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Reflecting on the architecture curriculum through a survey on career switching

Shenghuan Zhao, Politecnico di Milano, Italy
Enrico De Angelis, Politecnico di Milano, Italy
Dongqing Ma, Dalian University of Technology, China

Abstract

Due to the deteriorating investment environment, many real-estate companies in China have started transferring their business out of the construction industry. This leads to the shrinkage of the design market and also architects' salary. A great number of architects have switched career to maintain the same living quality as before. Meanwhile, architectural education in China is not able to integrate itself with emerging science and technologies, losing possibilities to explore new employment channels for its graduates. There is a huge gap between qualities needed in the current or future labour market and the architectural education in schools. An online survey was conducted to investigate the current state of architects' career shifting, trying to expose the problem mentioned above. In the second part of this paper, education missions from 50 universities are analysed and detailed education curriculums from three top universities are scrutinised. At the end, the education boundary is suggested to be reconstructed from three aspects: integrating the emerging technologies; reducing unnecessary content; and training in self-learning skills.

Key words

architectural education; Architecture design; Architect; Education development; Building design; China

Introduction

The architect used to be a favourable career choice among young Chinese, due to the high salary and social identity. With regard to a ranking (Speiyou, 2013), in the year 2012, new architectural degree holders had the highest salary among different major graduates, amounting to 4453 Chinese Yuan per month. However, statistics from the biggest job searching website Jobhui, whose yearly salary data was based on more than 30,000,000 samples, show that since the year 2011 architects' income has started decreasing (Figure 1). By comparing the salary prediction of architects with the average number of all industries in Shanghai, the increasing unimportance of architecture as a career in the whole society can be confirmed. What is worse, some design companies were already unable to pay the year-end

award which is a big part of income for Chinese architects, causing several scandals (ARCHCOLLEGE, 2016). Under this macro environment, many architects switch their career for a higher salary and social identity. It is reasonable for architects to offer services that do not belong to their traditional duties but that are needed in the market (Jann, 2010). Carnegie Foundation made a survey in the year 1996 and found that 22% of architecture graduates in one school switched careers (Ball, 2004).

Nevertheless, the swift development of building technologies actually already has brought many new possibilities for the architects, which still have not been realised by educators. Actually, the reality is even worse because architectural teaching is already lagging behind contemporary construction practice, due to most of the teachers lacking practical experience on real projects. Hence, students are getting the education which is already out of date in the job market, let alone those recently developed technologies. In order to deeply analyse this phenomenon and find some solutions, an online survey aiming to probe the architects' career switching was published. Results of the survey shed a light on the gap between job market and school education. In the second part, this paper focuses on the boundary of education content, with a vision of the inadequacy and redundancy in the existing educational system. The whole study has significance in the development of architectural education and will be beneficial for educators and schools.

