architectural design and theory APD 2.2 Articulate plan system based on design	APD 2.3 Space organization APD 2.4 Massing	APD 2.6 Circulation planning APD 2.6 Structure and building components	APD 2.1 Use of the application of the SUD 1.1 Site analysis and the application of the urban design throry Understand the indiscape and Duderstand the indiscape and survivormental principles and apply on the design based on urban design theory is	SUD 1.3 Circulation planning SUD 1.4 Master planning SUD 1.5 Dublic facilities	SUD 1.6 Water and soil conservation SUD 2.1 Understand the scope of urban design	SUD 2.2 Theory and applocation of urban renewal and urban design Identify the relationship of landscape, Identify the relationship of safety, sustainability, SUD 2.3 conservation, bublic at, safety, sustainability,	user participation and design review  Enforcement Rules of Architects Act, Building Ac	and Building Technical Regulations BCP 2 Urban planning law and urban renewal act	BCP 3 Spatial Planning Act, Regional Planning Act and regulation fro non urban region BCP 4 Condominium Administration Act	BCP 5 Construction Industry Act BCP 6 Government Procurement Act, contract and	BCP 7 Accessibility and relation regulation BCP 8 Other builiding code	AS 1.1 Concept of the structure system	AS 2.1 Structural components Stability of the structure, static and non static	AS 2.2 structure AS 2.3 Truss and rigid frames	AS 2.4 Steel , concrete , wood and bric building and its structure	AS 2.5 system AS 2.6 與時事有關之結構問題	Calculation of truss system and regid framing Esystem system	AS 4.1 RC system and Steel structure calculations B	AS 5.1 construction time, and cost for different	structural system an	8SC 1.1 Material properties of different building	BSC 1.2 Properties of frequently used material and engineering green materials	BSC 2.1 Foundation system, wood construction, RC, Steel and SRC construction SSC 2.2 Roof construction	BSC 2.4 Interior construction	BSC 3.1 Safety measures BSC 3.2 Machines and equipments 50 BSC 3.3 Application of other construction	BSC-4.1 Frequently used details	Knowledge for frequently used building SEC 5.1 construction particularing SEC 5.1 concertaints construction particularing SEC 5.1 concertaints construction and second second second second second second second second sec	accessibility construction specs	Knowledge and experience of architecture BSC 6.1 and interior construction, building system and on materials	BSC 6.2 Sustainability, resilience and environmental approperties  properties BSC 7.1 Understand the implication and relationships of faasihility construction schedule and cost	BEC 1.1 Thermal environment BEC 1.2 Architectural ventilation system	BEC1.3 Light environment BEC1.4 Architectural acoustic	BEC 2.1 Plumbing and sanitary systems BEC 2.2 Fire protection system	BEC 2.4 Architectural conveyer system BEC 2.5 Electrical and lighting system	BEC3.1 Earth environment and susumentum, BEC3.2 Green building, green materials and well BEC3.3 Sustainable construction, smart building and misconal dearing.	universal ucesign BEC 3.4 Recent case study BEC 4.1 Relationship of architectural design and Invironmental control
-	Pc	eM 1.1	Assess resources within the practice.																																										
Z W Z	10	M 1.2	Apply the regulations and requirements governing the work environment.				П	П		П			П			3			П	1	П	П								П												П			
G	Pc	eM 1.3	Apply ethical standards to comply with accepted principles within a given situation.													2						Ħ								Ħ															
A N	Pc	:M 2.1	Apply appropriate Standard of Care within a given situation.  Evaluate the financial well-being of the practice.																																										
Σ		M 2.2	Identify practice policies and methodologies for risk, legal exposure, and resolutions.  Select and apply practice strategies for given business							+									Ш			#								$\perp$														4	
] C	Pc	M 3.1	Analyze and determine response for client services requests.  Analyze applicability of contract types and delivery methods.					1											H																										
ACT		eM 3.3	Determine potential risk and/or reward of a project and its impact on the practice.																																										
P.R.		eM 4.1	Analyze the impact of practice methodologies relative to structure and organization of the practice.  Evaluate design, coordination, and documentation							Ш									Ш			44								$\perp$														4	
			methodologies for the practice.  Determine criteria required to assemble team.																		$\vdash$									+														#	
	Pjl Pil	M 1.2 M 2.1	Assess criteria required to allocate and manage project  Develop and maintain project work plan.																																				1						
-		M 2.2 M 2.3	Determine criteria required to develop and maintain project  Determine appropriate communication to project team - owner, contractor, consultants, and internal staff.							+									H			+								$\exists \exists$				+										+	
Z W E		M 3.1 M 3.2	Evaluate and verify adherence to owner/architect agreement.  Interpret key elements of, and verify adherence to																											目															
GEN	L		architect/consultant agreement. Interpret key elements of the owner/contractor agreement.							Н																																			
