THE PERSPECTIVE OF STUDENTS AND GRADUATES ON THE ARCHITECTURE EDUCATION IN THE MALAYSIAN CONTEXT

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ABSTRACT

Architectural education is essential to produce the profession of the architect responsible for creating a quality environment in the 21st Century. Therefore, architecture education should be holistic, addressing the needs of architecture graduates with six attributes: ethics and spirituality, leadership skills, national identity, language skills, thinking skills, and knowledge to meet the needs of the industry and the current market in parallel with the requirements of the national policy. However, not many past studies have been provided on architectural education in Malaysia, from the students' perspectives to hold on to the profession of an architect. Most past studies focus only on pedagogical methods of learning and evaluation of architectural studios, the application of technology in architectural education, the element of entrepreneurship in architectural education, and the importance of sustainability values in the architectural curriculum. Therefore, this study aims to identify architecture students' perspectives in private and public universities and outline proposals to improve the current architecture education curriculum to produce better architecture graduates. The methodology used involves a combination of quantitative research. The scope of study is focused only on architectural programmes

subject to LAM (Malaysia Architect Council) Part I and II recognition. The findings underline the need for quality teaching and learning, emphasizing generic skills to produce graduates with high marketability values in the 21st Century.

INTRODUCTION

Architectural education is one of the earliest forms of education that existed since the medieval period in the 5th Century. It began to be recognized by the world community as an official education in the early 19th Century (Dizdar, 2015; Griffin, 2019). This comprehensive architectural education combines theoretical and practical knowledge and covers various disciplines, including art, science, technology, and the humanities(Charalambous & Christou, 2016; Mahdavinejad et al., 2014). In this regard, this architectural education is unique in that it promotes the expression of creativity as well as the appreciation of intellectual satisfaction with the foundation to provide the career path of professional architects as well as those related to the field of design and construction(Glasser, 2000; Soliman, Taha, & El Sayad, 2019; Tzonis, 2015). In general, this architectural education is essential to produce the profession of architect who is responsible for creating a quality environment to uphold the prosperity of society to keep pace with the rapid development of the construction industry (Celani, 2012; Khair-El-Din, 1988; Nicol & Pilling, 2000, 2005).

Architecture education in Malaysia began in 1925 as a technician-level training program. It continued to grow as a complete architectural education program to the level of Bachelor of Architecture was first introduced in 1967. As an effort towards Vision 2020 and to make Malaysia a higher education destination in the region, in the 1990s, the Ministry of Education Malaysia approved the establishment of architectural programmes for more public and private universities in the country. Since architecture is a professional field, and its education is subject to ethics and charters established by professional bodies, the Board of Architects Malaysia (LAM) and the Malaysian Education Accreditation Council (MAPS) closely monitored

the architectural education LAM Part I and II in Malaysia. Up to 2021, the HAEP (Higher Architecture Education Provider) comprises eleven public and eight private universities recognized by LAM in architectural program offerings.

The strengthening of the architectural education system is needed as a solid platform to support Malaysia's transformation to a higher level in the 21st Century. This is important to produce holistic architecture graduates covering six attributes: ethics and spirituality, leadership skills, national identity, language skills, thinking skills, and knowledge to venture into the job market and meet the needs of the industry and the current market in line with the requirements of national policies.

However, the practice of architecture education in the Malaysian context is faced with many current issues which challenge its practicability and suitability in producing a generation of new architects for Malaysia. These three issues that need to be taken into account are 1) the problem of demographic change and the ageing issue of society, 2) the challenges of globalization that foster sustainable future growth, and 3) the impact of automation and data exchange in manufacturing technology.

First is the problem of demographic change and the issue of an ageing society that will hit the world's population in the next ten years, especially in developing countries, in line with the speed of the urbanization process. Following this, HAEP had to find new methods to educate the ageing population as a workforce. 'Lifelong learning' will be more critical than ever when there is a generational gap to keep pace with technological change (Schuetze & Slowey, 2013; Wals & Benavot, 2017).