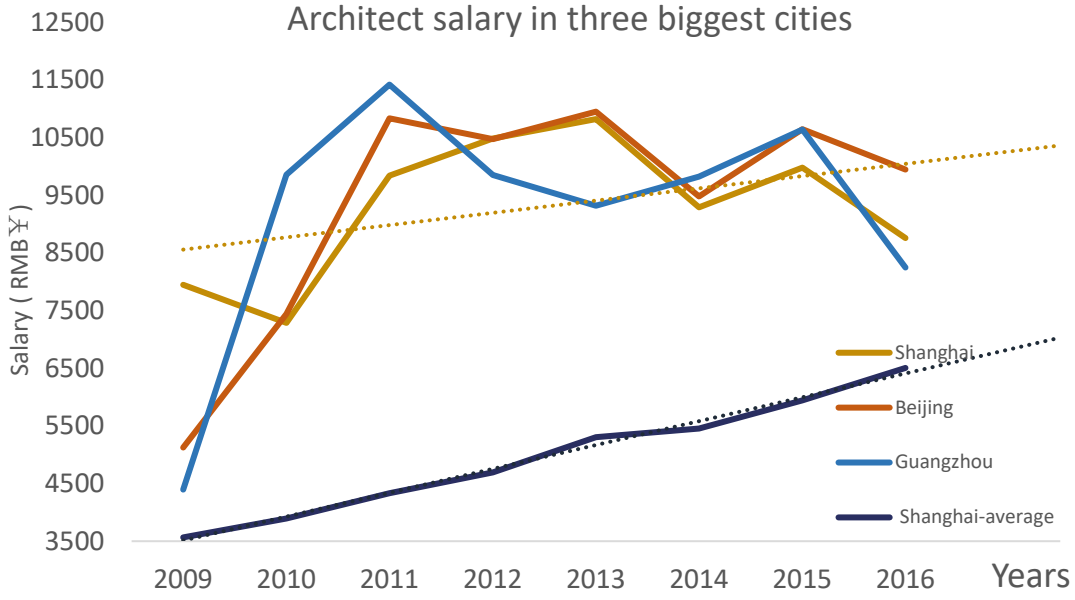


Figure1. Salary of architects decreases in China（Statics from website jobhui.com and Shanghai Municipal Statistics Bureau, elaborated by author）

Online survey

Respondents' situation

The questionnaire has been published on online survey website "Sojump" since 8th February

2017 and the link was diffused by posting it on various social media sites. Up to the 8th February 2018, we have 339 respondents whose IP addresses were from 28 provinces of China (15 persons of them were from abroad). The top five places are Beijing, Guangdong, Jiangsu, Shanghai and Henan. Around 70% of the answer sheets were submitted through mobile phones while the rest were sent back through computers. The age, education background, and licensed condition of these 339 respondents are illustrated in the Figure 2. About seven tenths of them had a bachelor degree while 27% and 1.5% of these people hold a master degree or a PhD respectively. A major part of these former architects were not certified by the authority while 9% of them were 1st or 2nd level certified architects in China. Due to varieties of limitations, it was impossible to get the total number of architects switching their careers of the whole country. The demographics of this online survey is limited but none-the-less unveils the existing conditions in some degree with a broad spread of respondents.

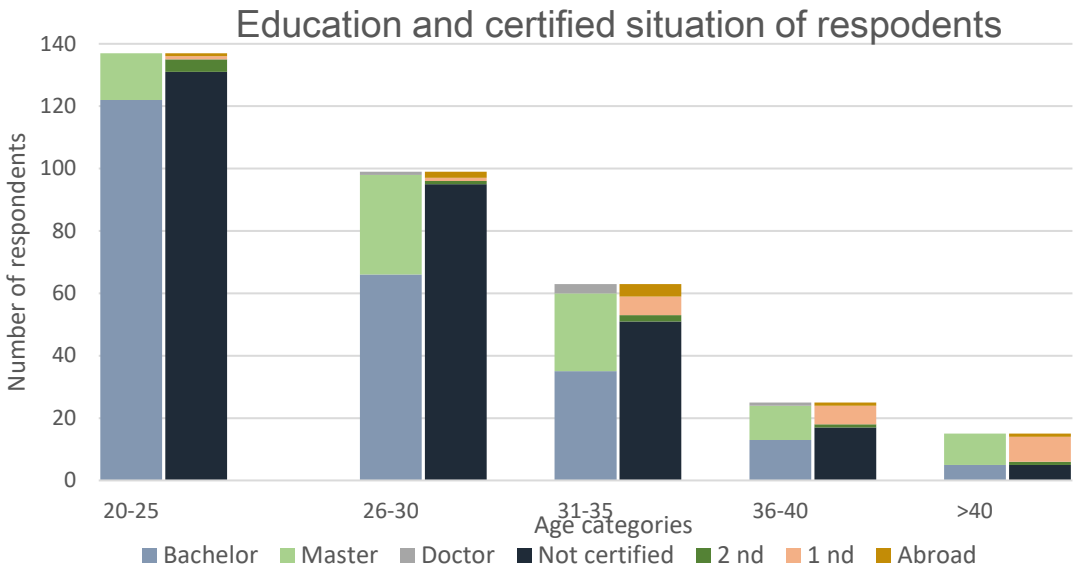


Figure 2. Education background and accredited situation

Conditions on career shifting

Survey results identify that around half architects left the career due to overwhelming workload or unsatisfactory salary (Figure 3). Another one-quarter of them lost interest in this major or found something more attractive. Only thirteen persons were unable to find a job as an architect then passively switched their career. The ratio of self-employment is 23% while the others still worked as an employee. Afterwards, the survey focused on the specific conditions of their new careers (Figure 4). Around two fifths of the people still stayed in the construction industry while the other three fifths went to a totally new industry. Despite this, nearly 90% respondents had a new job still with regard to designing, and many people believed that their architectural education background played a helpful role in new occupations.