A Z	Pjl	M 3.4	Interpret key elements of the owner/consultant agreement to integrate the consultant's work into the project.  Evaluate compliance with construction budget.																Ш									4		Ш									2					41	
₹ 5			Evaluate compilative with construction budgets  Evaluate and address change in scope of work and scope  Evaluate project documentation to insure it supports the					J										_																					3						
ECT		M 4.4	specified delivery method.  Identify and conform with the requirements set forth by					+		+			+			3	2	)		1		+								-									2				+++	+	
0 0 5	Pjl	M 5.1	authorities having jurisdiction in order to obtain approvals for Apply procedures required for adherence to laws and regulations relating to the project.					H		+			+			2	2 :	2	1	1		Н								+													+++		
P 8	Pjl	M 5.2	Identify steps in maintaining project quality control and reducing risks and liabilities.																			Ħ								T						2		1							
	1 3	M 5.3	Perform quality control reviews of project documentation throughout life of the project.																																	2		1							
	,		Evaluate management of the design process to maintain integrity of the design objectives.  Evaluate site-specific environmental and socio-cultural				2															Ш							4	Ш				+				2					$\sqcup \sqcup$		4
ဟ	P.A		Evaluate site-specific environmental constraints.  Determine optimal use of onsite resources by incorporating					H									+					H							1																
∀SI			sustainability principles. Identify relevant code requirements for building and site	1	3					Н			$\perp$									#							1													+	3	3 1	2
NAL	PA PA		Identify relevant zoning and land use requirements.  Identify relevant local and site-specific requirements.  Evaluate relevant qualitative and quantitative attributes of a	1	3	2	1			+											H	#								$\pm$				+											
8 A	PA	A 3.2	site as they relate to the program.  Synthesize site reports with other documentation and		2		3	$\blacksquare$		+			+								$\vdash$	++	_							$\dashv$													+++		#
o z	PA	A 3.3	Analyze graphical representations regarding site analysis and site programming.	1 3																		Ш																					Ш		
- 2 2		A 4.1 A 4.2	Evaluate relevant qualitative and quantitative attributes of a new or existing building as they relate to the program.  Evaluate documentation, reports, assessments, and analyses			3	1	1														44								4													$\Box$	+	4
R A	P.A	A 4.3	to inform the building program.  Identify and prioritize components of the building program.					2	1	3																																	$\coprod$		
ROG	P.A	A 4.5	Assess spatial and functional relationships for the building Recommend a preliminary project budget and schedule.					3		3												н																					丗		
4	11	A 4.6	Identify alternatives for building and structural systems for given programmatic requirements, preliminary budget, and Analyze graphical representations regarding building analysis					1		Ш	2 2	2										ш																					$\sqcup \sqcup$	$\bot$	4
ပ		PD 1.1	and building programming.  Determine Location of Building and site improvements based		+				1 3	++											$\vdash$	+								+													+++	+	#
ESIC	pp		on site analysis.  Determine sustainable principles to apply to design.										3	2	2							#								H															
~ 0		PD 2.1	Determine impact of neighborhood context on the project Apply zoning and environmental regulations to site and Apply building codes to building design.		2			+				1	2	2		3														$\blacksquare$				+											
o z		PD 2.3 PD 3.1	Integrate multiple codes to a project design.  Determine mechanical, electrical, and plumbing designs.		3								$\blacksquare$							1																									
Z	PP PP	PD 3.2 PD 3.3	Determine structural systems.  Determine special systems such as acoustics, compunications lighting security conveying and fire		2	3	$+ \mathbb{T}$			$+\Gamma$	3						$+ \overline{1}$													+						† <u> </u>						$+\Gamma$	++		
PLA	PP	PD 3.4	communications, lighting, security, conveying, and fire  Determine materials and assemblies to meet programmatic, budgetary, and regulatory requirements.		2		+	$\dagger \dagger$		$\dagger \dagger$			+				$\dagger\dagger$					$\top$						2		1	1					1			3			+	H		
CT F	PP	PD 4.2	Determine building configuration. Integrate building system in the project design.																			П																							
J E	TO TO	PD 4.3 PD 4.4	Integrate program requirements into a project design.  Integrate environmental and contextual conditions in the			1	$\pm \pm$	2	1		2		2 3			+														#															
PRO		PD 5.2	Evaluate design alternatives based on the program.  Perform cost evaluation.  Evaluate cost considerations during the design process.					3								_													+	$\dagger$						1									
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ELAMINATION (ARE) ASSESSMENT OBJECTIVE    The control of the contr			Site planning & urban design		Architectural structure		
1		Architectural planning Architectural design	Site planning Urban design	Act,			Building MEP & HVAC Trends environment system