Second, the challenges of globalization to foster sustainable future growth. This is due to the global economic shift, and in the next ten years, most of the world's population will be middle class. This phenomenon will create impact and pressure in providing better quality education to meet higher expectations and provide more diverse mobility and accessibility to increasingly demanding customers. International mobility will also increase, challenging HAEP to address more socially heterogeneous issues (social heterogeneity) in integrating diverse groups of students of different backgrounds (Peterson, Farmer, Donnelly, & Forenza, 2014).

Third, the impact of automation and data exchange in manufacturing technology combines physical, digital and biological "cyber-physical systems" that impact all disciplines of life, namely the younger generation. The development of this generation has presented challenges in the world of education and led to changes in the framework of a new strategy for the country's education system. Therefore, HAEP needs to focus more on teaching and learning more flexible pedagogy, with a more flexible assessment system to improve skills and provide functional added value to students in preparation for the competitive ability of graduates in the IR 4.0 era (Davies, Eynon, & Salveson, 2021). In this case, the traditional model of mainstream higher education must be overhauled using a more systematic and flexible approach in line with the latest technological innovations that emphasize the concepts of cloud computing, digital economy, AI, big data, robotics, blockchain and so on (Holmes, Bialik, & Fadel, 2019). Based on this matter, the framework of value-based education strategies containing elements such as Future Ready Curriculum (FRC), Agile Governance, Talent Planning, and Research and Innovation must be strengthened by HAEP in fulfilling the direction of Malaysian national architecture education towards providing prospective graduates who are characterized by value infused future proof talents. This is important so that graduates and students born from HAEP have a balance and holistic characteristics from aspects of digital literacy, incentive-thinking, effective communication, high productivity, and there are spiritual and moral values.

Furthermore, so far, there are not yet any past studies that have mediated the study on architectural education in Malaysia on how it should be implemented to produce a generation of professional architects who can contribute to the country's development towards the current Industrial Revolution 4.0.

Therefore, this study aims to identify the problems and challenges faced by architecture students in private and public universities and outline proposals to improve the architectural curriculum in Malaysia by understanding the needs of students and architecture graduates. This aspect is essential to provide adequate readiness for students and graduates of architects to survive in the future and uphold the architecture profession. The results of this study are in the form of proposing approaches to improve the architecture curriculum for the benefit of 21st-century education.

In the interest of this study and in fulfilling the objectives of the study, the paper is divided into two main parts: first, identifying the internal factors affecting architectural education in Malaysia; Second, digesting and peeling the aspirations in terms of students' needs that can be applied to improve the quality of architectural education for the needs of the 21st Century. Both of these parts will be described in turn.

LITERATURE REVIEW

Architectural education in Malaysia needs to have impartiality as inclusive learning and teaching that recognizes the right of all students to a learning experience that respects diversity and allows for the Involvement of many parties (including industry, community and agency). This is important as it will reduce barriers and expectations, considering various related needs that can contribute to the priority of the learning aspect. In addition, it effectively prepares all students for an increasingly diverse and complex future work environment. According to scholars, two central elements can be derived from this inclusive learning and teaching (Dizdar 2015). First, inclusive teaching and learning will recognize the importance of openly developing a learning community and appreciating and accepting community members' diversity. Secondly, inclusive teaching and learning recognize the needs of students individually and eliminate the sense of discrimination.

In this sense, collaboration between industry and HAEP plays a vital role in applying human skills that impact students' employment after they enter the industrial sector. Thus, maintaining the relationship between the industry and HAEP is necessary because the industry feels that applying human skills to its employees is the institution's responsibility. On that note, educators must ensure that their students have pure validity and appearance that is balanced with their existing knowledge and skills. To achieve this, the industry parties must also play vital roles in allowing employees to show their talents and abilities and improve their perfect human skills. Furthermore, the industry should also be ready to provide teaching points and skill-strengthening workshops to ensure the quality of their employees' work is perfect.