Figure 5 shows specific industries chosen by the respondents for new careers. Real Estate Company is a traditional option for architects to divert the profession, and it still occupies the

first place herein. IT industry ranks a surprising second place while the culture industry takes the third place. Interactive design is in the 7th position and the animation industry ranks the 9th respectively. Virtual reality also appears on the ranking, with more popularity than fashion design and furniture design which are regular choices for architects.

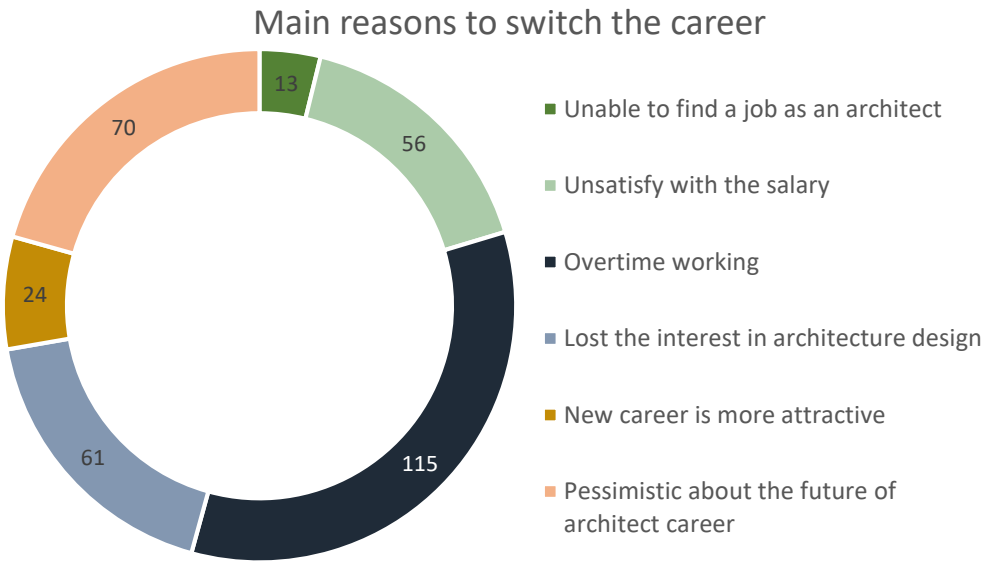


Figure 3.

