

# Integration of Design and Theory Courses in Architecture Learning for Introductory-Level Students



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**Abstract** Architectural education is a branch of education that requires the development of science and creative skills. Typical standard programme structure in the architectural programme has the design course as a core, while other theory-based courses act as supporting courses to complement the core. However, courses are commonly carried out independently rather than supporting one another. Due to the tension between design and theory-based courses, the programme structure in architecture education remains disintegrated, indirectly limiting learning effectiveness in architecture studies. Introductory-level students in architecture studies typically have zero to little knowledge of learning structure in architecture studies. Therefore, it is more challenging to create a method or curriculum to introduce architecture studies to these students. There is a lack of studies in defining the appropriate method to introduce architecture studies to introductory-level students. The practised methods mainly depend on the programme structure of the university. This paper assesses the implementation of integration between design courses and theory courses to create quality learning in architecture studies. A survey was conducted for undergraduate students at one private university in Malaysia. Analysis of the data was done through descriptive analysis and descriptive statistical analysis. Findings proved that the integration of courses had helped the introductory-level students better understand introduction to architecture studies.

**Keywords** Architectural learning · Course integration · Introductory level

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## 1 Introduction to Architecture Studies

Architectural education educates students to be meaningful architects [1]. Architects should be equipped with knowledge of many branches of study and varied kinds of learning. This knowledge is mainly constructed through practice and theory (Vitruvius 1914). One of the most renowned catchphrases surrounding the fundamentals of architectural values is by Vitruvius, which dwells upon the triad of *utilitas* (function, commodity, utility), *firmitas* (solidity, materials), and *venustas* (beauty, delight, desire) [2]. Each of these three in the Vitruvian triad depends on the other two to form architecture and contribute to the quality to form architecture [3]. All of the components are to be met, and the interaction between these three components would create unity in architecture. Therefore, architecture is not considered a self-sufficient profession but a multidisciplinary, multi-skilled, and multi-directional profession [4]. Concerning the profession, architecture education is an equally complicated process. Its demands must be supported by understanding art, science, psychology, mathematics, and engineering. The International Union of Architects (UIA) recommends that architectural education ensure that all graduates have knowledge and ability in architectural design, including technical systems and requirements and consideration of health, safety, and ecological balance [5]. UIA recommends that architectural education includes design, skill, and knowledge competencies, where knowledge should cover cultural and artistic studies, social studies, environmental studies, design studies, professional studies, and technical studies.

Similarly, the National Architectural Accrediting Board of North America (NAAB) stated that students' performance criteria are divided into four different realms: critical thinking and representation, integrated building practices, technical skills and knowledge, professional practice, and integrated architectural solutions [6]. While the Royal Institute of British Architects [7] further outlines similar criteria in the RIBA with eleven general standards and graduate attributes. In short, architecture studies are complex, and there is no single form of practice that can be described in precise terms. Therefore, it is hard to define the best approach and learning acquired by the architectural student, especially for the introductory level learners. Moreover, what are the courses, and is the integration of courses a possible solution towards effective learning? Thus, the research aims to assess the implementation of integration between design courses and theory courses to create quality learning in architecture studies. The research objectives are to understand the learning method in architecture design courses; determine problems and approaches in architectural courses, and assess the implementation of assignments integrated across the semester. The research focuses on the introductory-level learner through assignment integration as one of the comprehensive learning solutions in architectural pedagogies.

## **2 Architectural Courses**

### ***2.1 Architecture Design Course***

The design studio has long been the major component and the core of architecture education. It is organised in a special manner whereby it is conducted in a studio often conceived as a laboratory or workshop in experimental design [8]. The learning format involves high levels of student-centred learning pedagogies and is based on an inductive, problem-solving model carried out through the progression of project stages [9]. Traditionally, it involves a relatively small group of students under a studio master and an instructor [9]. A design course is an interactive decision-making process that produces plans by which resources are converted into products of systems that meet human needs and requirements or solve problems. This learning process includes all activities which a designer can perform from the beginning until locating the final solution (Kurt 1994). The procedure is full of repeated actions between the problem definition and the answer to the problem. Although the design process consists of regular experimentation, it can be said that architectural curriculum generally has few real variations in different countries [10]. Variations are based on pedagogies selected by learning institutions, profession requirements, or the registration boards. Architecture programmes are also affected by the constant change in architectural doctrines, movements, languages, trends, and digital application advancement.