In line with the evolution of the country's development today, the

education management system in Malaysia's HAEP has been increasingly demanding, in which the role of architectural lecturers is not only focused on teaching but also on other aspects of responsibilities like community service responsibility, research and publication. Nonetheless, the university highly demands Involvement in research to encourage discoveries in the field of architecture that can further enhance the creation of new products and innovations to help the development of the community. Henceforth, efforts to heighten research involvement and innovation must be made through quality approaches with various application methods to derive optimistic results.

Based on the three internal factors highlighted above, four indicators have been formed by researchers that form the basis for unravelling the perception of students and architecture graduates from HAEP on the effectiveness of existing architectural education and whether the present architecture curriculum is preparing the graduates to meet the latest market needs or not. These four indicators are 1) the need for continuous architectural learning, 2) the relevance of innovation in the implementation of the architectural curriculum, 3) the efficiency of the management of architectural education infrastructure that is characteristic of the revolutionary industry 4.0; 4) the need for the formation of the identity of graduates as professional architects as well as the role of architectural academics (Refer Table 1). These four indicators will be briefly described in the following sections.

Table 1. Correlation between Current Trend Factors and Internal Factors Towards Forming the Indicators as the Basis of the Study

| Internal Factors Affecting Architectural Education	First phase indicators to measure the students' and graduates' satisfaction with the architecture curriculum in adhering to the architecture profession
continuous architectural learning	Application of the concept of Lifelong Learning
innovation in the implementation of the architectural curriculum	Innovation and creativity in architectural education
Efficiency of Architecture Education Infrastructure Management	Up-to-date studio infrastructure
the formation of the graduates' identity as professional architects	Strengthening graduates identity – through the application of generic and human skills

Source: Author

To evaluate the effectiveness of architecture education in Malaysia towards the needs of the 21st Century from the perspective of students and architecture graduates at HAEP, the following section will explain the methodological methods and analysis techniques used referring to two categories of respondents: i) graduates who have graduated and have work experience in the industry of less than five years, ii) students of architectural programs who are still in study. The following section will describe this in detail.

RESEARCH METHODOLOGY

Referring to the importance and necessity of this architectural education, the methodological framework of the study has been developed to assess the context of students and architecture graduates on the perspective of their needs and expectations for architectural education in Malaysia so that they uphold the architecture profession (refer to Figure 1)

Figure 1. Research Framework
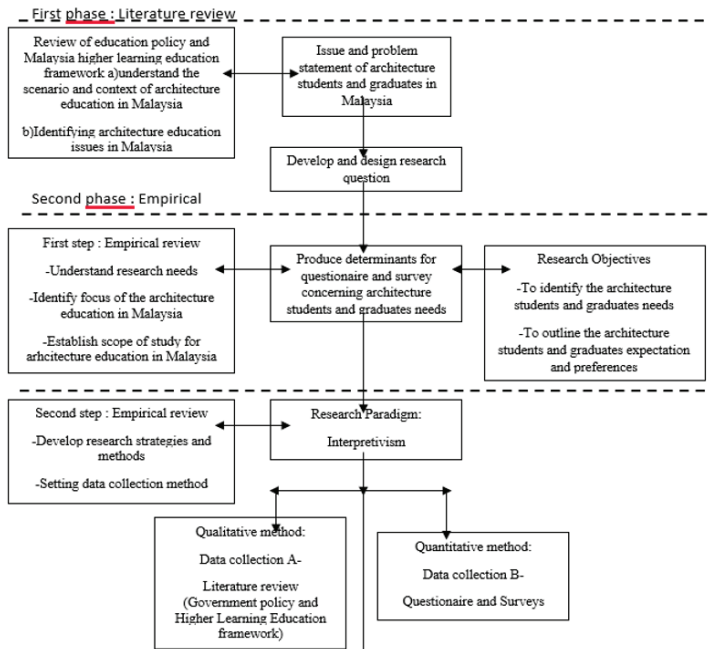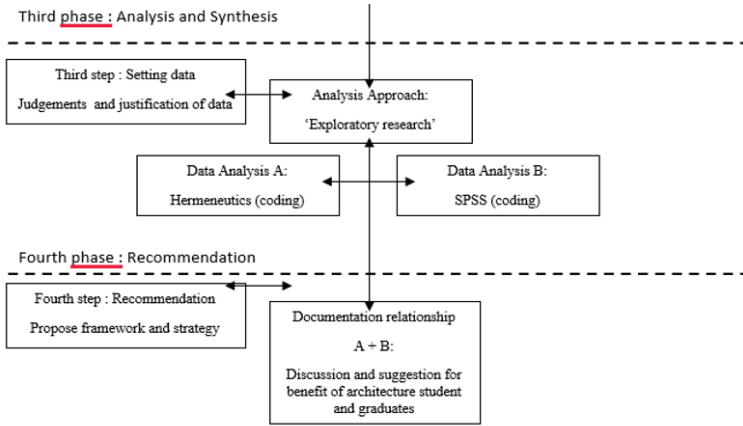
Source: Author

