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# STRATEGIES FOR INCREASING STUDENT NUMBERS IN ARCHITECTURAL DESIGN STUDIO

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## ABSTRACT

This paper considers the impact of increasing student numbers and decreasing resources on the teaching of design in schools of architecture. The provenance of these changes is considered and merits of studio-based learning are discussed. A specific pilot case study concerning the School of the Built Environment at the University of Nottingham is detailed, with regard to the formulation of practical strategies for managing increased numbers. A series of recommendations for managing expansion are outlined, developed from results of a questionnaire issued to staff. These set out criteria for minimum resource standards sufficient to enable effective learning and teaching based upon maintenance of the existing pedagogy. Preliminary outcomes of adopted strategies and their implications are interpreted with the view for these to form a basis for future monitoring and research in this area.

## KEYWORDS

Architecture, higher education, design studio, pedagogy

## 1 INTRODUCTION

The structure of higher education is undergoing significant change driven by social and political agendas. The current government aims to increase participation in higher education to 50% of the population. This has been driven by notions of social inclusiveness and instrumental knowledge, which have become increasingly influential since the Robbin's Report of 1963 when only 6% of the population attended university and higher education was regarded as an activity of the mind rather than a practical training (Pring 2001).

This change to the academy's size and remit has been accompanied by a decrease in funding of 40% in the last 20 years. Current expansion has seen a slowdown of funding decline, however the decline continues (Pring 2001). It appears that the combination of increasing student numbers and decreasing financial resources will continue to have a fundamental impact upon higher education for many years to come.

In recent years, a number of architecture schools in the UK have increased their intake of student numbers in line with university and government aims. Within this context teachers of architecture, broadly, consider traditional teaching methods to be threatened. Studio teaching has historically been the focus of UK architectural education. It relies upon one-to-one and small group teaching. However, it is increasingly under scrutiny as a teaching method with respect to its ability to deal with large numbers of students. Architectural academics, however, are reluctant to abandon the studio-based approach and are looking to modifying studio teaching, while retaining its essence, and adapting it to the requirements of large student cohorts.

## 2. THE ARCHITECTURE STUDIO

Studio teaching derived in part from principles of pupillage where the expert trains the apprentice in all aspects of design, practical and theoretical. In many schools, including Nottingham, studio as presently instituted is conceived as a critical, reflective model of the architectural office and is based on the pedagogy of 'learning by doing' and 'teaching by example' (Farren Bradley 2000) (Abel 1995).

Many consider that studio teaching remains an appropriate way to tackle the diverse issues informing architectural design and education. As Peter Cook has written:

"Architecture appears to have a mandate to involve itself in so many issues: sociology, art, history, style, mechanics, conversation, mythology, professionalism, business, craft and more" (Cook 2002).

Cook's list of issues highlights the complexity of design and suggests that a high level of supervision remains necessary to guide the novice. Dealing with such a wide scope of topics is a challenging task and studio is thought to provide the necessary, supervised, opportunity for the synthesis of knowledge gained from other disciplines and course modules (Till 2002).

Studio involves problem-based learning and as such is a learner-centred method requiring the student to assess the problem and decide upon information and skills necessary for its resolution. It also requires 'an ability to critique information which also demands them to take up a position towards the scenario in relation to their prior experience and the new knowledge they have gained' (Savin-Baden 2000). Studio thus provides a practical opportunity to integrate all aspects of design, but also provides an opportunity for dialogue. Rickwood suggests that through studio tutorials, students are often challenged with new ideas, allowed to discuss their values and work out potential plans for real and simulated situation. Through studio discussions the students learn to assimilate and rework their personal observations and experiences into their designs (Rickwood, 1999). This opportunity to discuss issues develops students' critical faculties. Lawson believes that studio based learning develops students' learning skills and critical intelligence, equipping them with a learning instinct to deal with the inevitable continual change of their professional life (Lawson, 1999). Brookfield and Preskill support this view and believe discussion improves higher quality cognitive strategies for learning (Brookfield and Preskill, 1999).

Brian Edwards has written that '[Architectural] education is not the real world but it must engage in the agenda of reality.' (Edwards 1999). The relationship of design studio with architectural practice is not limited to the model of learning from experts; it also applies in respect of teamwork. Team working is a fundamental characteristic of architectural practice and studio group projects successfully mimic this working arrangement. Team working as a form of co-operative learning is also thought by Brookfield and Preskill (1999) to result in high level of achievement. Teamwork is not restricted to group projects where students have to submit collaborative work. The studio also promotes informal teamwork, where students learn from each other.

In addition to the design development and discussion the design studio also involves the 'crit'. The crit is the final review of a design project and involves the student presenting their work to a group of tutors and fellow students and receiving feedback from the group and marks from the tutors. The crit is seen as an underscore for the students at the conclusion of a particular exercise; an opportunity to "develop a whole range of skills in presentation and communication" (McCallum 1999); and the moment of assessment. It is thus an important teaching and learning tool. Presentations allow students to learn from the work of others and help them distinguish general guidance from points that are specific to a particular scheme.