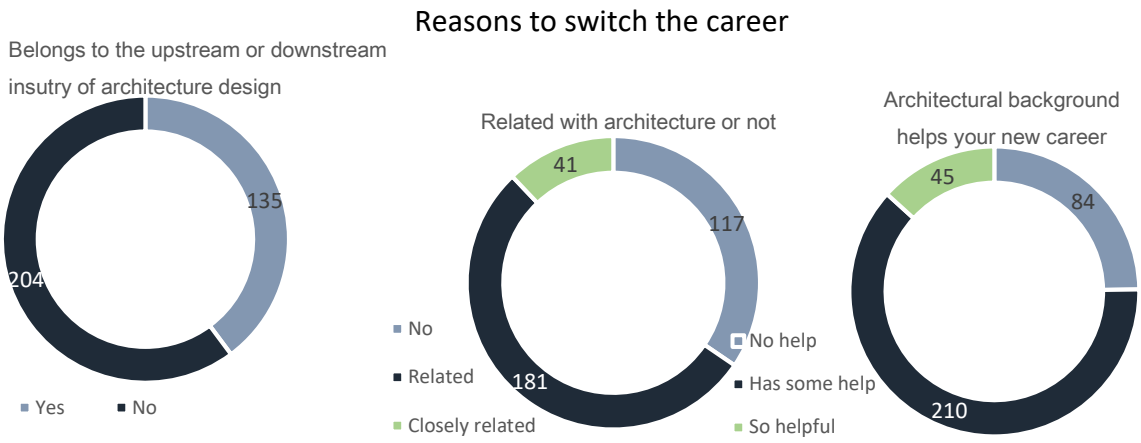


Figure 4. Conditions on new careers

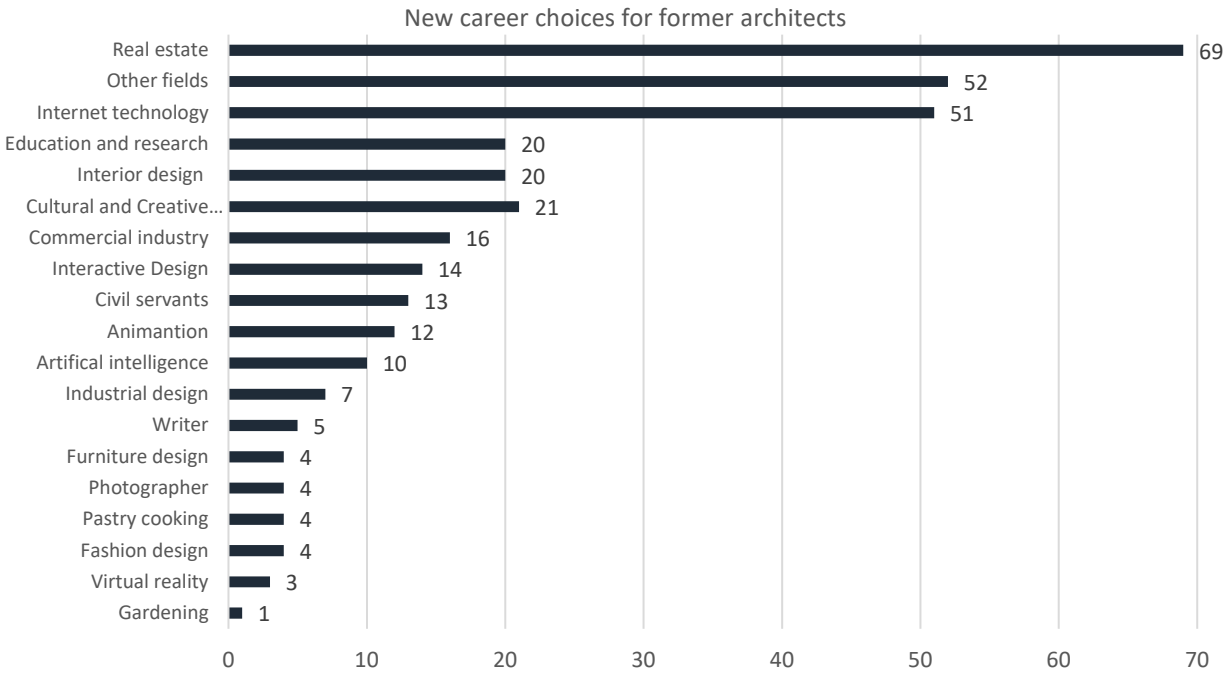


Figure 5. New career choices of former architects

Evaluation on the architectural education

The quality of university education was also asked in the questionnaire. Around seven tenths of people deemed that there is no progress or even worse. The most beneficial and helpful course during respondents' education was the Aesthetic Training, while Logical Training and Verbal Expressing were positioned the second and the third respectively. When they were asked about course contents, four fifths of respondents were concerned that the majority of knowledge taught in universities actually was out of date at that time. The familiarity with cutting-edge technologies when they graduated can prove this. Around 83% of them were unfamiliar with technologies on the building energy efficiency, and this number comes to 84% towards to the Virtual Reality, 87% to the Artificial Intelligence. One-third of them believed that these new technologies would promote the architecture industry and it is a pity it is not learned in schools. Meanwhile, around 83% respondents considered that there is not enough educational resource to support them working outside the architecture design field. Only seven persons gained enough resources training them for jobs besides architecture designing.

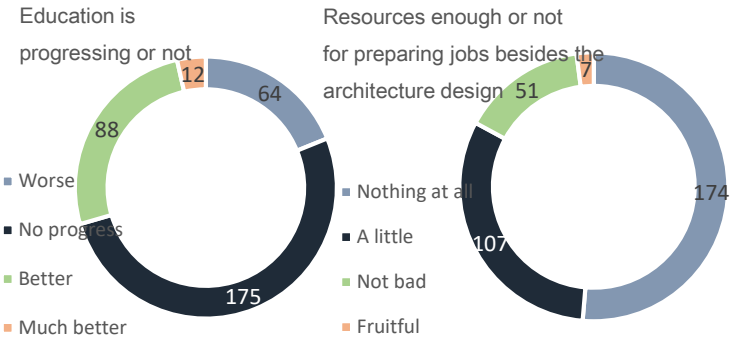
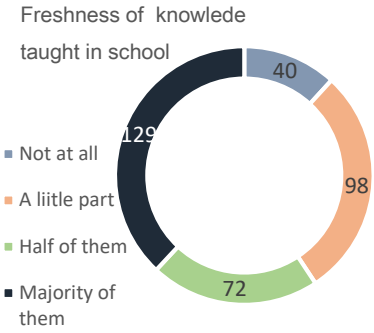