This study adopts scientific research and questionnaires to obtain views and feedback from two groups of respondents: graduates with less than five years of working experience and architectural program students who are still under study (LAM Part I and II) at HAEPs. Literature focusing on the country's education policies and national policies has also been consulted to help form questionnaire indicators. Such examples are the Malaysian Education Development Plan (2015-2025) Higher Education or PPPM (PT) (KPM, 2015) and others.

The questionnaire method is based on the following aspects: a) This type of study has general and homogenous characteristics. Therefore, the sample size does not matter as long as the result represents the whole aspect (across the board) of one type of target group. b) As for the target group of architecture students, the target group's representation of the whole aspect is more important than the total number of students. The questionnaire survey was conducted in two phases.

The first is the pilot study to validate the set of questions based on the first phase indicated indicators comprising four aspects) application of the concept of Lifelong Learning (curriculum) ii)Innovation and creativity in architectural education (academic staff exposure) iii)Up-to-date studio infrastructure (facilities) iv) Strengthening student's identity – through the application of generic and human skills (student capabilities).The pilot

study was done with 20 students from LAM-accredited HAEP representing a public university. In reference to the findings from the pilot study with the 20 students, the indicators are further revised in the 2nd phase to obtain holistic students and graduates' views of the architecture programme.

The second questionnaire phase consisted of comprehensive determinants established from the first phase determinants to examine the effectiveness of existing architectural programmes in each HAEP. These final determinants in the final set of questionnaires are divided into four sections: A, B1 & B2, C, D, and E. Each section has the following items (refer to Table 4). This questionnaire is designed based on the set objectives of the study. These sections include all the questions that the respondent needs to answer, which are 29 items, covering the satisfaction of the students and graduates on the curriculum deliverance, practical engagement of industry and preparation of ICT infrastructure, infrastructure of the architectural studio including expectations towards employer (advancement of generic skills and career development and growth). In this section, the researchers used the Likert scale. Respondents must mark an answer on a statement based on one scale from one extreme to another. The SPSS and NVivo analysis technique is used to analyze data from questionnaires to identify the students' satisfaction and expectations. And their outlook toward the quality and manner of the curriculum deliverance. All collected data is then triangulated to propose the best possible proposition to achieve the study's objective. (Refer to Figure 1). The questionnaires are analyzed using the 'Statistical Package for Social Science Version 14.0 for Windows (SPSS)' software to obtain accurate data descriptively. The researcher analyzes the questionnaire to determine each item's frequency, percentage, and means of achieving the objectives. The questionnaires are distributed to LAM Part I and II students in all Faculty of Architecture (HAEP) through their respective Heads of Departments.

Table 5 shows the statistical tests used based on the study's objectives. Researchers can sometimes use various theories and formulas to produce their index based on the study's objectives (refer to Table 4). Therefore, the results of the analysis in sections A, B1 & B2,C, D and E are analyzed based on the mean score value at three levels (refer to Table 6).