We will have been a second and the register of consequent to transport of the register of consequent to the register of the register of consequent to the register of th	EXAMINATION (ARE®) ASSESSMENT OBJECTIVE	APD 1.1 Identify and clarify design problems APD 1.2 Program analysis APD 1.3 Building code integration APD 1.4 Building environment and control system APD 1.5 Architectural structure and building system APD 1.5 Architectural structure and building system APD 1.7 Bartiar free universal design and safety APD 1.8 Socio-environmental concept APD 1.9 Spatial analysis APD 1.1 Respond to design criterias APD 1.1 Understand architectural design and theory APD 2.2 Autoust a part system based on design APD 2.4 Autous planning APD 2.5 Circulation planning APD 2.5 Circulation planning APD 2.5 Structure and building components	APD 27 Use of different materials SUD 1. Site analysis and the application of the urban design throry Understand the landscape and SUD 12 Invitronmental principles and apply on the design based on urban design theory SUD 13 Circulation planning SUD 14 Master planning SUD 15 Public facilities SUD 16 Water and soil conservation SUD 2. Inderstand the scope of urban design SUD 2. Inderstand the scope of urban renewal and SUD 2. Inderstand the scope of urban renewal and SUD 2. Inderstand the relationship of landscape. Inderstand design median facility in the relationship of landscape. Index of the relati	Hop 1 Inforcement Rules of Architects Act, Building and Building Technical Regulations HBP2 Uban planning law and ulban nenewal act HBP3 Spatial Planning Act, Regional Planning Act at HBP4 Condominium Administration Act HBP5 Construction Industry Act HBP6 Construction Industry Act HBP7 Accessibility and relation regulation HBP7 Accessibility and relation regulation HBP7 Accessibility and relation regulation	Concept of the structure system System planning cope Structural components Stability of the structure, static and non static structural components Truss and rigid frames Truss and rigid frames Truss and rigid frames Static concette, wood and bric building and its structure system and seismic structure system Wind resistent system and seismic structure system Calculation of truss system and regid framing system Calculation of truss system and regid framing system Calculation frames Sustainable structure and flexibility. Sustainable structure and flexibility Sustainable structure and flexibility	BSC 12 Properties of frequently used material and green materials.  SC 21 Foundation system, wood construction, RC, Steel and SRC construction  BSC 22 Roof construction  BSC 23 Exterior envelop  BSC 24 Herior envelop  BSC 23 Application of other construction  BSC 33 Application of other construction  BSC 34 Achines and equipments  BSC 34 Application of other construction  BSC 34 Frequently used details  Crowledge for frequently used building construction specification including accessibility construction specification including accessibility, resilience and environmental BSC 64 and interior construction, building system and materials and interior construction, building system and properties.  Crowledge and experience of architecture and interior construction, building system and properties.  Crowledge and experience and environmental properties.  Crowledge and experience and environmental properties.  Crowledge and experience and environmental properties.	BEC 1.1 Infernal environment BEC 1.2 Architectural venitation system BEC 1.3 Light environment BEC 1.3 Light environment BEC 2.1 Plumbing and sanitary systems BEC 2.2 Fire protection system BEC 2.2 The protection system BEC 2.3 Architectural conveyer system BEC 2.3 Architectural conveyer system BEC 2.3 Architectural conveyer system BEC 2.3 Teach environment and sustainability BEC 3.3 Creen building, green materials and well BEC 3.3 Sustainable construction, smart building and BEC 3.3 Sustainable construction, smart building and BEC 3.4 Recent case study BEC 3.4 Recent case study BEC 3.4 Architectural design and
Part 1   December 1   December 2   December 2   December 3   December		2					2
The state of the s	PDD 1.2 Determine the size of mechanical, electrical, and plumbing						
Supervision, commercial, excellent production of the integration of th	PDD 1.3 Determine the size of structural systems to meet project				3 2 1 3 2 2		
10.113 Determine the risk details the responsive of multiple building build	suppresion, conveying, security, and communications to						1 1 1 3 3 3 3 3
TO 10 Conclines machinistic, electrical gloritories, described, solution and solutions are considered as the control of solution and solutions are considered as the control of solutions are contro	PDD 1.5 Determine how to detail the integration of multiple building					2 4	
County   C	PDD 1.6 Coordinate mechanical, electrical, plumbing, structural, and		1 1 1 1 1 1 1 1 1 1				
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	CE 4.2 Evaluate building design and performance.						<u> </u>

## Path of Taiwan architects

After meeting education requirement, the candidates can take architect exam. The architect license will be issued upon passing the exam. In addition to architect license, two years architectural experience (with notarization) will be required for registration.



## Path of US architects

