Assessing students' learning process in design studio

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OVERVIEW

This case study presents the assessment design for undergraduate architectural design studio at the University of Indonesia. The design studio is an integrated and project-based module, in which the students work on individual projects where they should demonstrate their understanding of various forms of knowledge. Most of the activities in the studio are initiated by the students as their response to certain design issues. Although the students' efforts are aimed towards producing final design works, the works only become the vehicles for students to gain certain kinds of knowledge. The integrated and self-initiated nature of the studio requires certain methods of assessment which could assess the students' learning throughout the project, and not merely assessing the quality of the final outcomes produced at the end of the project.

INFORMATION ABOUT THE COURSE

Architectural Design Studio 3 is a core course taken by students at the third year undergraduate study of architecture. The studio is one among four other compulsory design studios taken by undergraduate students. Since 2004, the Department of Architecture at the University of Indonesia has developed integrated curriculum. In this curriculum design, a number of courses which were studied as separate subjects in previous curriculum are now integrated into design studios, thus reducing the number of stand-alone courses. The duration of the course is one semester or 14 weeks. During this period, the students work in the studio four days a week (approx. 26 hours). There are approximately 50-60 students taking this course each year.

DESCRIPTION OF THE CASE

The core task of the students in this design studio is to conduct a design work, which requires their ability to integrate five main aspects: architecture, urban contexts, structure, building services and communication. The learning process begins with a 'trigger' that provides direction for students' learning through a design project. The 'trigger' did not explicitly mention the title of project of certain types of building the students will work on. Rather it provides general illustration of the background, contexts and key questions that the students need to address in order to formulate their own projects. It also defines the scope and complexity level of the projects so that all students are more or less work on projects with comparable levels of complexity.

The studio encourages both collaborative and individual works. Students work in groups at the beginning phase of understanding contexts. Then each individual works on certain issue and discovers a unique way to contribute to the same contexts. The students work on their individual projects, which they define by themselves based on their own analysis and understanding of the major issues given at the beginning of the task. Following this individual definition of the projects, each student develops his/her strategies to complete the projects, which may be different from other students. However, the development of the students' works should follow certain milestones. During their work in the studio, the students may consult different literatures and resources that they consider important to complete the project. But certain general resources are given to the all students through compulsory readings, lecture series and workshops. These resources provide general outline of knowledge that should be acquired by all students. Then students are required to further

develop their own understanding through independent study, and consult other resources based on their needs in their individual project.

A key objective of this course is the students' ability to demonstrate continuity and consistency of thinking and understanding among different aspects of the work, from the beginning right through the completion of the design process. In addition, the students are also expected to demonstrate creative exploration and expression of ideas, and they are highly encouraged to develop the unique and distinct way to respond to the design issues.

The students' learning processes are supported by tutors. Each tutor works with a particular group of students throughout the duration of the project, with the tutor-student ratio of 1:8 to 1:10. The main role of the tutor is to guide the stages of students' learning and monitor the achievement of milestones, without dictating what the students should do. In addition, all tutors are also experts in certain areas of knowledge. From time to time they act as resources for the whole class through lecture series and workshops.

During the semester, students work on two design projects, each taking approximately 7 weeks. Figure 1 illustrates the learning process during a project, together with assessment instruments that are used during the process:

Figure 1. Learning process and assessment methods
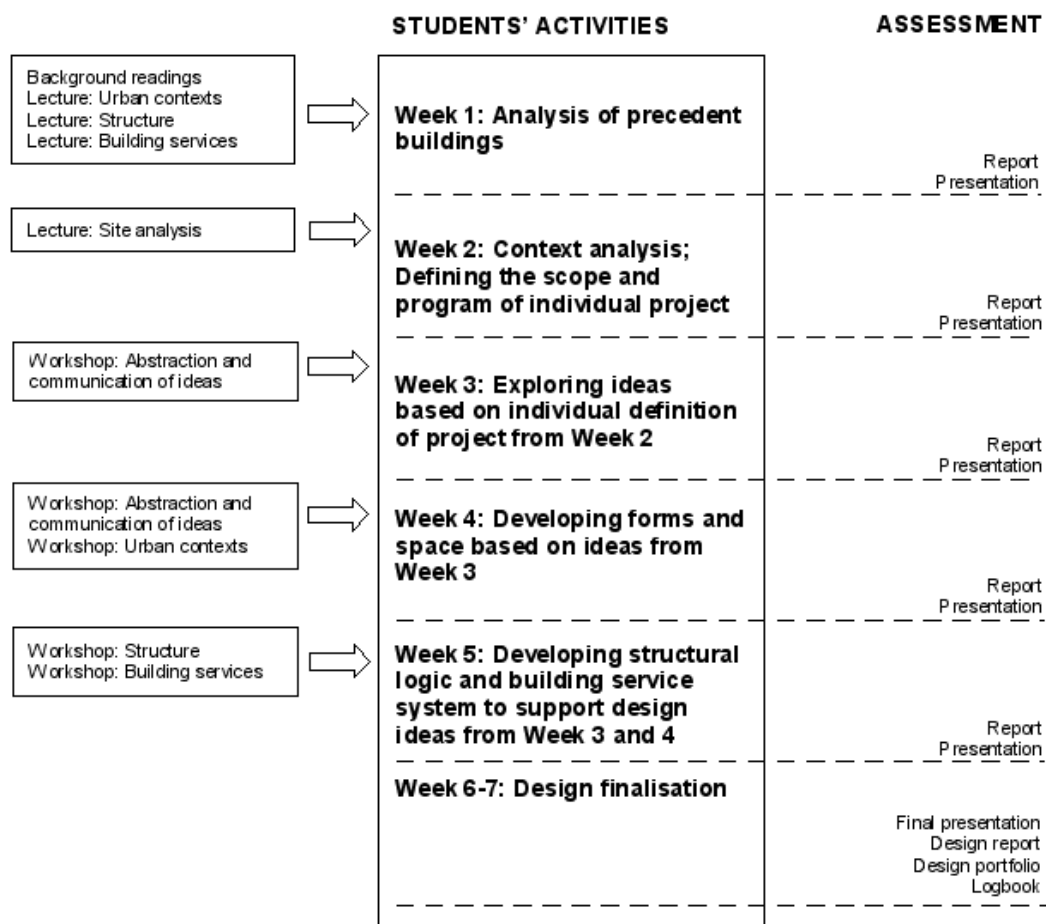
As illustrated above, there are several methods of assessment used throughout the process.

