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Block mode delivery for studio design teaching in higher education

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Abstract
Block mode delivery is widely practised in higher education institutions across the world. It is popular at postgraduate level, such as in business and management fields, but is less common at undergraduate level, especially for studio design teaching. There is a lack of literature on the block mode delivery for studio design teaching. The aim of this paper is to identify the favourable attributes and challenges of the block mode delivery for studio design teaching through the analysis of three undergraduate design studio units at an Australian university as case studies. Students' written feedback of studying these three units were collected and reviewed to evaluate strategies for enhancing student engagement. Challenges of block teaching to students and staff are discussed. The findings suggest that there are various ways to engage with students for active learning in block teaching, which are valuable for curriculum design and continuous improvement.

Keywords: block mode delivery; intensive blocks; studio design teaching; immersive learning experience; active learning

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Introduction

Universities traditionally deliver semester-length courses which require students to attend classes at least once a week over a semester and offer intensive courses for students during semester breaks. In the US, the earliest example of short-term summer courses can be traced back to the one taught at Harvard University in 1869 (Seamon, 2004). Compared with traditional semester-length delivery, an alternative format with a shorter timeframe has been delivered by some higher education institutions. There are a range of names to describe teaching offered in such an alternative format, including time-shortened courses (Daniel, 2000), block courses (Burton & Nesbit, 2008) and compressed courses (Herrmann & Berry, 2016).

There are many reasons for implementing a delivery with a shorter timeframe for higher education. Universities nowadays no longer cater for elite students exclusively, but are open to people with various backgrounds, including mature-age and part-time students. Alternative delivery formats offer greater flexibility in scheduling classes for those students who need to fulfill family obligations and work requirements (Krug et al., 2016). Students can take off a certain number of weeks during an academic year without affecting their progress towards graduation. Students can also take intensive sessions during semester breaks to catch up on progress. Such flexibility is attractive for those who prefer to pursue higher education but are unable to attend regular classes on a weekly basis. This is a way for universities to increase student enrolment (Herrmann & Berry, 2016).

Block mode delivery is common at postgraduate level, such as in business and management fields (Burton & Nesbit, 2008), but is less common at undergraduate level, especially for studio design teaching. In this paper, the block mode delivery for studio design teaching in built environment at a publicly funded university in Australia is

analysed as a case study. The research questions in this paper are: what are the favourable attributes and challenges of the block mode delivery for studio design teaching and what are the ways for enhancing student engagement and promoting active learning in studio design units? Before examining the actual block mode delivery in detail, an overview of the pedagogy for studio design teaching is discussed.

Literature review

Design studios are problem-based in nature which require students to identify the issues to be addressed and aware of the contexts involved (Casakin & Wodehouse, 2021; Mann et al., 2021). Problem-based learning motivates students to focus the learning on a particular problem and to think strategically and creatively to apply knowledge to tackle the problem (Marra et al., 2014). This promotes students' problem-solving skills, critical thinking ability and a high degree of involvement in learning activities (Masek & Yamin, 2011). Since the solution of the problem can extend beyond the traditional subject-related boundaries, so problem-based learning encourages students to navigate interdisciplinary issues in their studies and collaborate with others from different disciplines (Jensen et al., 2019).

In design studios, students are engaged in an iterative process and are encouraged to study precedent examples as sources of design inspiration. Students have opportunities to present their work-in-progress to their teachers and peers and to refine their work in an ongoing iterative cycle (Brandt et al., 2013). The whole process is a reflective practice for students to rethink the problem at hand and evaluate the effectiveness of the proposed design (Kuhn, 2001). Since there are many ways to tackle the issues, studio learning encourages students to unfold an open-ended exploration for alternative possibilities (Hoadley & Cox, 2009).

Design studios promote active learning (Salazar Ferro et al., 2020; Priya et al., 2020). Students are expected to proactively participate and share their views with others. They are required to articulate their design proposals through various representational modes, including sketches, diagrams, drawings, computer renderings and physical models. Different representations enable students to visualise and compare their design options.