Figure 6. Evaluation on college education



Discussions

China still has adequate designing jobs for architects (only thirteen respondents were unable to find a job as an architect) but the rising dissatisfaction with salary and working environment make architects hold a pessimistic view on the profession. They have perceived the necessity to alter the career in advance, not waiting to be passively compelled. The survey above also identifies that the traditional role of architects is dying while innovative technologies are bringing new opportunities for architects. Architects' new choices are not only constrained in regular options like furniture and fashion design but also extending to technology-demanding industries like IT and Virtual Reality.

The majority of investigated people were not satisfied with the received education. They insisted that teachers without the latest experience on practical projects should be excluded from design studio teaching. It means that teachers have to play double roles: an educator and also a practitioner. Besides that, the education they received neither realized the original claim in a large number of admission guides, which said that graduates from their architecture major can shoulder a variety of jobs besides being an architect.

Architecture designing is a service industry heavily depending on the market (Cuff, 1992). As

the urbanism (urbanisation) process in China is slowing down, the architectural education system should realise the necessity to change and fit the societal needs. The main initiative of following chapters is to revise the existing architectural curriculum, which currently is unsuitable and full of outdated knowledge.

Reflecting on the architectural curriculum

Knowledge boundary as an architect

Providing architectural education in a limited period is not easy and it needs to smartly define the architectural knowledge boundary (Mahalingam, 2007). Based on authors' practical experience and also designer role analysis by Krippendorf (Charalambous & Christou, 2016), the knowledge required to be an architect is categorised into five key domains and also sub-categories around them (Figure 7): art & design, science, technology, construction and politics. Figure 7 shows that the greater part of knowledge is located in the art category while the construction domain contains the least knowledge points. Out of the boundary, there are several points related to the specific domain but do not belong to the whole architecture field. Figure 7 also demonstrates more working chances but on the orientation of art outside the border. Then the politics side also has several options outside but the science and technology domain do not have outside knowledge points due to the learning threshold for architects. It hardly happens that architects switch profession to be a scientist or building structure engineer. Nevertheless, the combination of technology and art also offers many other possibilities which will be discussed in the next sections. Thence, new possibilities should be explored and integrated into the education programmes.

Figure 7. Knowledge boundary of architects, elaborated by the author

Knowledge teaching in universities

In order to analyse the school side with the theory discussed above, we randomly collected architecture teaching missions from fifty Chinese universities. Then a keyword cloud showing focuses of these fifty missions was automatically generated, according to the frequency of word appearance in missions (Figure 8). Besides the word *architecture design*, other main keywords are *technology, engineering, city, theory, construction*. We can contract a common mission from all of them: training high-level engineering professions who are adjusted to the market evolution. To get closer, three representative universities (Table 1), out of eight top architecture departments in China (Wikipedia, 2015), are picked for the curriculum investigation. University names are hidden to avoid unnecessary disputes. Three curriculums of five-year-BArch programmes were all retrieved from their official websites. Some unrelated courses, like Physical Education and China's Modern History, are not counted as major courses. Neither are internships, selective courses, and final thesis included. Results are expressed with radar maps in Figure 9. It can be found that “Art & Design” is the main part of all three curriculums while technology is the second important sector. The other three domains actually played a slight role in all three curriculums.

Figure 8. Keyword cloud of architectural education missions in China.

Table 1. Curriculum analysis

	University A	University B	University C
Time of the latest version	Year 2013	Year 2016	Year 2014
Total credits for graduation	200	237	213
Total credits of major courses	133	156	179
Credits related to art & design	100 (75%)	112 (71.8%)	121 (67.7%)
Credits related to science	10 (7.5%)	9 (5.8%)	11 (6.1%)
Credits related to technology	16 (12.5%)	33 (21.2%)	45 (25.1%)
Credits related to construction	3 (2%)	0 (0%)	0 (0%)
Credits related to politics	4 (3%)	2 (1.2%)	2 (1.1%)
Credits for Virtual Reality	N/A	2 (Selective course)	N/A
Credits for coding courses	N/A	2.5 (VB.NET)	3 (VB)
Credits for mathematics	5 (calculus); 2 (architectural math)	6 (advanced mathematics）	4 (calculus)