- *Weekly presentation*
  Presentation of progress is conducted weekly in groups, to provide opportunities for the students to present their progress, to have discussion and to obtain feedback from tutor as well as from peers. No marks were given for students' performance in weekly presentation, since the main purpose for the tutor is to monitor the students' progress from time to time.

- *Weekly reports*
  Reports are submitted in the forms of writing, schematic drawing and other visual modes of communication, which allow the students to demonstrate what they have achieved during the week. A weekly report should be concise (2-4 pages of A4), and it should demonstrate not only what they did; rather it should illustrate what knowledge they acquire and how they acquire it. In preparing the reports, students are required to choose the materials that are representatives of their progress during the week, thus allowing opportunities for self-reflection.

- *Final presentation*
  This form of assessment is conducted at the end of the project, in which the students should present their design work and design process to tutors from other groups as well as to external examiners. The primary objective of this assessment is the students' ability to explain their work as a series of progress which demonstrate continuity and coherence in their thinking.

- *Design report and design portfolio*
  These are submitted at the end of the project, as a means to demonstrate the students' learning process. The students are required to choose written and visual materials that are representatives of their progress throughout the project, which demonstrate continuity and coherence in their thinking.

- *Logbook*
  Logbook or journal is a personal record of the students during the whole process. While the materials in design report and portfolio are selected by the students, logbook is a complete record of everything that the students have done during the whole process.

The final marks of the students comprise the marks from all the above assessment components except weekly presentation. For the reports where students are required to demonstrate their understanding of certain aspect (e.g., urban context analysis report, structural logic report), the reports are marked by the tutors with expertise on that area. Meanwhile for the assessment components that contain integration of several aspects (e.g., design report and portfolio), the marking are done through marking session involving all tutors. All the marking processes are based on the performance indicators set at the beginning of the semester and made known by all tutors and students.

RATIONALE IN TERMS OF EDUCATIONAL IDEAS

The development of assessment methods as described in previous section is based on the understanding of certain characteristics of the design studio. The process primarily adopts constructivist learning approach where "… the content and knowledge occurs as a result of student learning, of the students constructing it for him or herself" (Light & Cox, 2001). Inherent in this approach is the need to take into account the whole learning process that occurs within the students, and not merely the final products. In this case study, the knowledge that is gained by students is demonstrated through their design work, hence the assessment should capture not merely the quality of the students' final design, but it should capture what the students gain throughout the process and how they gain it. The use of various assessment methods in this case study serves the purpose of assessing the whole process. The weight of assessment is not emphasised on the marking at the end of the

project, but based on the continuing performance during the whole process. Even the assessment through final presentation and final design report is aimed at capturing the students' continuity of thinking throughout the project.

The case study also illustrates the process within a project-based course. The students work on a particular project, based on their own definition and understanding of the contexts and issues. The project becomes a means for the students to demonstrate their ability and understanding of various forms of knowledge. However, the knowledge they gained may differ from one student to another as they work on different design problems. This has been realised as a challenge in developing alternative assessment methods for constructivist learning, where "…learning is personal, unique and contextualized for each learner" (Reeves & Okey, 1996). Particularly in this case study, there is also a key objective to encourage students' creative expression and exploration of unique ideas. Therefore, the criteria of assessment are developed as generic enough to allow comparison between students, but also specific enough to capture the uniqueness of individual students. The use of individual reports, logbook and portfolio allows the tutors to assess the students' performance based on the students' development of understanding since the beginning phase, and not based on certain 'ideal' performance from the point of view of the tutors.