The justification for the selection of respondents as a sample for the

2nd phase questionnaires is as below – a. Students during the architecture program - for each LAM-accredited HAEP (19 HAEP represented by public and private universities) - Year 1 to Year 3 (LAM Part 1) - minimum of 30 respondents from each 19 HAEP involved whilst Year 4 to Year 5 (Part 2) - minimum ten respondents from each of 10 HAEP involved. The respondents of 360 architectural students in the current year of study at HAEP are as follows (refer to Table 2).

Architecture graduates with less than five years of experience - Each HAEP has a minimum of 20 architectural graduates (combined with LAM Part I and II graduates). In total, 98 architecture graduates are the respondents for this study.

Table 2. Characteristics of LAM Part 1 and LAM Part II Architecture Student Respondents

Respondent Characteristics (Architecture students)		Percentage of architecture students who responds out of 360 respondents
Gender	Male	59.2%
	Female	40.8%
Ethnic	Malay	65.6%
	Chinese	28.9%
	Indian	0.8%
	Bumiputera	3.1%
	Others	1.7%
Student Categories	Local	98.3%
	ASEAN	0.6%
	International	1.1%
Location of Study	Public University	60.7%
	Private University	39.3%

Duration of Study	Current Study Standing: Bachelor Science of Architecture (LAM Part 1)	
	First Year	24.4%
	Second Year	37.1%
	Third Year	33.5%
	Others	5%
	Current Study Standing: Masters of Architecture (LAM Part 2)	
	Year 1	31.3%
	Year 2	66%
	Others	2.7%

Source: Author

Referring to the Questionnaire Survey for architecture graduates with less than five years of working experience from LAM Part I and LAM Part II studies from HAEPs, 98 respondents were investigated. Each of these graduates is required to express their views on the aspects of the profession that are pursued after five years of graduating from PPTS, the skills while studying applied during their work, the proposed improvements to the architectural curriculum and their views, recommendations and wishes whether to stick to the architectural profession until becoming a Professional Architect (LAM Part III) or vice versa. The characteristics of the respondents, 98 architectural graduates with less than five years of working experience, are as follows (refer to Table 3):

Table 3. Characteristics of Respondents who Graduated from Architecture with Less than Five Years of Work Experience

Respondent Characteristics (Graduates)		Percentage of architecture graduates who responds out of 98 respondents
Gender	Male	51%
	Female	49%
Ethnic	Malay	49%
	Chinese	48%
	Bumiputera	2%
	Others	1%
Highest Academic Qualification	Bachelor of Science in Architecture (LAM Part 1)	60.2%
	Masters of Architecture (LAM Part 2)	39.8%

Location of Study	Public University	60.7%
	Private University	39.3%
Category of HAEP's	Bachelor of Science in Architecture (LAM Part 1)	
	Public University	52.6%
	Private University	47.4%
	Masters of Architecture (LAM Part 2)	
	Public University	77.8%
	Private University	6.7%
	Others	15.5%

Source: Author

Table 4. Sections for Questionnaires

Outline of question items posed in questionnaires		Question items for (questionnaire)
A	Data analysis on students satisfaction on curriculum delivery (Table 7) (Q1 -Q7)	Curriculum satisfaction comprises knowledge deliverance on culture, environment, technology and practice; ii. guidance, critical thinking abilities, and problem-solving approach iii. training to work in a team iv. exercises given on inculcating ethical values v.training given on entrepreneurial skill development vi. training on inculcating generic and soft skills as well as technical abilities vii. teaching techniques and approaches in promoting the value of responsibility towards appreciating local wisdom
B1	Data analysis on students' satisfaction with the Involvement of practising architects and experienced experts (Table 8)(Q8-Q13)	Satisfaction Involvement of practising architects and experienced experts - i)in delivering knowledge on culture, environment, technology and professional practice ii)involvement in guiding technical knowledge iii)practice involvement in guiding communication skill iv)in providing career inputs to become a professional architect v)in delivering collaborative projects and a variety of activities vi)in providing professional inputs