Studio teaching involves a high expenditure of staff time, which seems balanced by the benefits experienced from the students' development of a self-critical approach. In conclusion, design studio teaching continues to be considered an extremely effective teaching method despite the necessary high-level of teaching commitment.

### **3 STUDIO AND LARGE STUDENT NUMBERS**

There has been little recorded exploration of methods for dealing with large cohorts of students in studio teaching. General guidance recommends the use of peer assessment to cope with large student numbers. More design oriented-advice resulting from a workshop on design education (RIAS 1999) highlights the importance of dividing cohorts into smaller groups to ensure more immediate involvement and closer and more intimate dialogue. Peer learning, self-evaluation and self-assessment techniques were also suggested as ways to increase the self-management of learning and create independent learners.

Dinham highlights the importance of planning all teaching events including content as well as organisation (Dinham 1989).

Very little feedback exists relating to the application of the above advice. One case study of a school dealing with large numbers does exist. The Portsmouth School of Architecture has completely revised their school structure in recent years (Potts 2000). The school now has vertical units with students from all years working with the same 'studio master'. While the design programmes are run horizontally the students support each other with older students in the vertical unit mentoring younger ones. This new structure appears to have succeeded in absorbing larger student numbers without detrimental effect to the students' learning outcomes.

### **4. THE NOTTINGHAM CASE STUDY**

A study of the practice of studio teaching was carried out last year at the School of the Built Environment, University of Nottingham, which aimed to establish a framework of good practice for dealing with increasing student numbers. This study initiated as a reaction to the predicament the school found itself in, is the beginning of a study focusing on the practicalities and quality issues associated with teaching architecture to large student cohorts.

The School of Built Environment has experienced a sharp increase in student numbers. Student intake in the past four years has increased from approximately 80 to 100 to 160 and then 240. Nottingham is now the largest school of architecture in the UK, twice the size of any other school in the UK. Other schools are also experiencing marked increases in student numbers and are likely to have to consider similar issues to those addressed by this paper in the future.

The school operates by providing an individual tutorial and a group tutorial each week, involving two full time teaching days for each full-time member of academic staff. When this study began, one full time member of academic staff was responsible for groups of up to 45 students assisted by a part time tutor, in addition to offering lecture courses. The school had no intention to make radical changes to the existing organisational structure for teaching studio, but some changes were recognised as necessary in order to cope with large student groups without overloading staff.

The following study was undertaken by five studio tutors of the School of Built Environment as part of the Post Graduate Certificate of Higher Education course run by the University. The aim of the study was to identify teaching issues of importance to the school as a whole and analyse them with the aim of improving current teaching methods.

The study was divided into two phases. The initial phase involved a desktop study of principles and issues affecting studio teaching in architectural education and existing approaches to large student numbers in studio. These issues were discussed among the research group with the aim of formulating a survey questionnaire for circulation among architectural staff to investigate the principal issues highlighted by phase one of the study.

The second phase involved a survey of all studio staff at the school. The aim of the survey was to establish individuals' opinions on good practice for the organisation of studio teaching in the context of increasing student numbers. The survey was undertaken by means of a questionnaire and a number of informal interviews conducted with the objective of collecting views from experienced teachers on issues affecting the organisation, pedagogy and assessment of studio.

The recommendations resulting from this study were presented to the School and partially implemented for the 2002-03 academic year. The initial effects of the new teaching structure were recorded as part of this study and the overall changes are being monitored for review at the end of the 2002-2003 academic year.

## 5 THE SURVEY

Following from the desk-top study of design studio and teaching organisation, specific issues were identified as being of importance in formulating a structure for studio teaching, which was based on the existing structure but catered for expansion. The issues identified related to pedagogical pragmatics, rather than the merits or otherwise of accepting large numbers. Questions were formulated concerning the following issues:

- size of student groups and relation of sub-group to main year group
- tutorial times, frequency and nature
- crits structure and nature
- marking system to ensure adequate moderation throughout year group
- studio facilities

A questionnaire was designed (refer to appendix for list of questions) and issued to fifteen studio staff members. All questionnaires were completed and returned. The results were analysed and a set of recommendations presented to the School

## 6 RECOMMENDATIONS

The first category of recommendations related to the subdivision of year groups. It was concluded that years should be sub-divided into year groups of no more than 28 students. It was concluded that each year group should be under the control of one full-time and one part-time member of staff who should ideally be a visiting practitioner. On studio days where individual tutorials are required, both full-time and part-time tutors should be present. The *staff to student ratio* would thus be *1:14*. It was suggested that year Group sub-divisions should be based on names alphabetically in the first Year, and *project choice* in the second and third Years, with projects ideally linked to staff interests and research areas. The results of student voting for their project choice should be controlled so as to ensure balanced numbers and ability mix.