Design studios foster peer learning among students. Through various presentations during the class, students display their emerging design thinking to classmates and learn from one another. Peers' work enables students to evaluate their own progress (McLaughlan & Chatterjee, 2020). It is beneficial to cultivate a strong peer culture in design studios.

There are limited studies on the delivery of studio design units for built environment in an intensive mode. A one-week block teaching of architectural technology for second-year undergraduate students in a design week was evaluated (Adeyeye et al., 2011). The design week enabled students to concentrate on a specific content with fewer distractions and apply what they learnt within the limited timeframe. Students responded to the design challenges positively and were actively engaged to deliver creative outcomes. It was crucial for academic staff to carefully plan learning activities and provide timely support to students during their design process. Another study was the analysis of a first-year planning studio which was restructured to have a three-day intensive charrette at the beginning of a semester followed by drop-in studios in subsequent weeks (Dredge, 2012). For academic staff, the intensive teaching period freed up their time to pursue research and other academic engagements. The initial preparation was time consuming but was substantially reduced once the design studio unit was

established. For students, intensive studio units freed up their time for other commitments.

Although there is a lack of literature about the block mode delivery for studio design teaching, comparative studies between block teaching and other traditional teaching deliveries were carried out for other disciplines. Two-week intensive psychology courses received significantly higher overall course ratings on student evaluation than traditional 16-week courses (Richmond et al., 2015). Instead of taking four to five courses concurrently in a semester, students only took a two-week intensive course at a time which reduced the amount of cognitive load and avoided them juggling between competing demands or deadlines of different courses. The concentrated interaction between students and academic staff under the immersion scheduling expedited student-teacher rapport. In a recent study, 20 matched-pair courses in both traditional and intensive formats from 11 disciplines were compared and evaluated (Walsh et al., 2019). Students preferred the intensive format because they were only required to retain course material for a shorter period of time. However, students might struggle to process the learning material and complete assessments due to the time constraint. It was also challenging for academic staff to complete marking and provide timely feedback to students.

There are various ways to engage with students for active learning in block mode delivery. It is crucial to shift the role of the student from a passive receiver of information to an active and engaged learner (Tucker & Rollo, 2005). Lectures are considered as an efficient teaching method because of the large student-to-teacher ratio, but its effectiveness has been called into question due to a lack of student engagement. Large impersonal lectures for passive learning are replaced by small groups in interactive workshops (King et al., 2018). Class groups are deliberatively small to encourage students

to engage with others (McCluskey et al., 2020). Instead of having summative examinations at the end of the semester, smaller project-based assessment tasks are arranged throughout the unit, which are more manageable for students in terms of workload (Walsh et al., 2019).

Research methods

In view of the research gap in the literature on the block mode delivery for studio design teaching, this paper aims to contribute to the body of knowledge in this area. Considering that case studies are the common way of studying this topic, the research methods for the evaluation of the actual block mode delivery for studio design teaching in this paper are case studies and the written feedback of the student evaluation of unit of study (SEU). Three undergraduate units involving studio design teaching are selected for analysis, which are Building Design Documentation, Urban Design and Development, and Commercial Sustainable Design. Each unit has 11 intensive sessions within a four-week block. At the end of each unit, students were encouraged to complete SEU to share their views about their learning experience. Students' written feedback of studying these three selected units were collected and reviewed. The use of SEU written feedback has been approved by the Low-Risk Human Research Ethics Panel of the university involved.

Case study

Case 1: Building design documentation

Building Design Documentation is one of the foundation units offered for all first-year undergraduate students studying built environment. This unit is based on a series of designed problems to introduce students to building design process and detailing.

Learning outcomes and assessments of this unit are shown in Table 1.

Insert table 1 about here

In each three-hour block session, mini blocks are introduced and each mini block lasts around 15 minutes as a condensed hybrid of lectures and tutorials. Each mini block has three general modules, covering teaching, practice and feedback. The first module of teaching is in the form of presentation and/ or demonstration for teachers to cover key points. Based on the covered key points, students practise immediately in the second module to gain hands-on experience. Then, students receive timely feedback from their teachers and peers according to their performance during the in-class practice. If the feedback shows that a particular key point covered in the mini block needs more clarification, such key point will be re-capped or further practices will be conducted accordingly. If the feedback shows that students have completed the module satisfactorily, then the class will move on to the next mini block. Teachers can expand or simplify a particular mini block according to the actual needs of each class. The mini block arrangement allows the sessions to be delivered with flexibility to cater for different student cohorts.