B2	Data analysis on students satisfaction on Information and communication technology (ICT) infrastructure provision (Table 8)(Q14-Q18)	Satisfaction on (ICT) infrastructure provision - i)for Teaching and Learning purposes, ii)for e-learning access, iii)for student and lecturer communication, iv)for an independent learning platform
C	Data analysis on students perception on Architecture studio facilities (Table 9) (Q19-Q21)	Perception of Architecture Studio i) as a living lab or workshop ii)equipped with technology 4.0 and AI facilities for active and innovative teaching and learning purposes iii) in collaborative mode which has joint design studio facility with industry counterparts
D	Data analysis on the expectation of architecture graduates towards employers (Table 10) (Q22-Q27)	The expectation on the advancement of generic skills like i)Leadership exposure and training in handling and managing a design project, ii)Inculcating Interpersonal skills to work in a team, iii) Inculcating Project Management skills, iv) Application of IT technical skills in the ability to produce design work v) Application of management and law practising skills in handling building contract vi) Application of communication skills (verbal and writing) in conveying ideas to a professional audience in a design project
E	Data analysis on the expectation of architecture graduates towards employers (Table 11) (Q28-Q29)	Expectations on career development and growth like i)provide a suitable platform for extra skill and professional development growth like the BIM Revit workshop and ii) provide motivational and moral support in pursuing professional education towards career development

Source: Author

Table 5. Methods to Analyze Data and Statistical Research using Mean

Methodology Based On Study Objectives	Study Methodology	Data Analysis Methods	Statistical research
i.To identify architecture students and graduates in response to architecture curriculum deliverance (satisfaction)	Questionnaire (percentage and frequency)	SPSS	mean
2. To synthesize the level of expectation among architecture students and graduates on advancement of generic skills and career growth development from employer(expectation)	Questionnaire (percentage and frequency)	SPSS	mean

3.Propose the finalized proposition of staisfaction and expectation among architecture students and graduates in enhancing the architecture curiculum	Questionnaire (t-Test,Correlation)	Triangulation	Triangulation

Source: Author

Table 6. Statistical Research using Mean

Mean score value	Level
1.00 -2.33	Low
2.34 -3.67	Moderate
3.68 -5.00	High

Source: Author

RESULTS AND FINDINGS

This section discusses the findings gathered from the HAEP questionnaire in Malaysia that offers an accredited architecture program for LAM Parts 1 and II. The questionnaires are conducted by referring to the six main determinants (refer to Table 4). These determinants are evaluated based on 458 respondents on 29 items to answer the study's objective. This section will be formulated to a smaller scale of positive and negative for the entire item. Twenty-nine items were used to measure the study question. The overall mean for findings to identify students' satisfaction with the architecture curriculum, the Involvement of practising architects and experienced experts, and the provision of ICT infrastructure in Malaysia is 4.92. These findings show high student satisfaction with these three aspects above (refer to Tables 7 and 8). The mean relating to perception on the provision of architecture studio facilities indicates that students are at a moderate level (refer to Table 9) whilst the expectation of graduates towards employers are also at a high level (refer to Tables 10 and 11)

Table 7: Summary of Findings to Identify Students' Satisfaction with the Delivery of Architectural Curriculum

No	Item (satisfaction) - Section A (7Q)	Mean
1	Satisfied with knowledge deliverance on culture, environment, technology and practice	4.24
2	Satisfied with guidance, critical thinking abilities, and problem-solving approach	3.76

No	Item	Mean
3	Satisfied with training to work in a team	4.35
4	Satisfied with exercises given on inculcating ethical values	4.35
5	Satisfied with training given on entrepreneurial skill development	4.18
6	Satisfied with training on inculcating generic and soft skills as well as technical abilities	4.94
7	Satisfied with teaching techniques and approaches in promoting the value of responsibility towards appreciating local wisdom	4.35
	Average overall mean	4.92

Source: Author

Table 8. Summary of Findings to Identify Students' Satisfaction with Experts' Involvement and ICT Provision