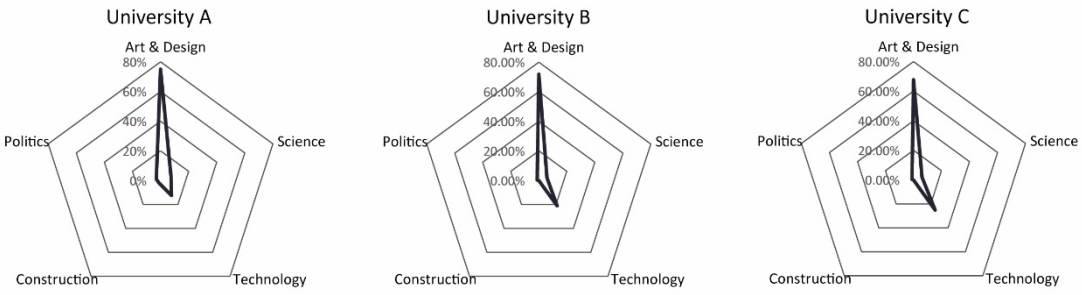


Figure 9. Focusing orientation of three top universities.

As mentioned above, China's urbanisation process has gone into another new stage, one crucial feature of which is the exploding boundary of the construction industry with the

emerging technologies. The magnitude number of architects' career switching and our investigation on school teaching identify that the current education system does not really follow the social change, though they were deliberately claimed in missions. Therefore, we propose three steps to strengthen the curriculum in schools to make them fit the market demands now and in future.

Add new contents for architects' new roles

The social identity of an architect in this world has been totally changed. Architects were the minority group who grasped the drawing method of perspective in the fifteenth and sixteenth centuries. This scarcity made them respectable during that Renaissance Period. However, comparing with current emerging technologies like Big Data, Artificial Intelligence, and Genetic Technology, architecture designing is a skill with a very low technical threshold. Therefore, it is not strange that architects are gradually losing their prestige in the society. In this circumstance, the most crucial challenge of architectural education is not choosing the direction between globalism and localism (Tzonis, 2014), but combining those cutting-edge technologies with architecture design. Demarcating the boundary of education, incorporating newly developed technologies should be the first step to improve the education quality. Incorporating these new technologies or orientations is not only for increasing the employment opportunities but also is in line with the nature of architecture. Architecture as a discipline has not had a tightly fixed boundary since it was born and is of relevance to a significantly great number of different fields as time changes. Prue Chiles, the head of Sheffield School of Architecture, also stressed that future architecture students need to be educated in a broad context in order to function effectively in a multidisciplinary and expanding field (Design Buildings WIKI, 2014).

In accordance with those new roles of architects, some new courses and orientations have been explored in other countries and some of them have made a success. For example, many British architecture graduates have started playing a role in movie making because their digital animation and design skills learned in schools helped them break into the film industry (Shaw, 2015). Former architect Kibwe Tavares, the co-founder of an innovative studio, is exploring ways architects can use digital representation to encourage imaginative thinking through a combination of architecture and film (archdaily, 2016). Architectural education organisations in the UK have realised this new orientation and let Tavares's studio became one part of series seminars held by the RIBA (archdaily, 2016). On the contrary, scene design in video games, a kind of virtual architecture design which has a lack of people in China (Xinhuanet, 2006), still has not been known by architecture educators.

On the other side, Chinese architects can get easier access to their own business now. The Ministry of Housing and Urban-Rural Development of China updated their regulation on the management construction design business. One company can get the certification for starting businesses with only one Licensed Architect, rather than three 1St level Licensed Architects which were required before. This means that more architects will not only be required to be a

designer, but also an entrepreneur. More knowledge of business and management need to be offered during college life. How to organically integrate this new knowledge with education activities on designing is another topic for future.

Remove unnecessary parts

There is a voice always criticising the lack of human science and art courses in architecture education and it becomes an entrenched preconception for many architectural educators (Coleman, 2010; Salama & Noschis, 2002). As a result, current architectural education is always intersecting with urban planning and landscape design, or other subjects more artistic or social science oriented. Although our survey indicated aesthetic ability as the most beneficial and satisfied part of the architectural education, it does not mean putting too many art or humanity courses in the curriculum is necessary.