After each session, there are practices for students to reinforce the key points already covered in the mini blocks. According to Hermann Ebbinghaus' forgetting curve, the percentage of retention decreases steeply in the first week (Ebbinghaus, 1998). The University of Waterloo provides a forgetting curve based on a one-hour lecture, which shows that around 50%-80% of what students learnt in the lecture will be lost on another day if there is no follow-up activity (Waterloo, 2017). A timely repetition is an effective way to break the forgetting curve as the more frequently a person repeats thinking about what has been learnt, the more likely that part of knowledge will be retained (Savara,

2012). Therefore, special attention is paid to the frequency of learning activities and practices. Students are encouraged to study further for self-exploration and ongoing self-learning. Through synthesising multiple mini blocks, students can construct their own schema of knowledge and skill toolkits based on their areas of interest and strength.

For preparing the project, students visit real estate agents and neighbourhood residents for selecting a family house prototype per group. Students in each group then interview an imagined client to identify the client's expectations and constraints. Based on the selected family house prototype and project brief, students work together to develop a set of building design documents and complete working drawings to industry best practice to align with the intended learning outcomes (Biggs & Tang, 2011). The last session of this unit is group presentations which resemble pitch presentations to clients and other industry stakeholders. Each group is required to explain underlying ideas, articulate their design and deliver the presentation within the time limit. Creative representations, including rendered views, walkthrough animations and posters, are encouraged to show the final design.

The arrangement of project-based practices for work-related learning aroused students' motivation as reflected in their feedback. A student mentioned that "the best aspect of this unit was gaining insight into the work of architects". The hands-on approach in learning relevant computer software as useful industry-ready skills was appreciated by students.

Timely feedback from the teacher in this unit was well-received by students. A student was glad to "get encouragement from the teacher". Progress review was considered valuable by students to enable them to evaluate their performance and identify areas of improvement. However, within such short timeframe, students preferred to have "more time to work on the group project".

Case 2: Urban design and development

Urban Design and Development is a unit specifically for Bachelor of Building Design students. In this unit, students participate in both independent and collaborative analyses of urban spaces to inform conceptual design ideas, develop an understanding of the project brief and generate a design-based project per group.

Besides in-class activities, before-class and after-class activities are essential parts of learning for students to have a better and deeper understanding of the topic contents. All teaching and learning materials are accessible via the online learning platform. Learning outcomes and assessments of this unit are shown in Table 2.

Insert table 2 about here

The Urban Design and Development adopts a real-world urban issue as the design agenda. In collaboration with a city council, the design task is to revitalise a local community centre. A real-world issue is taken for students to tackle, which arouses their motivation to participate. Bringing real-world issues into design studios draws students' awareness of contemporary issues and equips themselves with the capabilities to formulate corresponding strategies to cope with the changing working environment. There is a field trip for students to visit the site to observe and gain first-hand experience of the context and surrounding conditions, which inform their subsequent design approaches. Through the analysis of existing urban spaces, students propose conceptual designs and prepare master plans through collaboration in groups. Students delivered their final design presentations through posters and physical models.

The active learning approach of this unit received positive feedback from students who considered the best aspects were "walking through the streets and visiting sites" and

"group activities and the poll questions". The engagement with realistic urban issues was also appreciated by students:

- The assessments were based on real-life projects that gave us the practice of working on field.
- The choice of site and able to work freely once the content was taught was great as it gave myself the chance to apply my knowledge down.

Case 3: Commercial sustainable design

Commercial Sustainable Design is a unit for both Bachelor of Building Design and Bachelor of Architectural Engineering students. The task requires students to design a sustainable office building in Melbourne. The first part of the unit covers environmental sustainability design principles, whereas the second part introduces building performance analysis tools for students to analyse and explore alternative design scenarios to optimise the environmental performance of their office design. Learning outcomes and assessments of this unit are shown in Table 3.