No	Item (satisfaction) - Section B1 & B2 (10 Q)	Mean
8	Satisfied with practising architect involvement in delivering knowledge on culture, environment, technology and professional practice	4.38
9	Satisfied with architect practice involvement in guiding technical knowledge	4.12
10	Satisfied with architect practice involvement in guiding communication skill	4.78
11	Satisfied with architect practice involvement in providing career inputs to become a professional architect	4.53
12	Satisfied with practising architect involvement in providing collaborative projects and a variety of activities	4.46
13	Satisfied with practising architect involvement in providing professional inputs	4.32
14	Satisfied with ICT infrastructure provision for Teaching and Learning purposes	4.29
15	Satisfied with ICT infrastructure provision for e-learning access	4.67
16	Satisfied with ICT infrastructure provision for student and lecturer communication	4.65
17	Satisfied with ICT infrastructure provision for an independent learning platform	4.13
	Average overall mean	4.92

Source: Author

Table 9. Summary of Findings to Identify Students' Perception towards the Infrastructure of the Architectural Studio

No	Item (perception) - Section C (3Q)	Mean
18	Architecture studio as a living lab or workshop	2.55
19	The architecture studio is equipped with technology 4.0 and AI facilities for active and innovative teaching and learning purposes	2.46
20	Has collaborative or joint design studio facility with industry counterparts	2.23
	Average overall mean	2.41

Source: Author

Table 10. Summary of Findings to Identify Graduates' Expectations of towards an Employer on Advancement of Generic Skills

No	Item (expectation) - Section D (7Q)	Mean
21	Provide leadership exposure and training in handling and managing a design project	3.68
22	Provide teamwork exposure and training with other professionals in handling a project	3.78
23	Inculcating Interpersonal skills to work in a team	3.59
24	Inculcating Project Management skill	3.69
25	Emphasis on the application of IT technical skills in the ability to produce design work	3.94
26	Emphasis on the application of management and law practising skills in handling building contract	3.56
27	Emphasis on the application of communication skills (verbal and written) in conveying ideas to a professional audience in a design project	3.78
	Average overall mean	3.72

Source: Author

Table 11. Summary of Findings to Identify Graduates' Expectations of an Employer on Career Development and Growth

No	Item (expectation) - Section E (2Q)	Mean
28	Provide a suitable platform for extra skill and professional development growth like the BIM Revit workshop	3.78
29	Provide motivational and moral support in pursuing professional education towards career development	3.94
	Average overall mean	3.86

Source: Author

DISCUSSION

Based on Table 7 on the respondents of architecture students at HAEP, improvements are recommended to the architectural curriculum through assessment, teaching, and learning methods. Findings indicate that much improvement is needed to enhance the quality of the architectural curriculum at HAEP for 21st-century learning for the benefit of students in four main aspects. First, teaching methods must be strengthened to align with multidisciplinary needs across various fields. This will provide an alternative to the architectural curriculum so that there is an element of specialization and diversity of fields, which opens up the path of choice to hone the talents of students in other fields related to the built environment, not just upholding the architect profession. Second, increase the number of collaborations in handling projects practically with industry from various disciplines so that students gain exposure and experience to prepare themselves before entering the realm of employment in practical firms. Third, strengthen the skills of academic resources to be more up-to-date in delivery methods using 21st-century teaching concepts and techniques that align with the practical needs of architecture and market trends (Shari, Z., & Jaafar, M. F. Z. 2006).This can be achieved by providing and improving teaching and learning infrastructure for the facilities of architectural students, especially in architectural studios with infrastructure and infostructure along with the latest technology and software. Based on the feedback from the questionnaire, architecture graduates suggest two main aspects: a. Improvements to the architectural curriculum and b. There is a need to get support from practical firms. This point is crucial because it will contribute to the quality of graduates and improve their ability to uphold the profession of architecture. In this regard, architecture graduates recommend that LAM Part I and Part II's architecture curriculum be enhanced in the following six aspects to enhance graduates' generic skills and abilities. The first is exposure to the construction industry, such as technical learning, contract management, occupational safety, health (OSH) requirements, and economic costing (Ishak, N. A., Fadzil, S. F. S., & Taib, N. 2021). Second, using the latest digital software skills in the market, such as BIM and REVIT, should be heightened in the early stages of course learning so that graduates are better prepared and proficient (Hasan, A., Abd Baser, J., Abd Razzaq, R., Puteh, S., & Ibrahim, N. 2017). Third, exposure to entrepreneurial knowledge adds value to graduates in terms of generic skills. Fourth, exposure to the latest technology and building