Another aspect considered in the development of assessment procedure is the need for the students to reflect on their own progress. This will enable them to complete their design work with continuity and consistency; in other words, what they learn at the beginning phase should be reflected in the following phases. Self-reflection and self-awareness has become one of the key goals in constructivist learning, in which the students need to be fully aware of why they do certain things or use certain strategies to solve a problem. In other words, there is the importance of "knowing how we know" (Honebein, 1996). In this case study, this issue is assessed through students' weekly reports, final design report, and design portfolio. Through these assessment methods, the students need to conduct careful selection of materials that reflect their own progress. In addition, the logbook also becomes a vehicle for students to record the process that they go through, and these records are also accessible for the tutors to understand the whole process of students' learning. Following the submission of reports and feedback from tutors, students are able to develop their own strategies to continue their project. These means of assessment at the same time becomes a means of developing students' self-directed learning.

Table 1 illustrates the relationship between the above assessment methods and REAP eleven principles of good assessment design.

Table 1. Reflection of REAP principles of good assessment design

	REAP principles of good assessment design	How this case study reflects the principles
1	Engage students actively in identifying or formulating criteria	Students' individual definition of projects lead to the development of criteria to be used in assessing students' learning.
2	Facilitate opportunities for self-assessment and reflection	Logbook becomes an instrument for students to record their own learning and progress. Weekly report, final design report and portfolio allow students to reflect their own work throughout the process.
3	Deliver feedback that helps students self-correct	Regular presentation offer opportunities for discussion and gaining feedback from tutor and peers. Continuous feedback during the process allows the students to continuously develop their work.
4	Provide opportunities for feedback dialogue (peer and tutor-student)	Regular presentation offer opportunities for discussion and gaining feedback from tutor and peers.
5	Encourage positive motivational beliefs and self-esteem	Student-led project encourage the sense of belonging to the project and increase motivation to perform well. Each student's unique approach to the project encourages individual self-esteem.
6	Provide opportunities to apply what is learned in new tasks	The nature of design studio require the students to apply various aspects that they learn into their individual project.
7	Yield information that teachers can use to help shape teaching	Students' reports, logbook and portfolio form complete records of students' learning that provide useful materials for tutors to define appropriate practice in facilitating students' learning.
8	Capture sufficient study time and effort in and out of class	Frequent submission of reports provides opportunities to monitor most of the students' time and effort in completing the task.
9	Distribute students' effort evenly across topics and weeks	Weekly submission of reports provides opportunities to monitor students' understanding of each aspect of knowledge included in the course.

10	Engage students in deep not just shallow learning activity	Students are required to have deep understanding of knowledge in order to be able to apply their understanding into the project.
		Students' reports should demonstrate not only what they did; rather it should illustrate what knowledge they gain and how they gain it.
11	Communicates clear and high expectations to students	Performance criteria for each assessment are set from the beginning and made known to all tutors and students.
		Students get opportunities to direct their learning to fulfil the expectation – which is indeed the expectation for them to learn.

EVALUATION

The assessment methods described in this case study have been conducted with certain benefits, as well as challenges, for students, tutors and institution.

Benefits for students were indicated from students' feedback at the end of the semester. The students mentioned that this method made them realise how much they had learned during the process, and that the end product was not as important as the whole process that they went through. In addition, students indicated their high motivation of learning, and their perception of learning as fun and stimulating. On the other hand, students also felt quite heavy burden during working in this course – partly due to the nature of the studio that integrated quite a lot of aspects, and partly due to the number of requirements that they should fulfil as the assessment procedures.

For tutors, this assessment method requires careful consideration of how the learning process should happen from time to time. Therefore the tutors need to plan in advance the detailed procedure of assessment, along with all the criteria to be made known by the students. However, the setting up of clear procedure not only provides practical benefit in daily implementation, it also allows similar attitudes and understanding among the tutors toward what is expected from the students in each stage of learning. The nature of assessment that require collaboration of tutors had also increased the number of contacts among tutors in discussing students' progress as well as strategies for facilitating and assessing. This can be seen as a development from previous curriculum, where tutors tend to work individually to develop assessment instrument, with few relationship between an assessment method and another.

Another benefits gained by the institution is the setting up of the assessment procedure that allows the process of learning not to depend on certain tutors, thus ensure the sustainability of the learning methods. The method of assessment also offers a generic model that may be applied in other design studio courses, with necessary adjustment depending on level of complexity of the projects and the level of expectation.

This case study has illustrated a model of assessment for project-based learning process that is mainly initiated by the students. This model accommodated the complex nature of integration of knowledge, together with the expectation of individual expression and creativity. All these aspects are channelled through continuous assessment with the criteria that consider the fulfilment of certain generic criteria, while at the same time allow the development of individual unique process of learning.

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