Insert table 3 about here

At the outset of the unit, students are encouraged to conduct site visit and observe existing site conditions. Each student is required to complete individual precedent case studies for better understanding of current commercial practice before developing their own solutions. Precedent case studies exemplify different approaches to tackle the issues. Students are reminded not to imitate the precedents, but to consider them as sources of inspiration. After completion of individual assignments of case study and initial conceptual ideas, students work in groups to develop the work from schematic to final design outcomes.

Collaboration between building design and architectural engineering students in groups is highly recommended. Interdisciplinary interaction fosters students to think outside their own disciplines and learn how to communicate with other professionals.

The learning process of this unit is project oriented which triggers students' incentive to be actively involved (Barth, 2014). A series of in-class presentations are arranged for students to share their work and exchange ideas with their peers. Apart from the feedback provided by teachers, students are encouraged to raise questions to other's presentations as peer review. Setting up the discussion atmosphere in the classroom enables students to experience the dynamics of communication and gain confidence in sharing their views. The teacher acts as a facilitator to stimulate further discussion and innovative exploration.

The interdisciplinary student cohort of this unit aroused learning motivation. A student considered that this was a "fun unit to play with the creativity of the engineering students". The design task encouraged students to explore "innovative ways to provide healthy environments for people to work". The problem-based learning approach was positively received by students which motivated them to come up with "own solutions to problems". However, some students raised their concerns about the arrangement of assignments within the tight timeframe and preferred to increase the time between assessments for having "more time to evolve the design".

Discussion

Through the analysis of the selected undergraduate units as case studies, all three units with studio design teaching are problem-based in nature requiring students to collaborate with others in teamwork to apply the knowledge to tackle identified issues. The active learning approach involves problem-solving skills, critical and creative thinking which motivates students to study as reflected in their feedback. However, students also raised

their concerns about the allowed time and workload of assessment tasks. Within the four-week duration of each block unit, assessment tasks are required to be carefully scaffolded and designed, so that they are manageable for students to evaluate their performance and understanding against intended learning outcomes.

From the perspective of academic staff, the timing between assessments should provide a reasonable turnaround for marking the assignments and providing feedback to students. Timely feedback is important for student learning especially for block mode delivery. All three units have developed assessment rubrics with detailed evaluative criteria and scoring strategy (Popham, 1997). The holistic and task-specific assessment rubrics in the online learning platform are user-friendly for teachers to complete and provide the feedback to students in a timely manner (Dawson, 2017). The criteria in the assessment rubrics also serve as checklists to remind students the expected quality of work required.

Under the COVID-19 pandemic, all block units have been converted to online delivery due to the campus closure. Block mode delivery provides flexibility to address COVID-19 new normal changing circumstances (Cahapay, 2020). As each block unit only lasts for few weeks instead of the whole semester, this allows rapid conversion from online delivery to in-person sessions when social distancing conditions are relaxed and prompt swift to online teaching to cope with a new wave of inflections whenever necessary. It is simpler to manage the student density on campus by adjusting the proportion between in-person and online block units. When students return to the campus, they only attend one single block unit for few hours with the same teacher and classmates, so social contacts are minimised and the sanitisation work for classrooms is optimised. It is also simpler to trace social contacts among the same student cohort within a block unit in case an outbreak occurs in a class.

There are some limitations of the above three case studies. A small number of intensive block units in the discipline of built environment are involved in this analysis. For further research, more case studies can be included for obtaining a comprehensive comparison and understanding of the block mode delivery for higher education. Regarding the research methods, apart from case studies and the review of students' written feedback, other research methods, such as questionnaire surveys, focused group discussion and interviews with students and teachers involved can be conducted in future research to obtain their first-hand teaching and learning experience for further analysis.