materials while working in the construction industry. Fifth, exposure to other fields and professions in the construction industry during the learning process allows students to get first-hand experience in practical project management methods (Abdullah, F., Kassim, M. H. B., & Sanusi, A. N. Z. 2017). Sixth, generic and soft skills should be strengthened since these skills are highly applied in the work environment. Based on graduate feedback, these generic skills, like leadership, team, interpersonal, management, digital capabilities, ethics, professionalism, and communication, are indispensable in the industry.

In addition, architectural graduates also feel the need for support and encouragement from employers in the industry, so they have the desire and ability to continue their studies until they achieve professional architect status (refer to Tables 10 and 11). The integrated Involvement of the industry in this regard is also seen as necessary as a second support system in addition to the role of HAEP and professional bodies (LAM) to increase the number of experienced architects in Malaysia by 2030. Almost half of the respondents agreed that employers should be open and provide moral encouragement and physical environment assistance for the career development of architectural graduates in the industry. In this regard, industry employers need to play an influential role in helping to encourage, train and provide graduates with the passion, desire and confidence to remain in the career of Professional Architects after graduation; industrial employers, HAEP and LAM should join the process of realizing the dream of architect graduates in obtaining the professional status (Darus, Z. M., Ani, A. I. C., Azami Zaharim, N. M., & Yusoff, W. F. M. 2021).

This is important because one of the main challenges that needs to be addressed is the lack of planning towards producing architectural graduates and professional architects who will contribute to forming a quality sustainable environment in Malaysia. This requirement is also supported by the 2020 statistics, which show that the ratio of professional architects to the population in the country is 1:14,400. This statement indicates that the number of professional architects in the country is low compared to other developing countries. The ratio that Malaysia needs to target should be estimated to be 1:8,000 (UIA Accord, 2020) to increase the number of professional architects to meet the ratio of developed countries. Based on the current population in Malaysia of 32.37 million, Malaysia needs

4,000 professional architects, but the number registered as professional architects now in Malaysia is only 2,222. Malaysia needs a double increase in professional architects to contribute to the nation's development.

CONCLUSION

Overall, the architectural curriculum should be characterized by 21st-century education, emphasizing the formation of six specific skills for graduates. These are - Building the values and thinking skills from different opinions and demands while making rational decisions; Strengthen complex communication skills across borderless worlds, languages and cultures; Empowering collaborative skills towards discovering various ideas and perspectives to produce holistic results towards fostering increased knowledge; Strengthening creativity and innovation to generate a vision to create a better world for the good of others; Cultivate the value of citizenship to fulfil responsibilities as a citizen in the form of self-conduct and relationships with other individuals in the local and global community; Strengthening character as a worldwide leader and open-minded and flexible professional; Having added value in technical and entrepreneurial skills, interested in culture, sensitive to an organization, resilient, innovative, integrity, optimistic and energetic to deal with something complex. The architectural curriculum also needs to integrate the core design courses and merge with other disciplines through formal education at the university so as not to become an isolated program. There needs to be continuity in the practical world to enable graduates to gain exposure and experience without borders. This description is essential to avoid a decrease in the number of architectural graduates who remain in the architectural career in realizing Malaysia's dream as a developed nation, in line with the country's desire to transform from a pure manufacturing-based economy to a knowledge and innovation-based one by 2030.

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AUTHOR CONTRIBUTIONS

All authors contributed to the design of the research, the questionnaire, and the write-up. Universiti Teknologi Malaysia undertook the online survey, data cleaning and tabulation. All authors have read and approved the final manuscript.

CONFLICT OF INTEREST

The authors declared to have no conflict of interest.

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