Art and human science are important for architects, however, many of them are out of date and not suitable for being included in the curriculum. For instance, “Critical Regionalism” is an architectural theory trend which fights against the modern architecture lacking the identity of a place. Nevertheless, it actually should only exist in the beginning of globalisation when people were unsure whether they could retain their cultural identities while benefiting from globalisation, not now. Because globalisation already makes us similar and our new identity is the “global citizen”: we wear the same style clothing, eat the same KFC and McDonald food, watch the same movies from Hollywood, use the same iPhone. Neither will architecture burden the duty of identifying unique cultural characteristics. Just like the Apple company will never produce the iPhone with culture features, only the performance (energy-saving, indoor environment quality, etc.) will determine the building shape in future (Zhao, Lavagna, & Angelis, 2016), rather than the culture.

Moreover, buildings are becoming increasingly expression-less rather than something carrying on architects’ personal aesthetics or emotional preference, and architects with the strong individual features are fading out from the field. Most projects in industry require less and less artistic perception and are treated as a production rather than an artistic creation. Housing community planning, which is the main income source for design companies, can be a good representative case. In most occasions designing a residential community, the initial two things that need to be considered are “floor area ratio” and “sunshine hours on winter solstice day”. “Floor area ratio” means the land intensity should be maximised to make economic profits for clients. Sunshine hours are required by authorities, to assure at least one room has one-hour sunshine on that day with the worst condition. These two objectives actually are in a trade-off relationship and should be balanced simultaneously, more related to math. Nonetheless, fresh graduates are unable to solve such basic design problems, but always trying to display their own “creative or artistic ideas”.

Ultimately, arts are totally not crash courses which can be taught in one or two semesters. The art appreciation ability can be achieved only after years of nurturing. In some cases, due to the

talent issue, even enough time may not bring satisfactory results. Hence, teaching results of arts in the architectural education totally cannot be guaranteed. Meanwhile, social science, which has a lower threshold for understanding compared with mathematics and physics, is not difficult to learn by students themselves. In conclusion, authors of this paper agree on the importance of art and human science, however, we also consider that they should be learned outside the education programme, not be something snatching the limited time from new technology and science learning. The purist of "art-based design" should be decreased and the attention on "technology-based design" ought to be raised.

Train self-learning skills

Pursuing architectural knowledge and improving design skills is a lifelong process. Therefore, we should teach rules for the changing of rules, teach knowledge required to obtain specific knowledge for a particular project (Rittel, 1971). Design by nature is giving a response to the present and finding its most valuable tools for the future (Bermudez, 1995). The future is not only an extrapolation of the past but a non-linear evolutionary leap difficult to be predicted. Hence, a vision of future is an initial necessity to help us revamp the architectural education. Bermudez (1995) deemed that

"paying attention to the future means at least two things for architectural education: (1) Look at the architectural discipline without relating our current curriculum. We should not let the existing education system restrict our imagination for the future. (2) Look at the architecture education with the frame of a curriculum. Too much discussion about future is theoretical without any permeation into actual teaching."

Not only for their future, self-learning skills which suit the curriculum flexibility are also helpful for study at school. It is crucial to teach students how to learn rather than filling everything in their brains. To achieve this goal, educating students to become architects involves more than just inculcating the knowledge, skills, and abilities (learning outcomes) reified in courses (Webster, 2008). Meanwhile, the flexibility in design instruction (Hisarligil, Lokce, & Turan, 2013) and curriculum necessitates self-learning skills that make students adaptive and responsive to the ever-changing design industry.

Conclusions

According to the official website of China Higher Education (CHSI, n.d.), until the end of the year 2016, there were 290 Chinese universities running the major of architecture and the deduced number of graduates from this major is around 16000-18000 each year. However, such a huge education scale reinforces the future risk because the job market becomes not as prosperous as before and will be worse.

The online survey confirmed a trend that more architects are switching the career to a more technical orientation because of more opportunities there. Restructuring the curriculum is

imperative to prevent poor employment of architects in the future. China has official education quality assessment on the architecture major (Ministry of Housing and Urban-Rural Development, 2016), however, this evaluation system does not have an articulate standard on curriculum evaluation. It does not have a function leading good universities to be better but only can give an aim to the unqualified universities.
In the second part of this paper, knowledge boundary was analysed and curricula from three top universities were investigated. The authors proposed three suggestions to revise the curriculum: new technology-based design should be added; art and human science courses should be reduced; the learning skills to satisfy a long-lasting career life should be increased. The present paper is just a start to offer the insight on the problem and further research will go on being conducted.

Acknowledgments

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