Conclusion

Compared with conventional design studios offered over a semester, the challenges of the block mode delivery are the impact of the compressed schedule to students' learning and academic staff's workload. Since the duration of each unit is shortened and students are only required to focus on a unit at a time, so competing deadlines of different units are avoided. This provides an immersive learning experience for students with fewer distractions. If the timing and workload of assignments are properly arranged, students can apply gained knowledge to complete progressive assessment tasks throughout the unit. Short and frequent assessment tasks are more manageable in the block mode delivery with less stress than summative assignments or traditional examinations at the end. For academic staff, it may be challenging to mark assignments and provide timely feedback to students in a short timeframe. Detailed and user-friendly online assessment can ease the marking workload and enable the comments to be promptly released to students once available. During class presentations, teachers can also provide on-the-spot feedback to students which is valuable for the continuous improvement of their academic performance.

Based on the previous discussion, there are some favourable attributes of the block mode delivery for studio design teaching to foster student engagement and promote active learning in higher education. First of all, the block mode delivery requires careful planning in which the intended learning outcomes should be clearly identified and aligned with teaching and learning activities as well as assessment tasks. Well-defined learning outcomes enable students to have a clearer understanding of what is expected and what is going to achieve. Interactive workshops promote small group interaction for cohort discussion and problem solving. Small-cohort learning is beneficial to cultivate a strong peer culture in design studios for students to exchange ideas for ongoing iterative cycle of design refinement. Groupwork and peer collaboration stimulate interactive inquiry-based learning among students. Carefully structured assessments encourage students to actively participate throughout the whole process and consolidate their learning through scaffolded tasks. Timely advice from teachers and comments from peers are valuable for students to enhance their understandings of the contents and to learn from one another. Besides, teachers' enthusiasm, expertise and communication skills are crucial to inspire students and arouse their motivation to study. The favourable attributes and challenges of the block mode delivery for studio design teaching identified in this paper are valuable for curriculum design and continuous improvement of teaching practices. In view of the changing society needs, it is beneficial for reviewing the subject content of design studios regularly, so that students are well aware of real-world issues at stake and are equipped with problem-solving skills to face and tackle the challenges ahead.

Declaration of Interest

The three co-authors teach the three selected units.

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Table 1. Learning outcomes and assessments of Building Design Documentation

Learning Outcomes

1. Comply with occupational health and safety (OHS) regulations applicable to workplace operations
2. Apply organisational policies and procedures, including quality assurance requirements where applicable
3. Select and apply appropriate techniques for the documentation and communication of finalised design
4. Produce two and three-dimensional drawings for residential and commercial building projects
5. Interpret and report on commonly used built environmental project documentation
6. Complete working drawings to industry best practice and as determined by the project brief

Assessment Tasks		
Test	In-class tests (6 nos.)	30%
Portfolio	Individual portfolio	20%
Project	Teamwork including a technical report	40%
Presentation	Team oral presentation	10%

Table 2. Learning outcomes and assessments of Urban Design and Development

Learning Outcomes

1. Formulate deep insight into a wide range of urban design projects
2. Propose creative strategies to analyse urban spaces and communicate effectively with a range of skilled professionals, including architects, builders and engineers
3. Adapt knowledge and skills to design for liveable neighbourhoods and sustainable communities
4. Design and develop the urban conceptual master plan which demonstrates a deep level of understanding on the existing design issues and high level of analytical and critical skills

Assessment Tasks		
Case Study	Individual Case study	20%
Test	In-class tests (5 nos.)	20%
Portfolio	Individual portfolio	20%
Portfolio	Team portfolio, poster presentation and physical model	40%

Table 3. Learning outcomes and assessments of Commercial Sustainable Design

Learning Outcomes

1. Critically analyse the construction principles, materials and design strategies of commercial building design
2. Demonstrate design skills to develop environmentally friendly commercial buildings from initial concept stage to detailed design
3. Critically review the environmental performance of commercial buildings by modelling and stimulating the building design in the areas of indoor environmental quality, natural and mechanical ventilation and natural/ artificial lighting
4. Communicate design ideas and strategies effectively to targeted audience
5. Formulate an environmentally sustainable design (ESD) report for commercial buildings

Assessment Tasks		
Case Study	Individual Case study	20%
Project	Individual initial design (10%) + Group design development (40%)	50%
Presentation	Final group design presentation	10%
Report	Group ESD report	20%