### ***2.2 Architectural Courses Problem and Approach***

Architecture studies aim to prepare students for the conditions and problems of practice and familiarise them with real design construction and coordination situations. In the study of architecture, some main aspects are used in the learning programme. These include technology and scientific courses, artistic courses, and design courses. It is an interactive course where students interact with each other and their supervisors to solve a design problem. Although the fundamental is simple, students find it difficult to understand how a design studio operates regardless of whether they are new to the design studio learning environment or experienced design studio [11]. Students find it difficult to form perceptions of what occurs in the design studio when the variations include the instructors' personalities, and their expectations are unclear. The students' backgrounds have not prepared them for such an environment. Students are to perceive the design studio by relying on the syllabus. Learning anything may promote a sense of excitement and potential discovery or result in the reluctance to start learning [12]. In architectural studies, the concern is the latter.

Architecture education should be in symbiosis with professional needs, and the education structures should reflect these new ways of working. Hunter [13] recommends that the education structure includes instructors and a range of expert consultants, different disciplines, and other institutions. Due to the advantage of the architecture design course being positioned as the core of learning architecture, it is appropriate that it also acts as a learning platform where knowledge of all other subjects should be incorporated. According to Boyer and Mitgang [14], the design studio sequence provides the connectivity that brings together the many elements of architecture education at its best. Therefore, the central role of the design studio in the conventional pedagogical structure of architectural education needs to be reconsidered to respond to these changes. The architecture design course alone is insufficient to cover all the domains of knowledge offered parallel to studios, such as architectural history, theory, structures, technical issues, environmental science, and economics [3]. Architecture design courses can provide students with a broad understanding of learning architecture by integrating theory courses. In brief, it is seen that the assignment integration is one of the resolutions to which the architectural education and professional needs correspond together.

### 3 Methodology

Integrating theory courses into architecture design course have been implemented at UCSI University, Kuala Lumpur, as a structure in learning architecture. There are two main roles in learning architecture: the instructor and the student [11]. Although the instructor plays an important role in the students' learning experience, as stated previously, this paper is focused on the introductory level students in the architectural programme. A survey was distributed to 36 first-semester undergraduate students from UCSI University, which has experienced integration as part of the introductory level in learning architecture. The data collected from the student questionnaires was analysed in descriptive analysis and descriptive statistical analysis. The items were based on collecting data on:

- (1) Fulfilment of course learning outcome for the core course: Architecture Design Studio 1.
- (2) Effectiveness of integration of design courses and theory courses.
- (3) The overall effectiveness of integration as a method to assist students in learning architecture.

Besides rating on both sections above, students were also asked to provide feedback on integrating each theory-based course with the design course to give a qualitative aspect of integration as a method of learning architecture. The architecture programme at UCSI University in Kuala Lumpur is a full-time programme comprising seven (7) semesters: 3.3 years, including 16 weeks of professional internship. In the first semester, students take five (5) courses which are:



## 4 Findings

Students were asked to rate their level of fulfilment on Course Learning Outcome (CLO) for Architecture Design Studio 1. Students ranked these three (3) CLO from one (dissatisfied) to five (fulfilled) through the incremental Likert scale method. Table 2 indicates students' ranking on the fulfilment of CLO for Architecture Design Studio 1.

The data collected shows that all the CLOs were met with at least 4 for CLO 2 and 3. Only CLO 1 shows that the rate of learning outcome specifically in design elements, design principles, anthropometry, scale, and proportions via spatial manipulation was rated as 3. None of the CLO listed was rated as dissatisfied. Therefore, the level of fulfilment in learning for Architecture Design Studio 1 is generally fulfilled, with a small percentage stating otherwise. Students in the introductory level have managed to grasp the idea of learning architecture design. In section B, students were asked to rate the integration between Architecture Design Studio and theory subjects: Design Communication 1, Building Construction and Technology 1, and Professional Communication. The data collected is shown in Table 3.

From the data collected and displayed in Table 2, students rated all the integration between Architecture Design Studio 1 and theory courses at 4 (effective). More students rated the integration with Design Communication 1 more effectively

**Table 2** Fulfilment of course learning outcome (CLO) in Architecture Design Studio 1

Course learning outcome (CLO)	1	2	3	4	5
CLO 1: Acquire and apply knowledge of design elements, design principles, anthropometry, scale, and proportion via spatial manipulation	0	5.6	38.9	36.1	19.4
CLO 2: Demonstrate an understanding of drawing methods and graphic composition techniques	0	8.6	28.6	45.7	17.1
CLO 3: Able to verbally present simple design concepts with the assistance of basic techniques and tools through sketch, drafting, and model making	0	8.6	31.4	42.9	17.1

**Table 3** Effectiveness of integration between Architecture Design Studio 1 with theory courses

Course learning outcome (CLO)	1	2	3	4	5
1. Integration of Architecture Design Studio 1 with Design Communication 1	0	2.8	22.2	55.6	19.4
2. Integration of Architecture Design Studio 1 with Building Construction and Technology 1	0	8.3	30.6	41.7	19.4
3. Integration of Architecture Design Studio 1 with Professional Communication	0	5.6	27.8	41.7	25

at 55.6% than integration with Building Technology 1 and Professional Communication, although all were rated 4. The higher percentage rated in integration with Design Communication 1 is due to the constant integration and shared assignments between these two courses throughout the semester, as shown in Table 1. Design Communication is a course that introduces introductory-level students to drawings and communicating through drawing in the construction industry. On the other hand, Architecture Design Studio 1 introduces students to visual design thinking. Previously, both courses were conducted separately with different assignments, resulting in a heavier workload, and students could not relate between these courses. Integration of these two courses has proved to create a better understanding of both courses, and it has assisted students in understanding the relationship between the Architecture Design Studio and Design Communication based on the positive feedback:

Design Communication 1 helps to improve the presentation drawings.

Can develop better drawing skills and technique to show our design drawings and model.

There are some similarities and relationships between those two subjects. So, I believe integration between them is bound to happen and makes sense.

Integration with another two theory courses (Building Construction and Technology 1 and Professional Communication) rated 41.7% at level 4 in being effective. Based on Table 1, these two-theory subject shows lesser integration when compared to integration with Design Communication 1 course. However, students' feedback on integration with Building Technology was positive and shows that the students are aware of the importance of learning construction as part of architecture learning.

The lecturer had expected us to draw all the design plans, etc., with the skills she had taught us in class which put the knowledge into action.

The interesting part about it is when the student applies what has been taught in Tech on the design, the details and construction fundamentals.

Although the integration is directly integrated for projects, students wanted more integration between these courses. Nevertheless, it has helped them execute design thinking in Architecture Design Studio 1. Despite the small percentage of integration between Architecture Design Studio 1 and Professional Communication throughout the semester, students benefited from applying the presentation skills for their final presentation for Architecture Design Studio 1. However, students have also commented that too little integration impacts their learning. Some of the benefits are highlighted below:

Professional communication aided us in a way we could formally communicate our design and intent towards our client/audience.

We are more exposed to different ways to present and learn how to present better.

## 5 Discussion and Conclusion

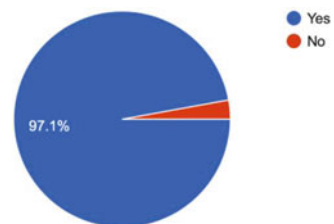
Besides gaining data on the effectiveness of integration between Architecture Design Studio 1 and theory courses, students were also asked about the overall effectiveness of integration as a method of learning architecture for introductory-level students. Chart 1 shows that 97.1% find that integration has assisted them in learning architecture, while only 2.9% stated otherwise. Students' positive feedback indicated that integration had helped them learn architecture at an introductory level. Therefore, integrating design and theory courses could be an effective way of understanding architecture. It goes hand in hand with what was stated by Siddiqi [15] on the design being the connector to bring together the many elements of architectural education. However, there were some pointers on how integration can be a more effective method.

One of the points is to ensure that the percentage of integration between the courses should be well planned to have an effective integration. A well-planned integration mapping should be discussed with all lecturers involved. Another issue is the miscommunication that has arisen due to integration. Therefore, to further increase the effectiveness of integration in learning architecture, attention must be given to the assignment briefs as possible solutions. Effective integration requires integrated courses to have only one (1) brief to minimise miscommunication between lecturers and lecturers and lecturers and students. Careful consideration must be taken when designing a brief in integration, as one of the integration points is to minimise the workload for students and aim for quality instead of quantity.

Students also raised difficulties adapting to integration as they are not used to learning through integration. Therefore, perhaps one of the first few steps in adapting the integration method in architecture learning is for lecturers to learn integration methods and introduce the students to the technique itself upon starting the semester.

Overall, students rated integration as an effective method in assisting learning architecture at the introductory level. Among the positive feedback given by students on integration is that it has assisted in helping them relate the theory courses to the core course, Architecture Design Studio 1. For example, one student's feedback was how Architecture History could have been integrated to understand precedent study application in the design studio. This positive feedback shows that the method was well adapted at the end of the semester; hence, the student understood the importance of applying theory and design.

**Chart 1** Effectiveness of integration between Architecture Design Studio 1 and theory courses





In conclusion, the recommendations and feedback from the students can provide more insight to enhance the quality of learning and improve educational outcomes in the first year and above. However, the direction and the implementation of the integration between courses designation need further resolution to enhance student quality of learning. The balance between design and theory courses in complementing each other must be clearly defined. Integrating theory into the design course can encourage students to be actively engaged instead of the traditional lecture approach, which is passive and ineffective than active learning methods [16, 17]. Future research may investigate the design of the CLOs across courses, and the concept of pre-integration, post-integration, or concurrent integration may further enhance the introductory student learning experience.

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