With regard to tutorials, it was suggested that students should be given two tutorials per week. At certain stages of projects, e.g. introductory stages or with less complicated briefs, one of these tutorials can be conducted in groups. Beyond the introductory stages of a design project, both these tutorials should be individual tutorials. Tutorial days should be based on *maximum 7.0 hours contact time* (420 mins). With a staff to student ratio of 1:28, group tutorials conducted by one member of staff thus allows fifteen minutes per student. With both full and part time tutors present on *individual tutorial days*, a staff to student ratio of 1:14 allows *30 minutes per student*. It was suggested that some individual tutorials should be conducted with other students present to increase learning from each other. Staff recommended that students should receive a minimum of 2 and maximum of 3 tutorial opinions during the duration of a project.

Ideally, there should be three tutors present at all crits; a full-time tutor, a part-time tutor and another tutor fresh to the project. There should be a minimum of 2 tutors present at each crit. These crits should allow for 30 minutes per student. To achieve this minimum time, and a minimum of 2 tutors per panel, an additional two tutors (minimum) need to be present on crit days for each year group of 28 students. It was reinforced that all students should be required to attend other students' crits (including across the years) for greater dissemination of learning. Staff suggested that crits should not be held over more than one day if possible, due to pressures on staff time, space booking across the years etc.

Marking proved a particularly contentious issue among staff with regard to increasing student numbers. There remained a consensus that significant effort should be made to moderate marks across crit groups in a project. Ideally, an optimum number of three tutors should moderate each student's work after the crit, including at least one member who was present at the crit and taking into account the provisional marks given by the tutors in each crit group. Much architectural knowledge remains subjective rather than

objective, and it remains desirable to review each piece of work in an attempt to even-out inconsistencies of judgement. It was suggested that marking should be carried out on the day of the crit or the day after.

At first year level, because projects are common to the whole year, a selection of top, middle and bottom grades for each group should be considered and the marks for the whole group moderated. At second and third year level, because year groups are working on different projects, less moderation of marks should be needed. However consistency of marking across the years needs to be maintained.

Staff suggested that marks should be presented to students as a degree classification i.e. 1<sup>st</sup>, 2.1, 2.2 etc. This gives greater scope for moderation and should serve to mitigate students' preoccupation with grades by eliminating 'plus' and 'minus'. Students should be given written feedback on the content of their crit. Ideally this should be compiled by one of the crit tutors, giving indication of how the objectives of the project have been met. Since this is rarely possible due to lack of time, notes on pro-formas taken by observing students during the crit should be compiled. This feedback should contain no additional indication of grade. It was suggested that student reviewing and marking should be used as learning exercises with regard to particular projects when appropriate.

The questionnaire highlighted particular issues with students' working practices. It was recommended that students should be required to work in studios, with an appropriate environment provided for them. Studio space provision should be based on 80% of the year group. This reflected an optimistic measure of present space uptake in a studio where spaces were provided for 100% of students. It was felt that ideally each studio space should allow for an A1 drawing board, a table for layout space or to carry a lap-top computer, a chair, pin-up space, sufficient lighting (lamps) and sufficient electrical / data / cabling points. Additionally, there should be sufficient communal personal storage, drawing storage and model storage facilities. Computer provision was estimated according to year group, with recommended ratios as follows:

Year 1	1: 4.4
Year 2	1: 4.5
Year 3	1: 3.5
Year 5	1: 2.5
Year 6	1: 2.3.

It was also agreed that student model making space and facilities, and technical equipment e.g. modelscope, data projectors, printers etc, need to be expanded in accordance with increasing numbers. A central printing area with photocopier/ printers was proposed with one technician in charge and present. Access to these facilities also needs to be improved, as does the technical assistance.

The questionnaire requested quantitative responses about levels of resourcing necessary to deal with large numbers of students. Recommendations were therefore formulated with regard to specific pragmatic issues. Their presentation effectively became a series of resource standards, partly determined by an intent to use the document internally within the School and University to state clearly minimum requirements for the effective conduct of design studio.

## **7 APPLICATION OF RECOMMENDATIONS**

The School of Built Environment was issued with recommendations from the study at the end of the 2001-2002 academic year. These have been partially implemented at undergraduate level, where student numbers are currently about 100 in third year, 160 in second year and 240 in first year. The initial effects of adopting these recommendations are outlined below. These are interim observations. The extent and implications of their adoption will be reviewed towards the end of the 2002-2003 academic year with a view to taking necessary action to further reinforce the teaching structure. Whilst these recommendations have been accepted and necessary resources agreed for this academic year, the success of this teaching structure relies on the continuing commitment to resource provision from the School and University.

### **7.1 Sub-dividing year groups**

Staff numbers at undergraduate level have been increased considerably and in year three, a staff student ratio of 1:14 within year sub-groups of 28 has been achieved, in year two, a staff student ratio of 1:22

within unit groups of approximately 30 has been achieved and in year one, the staff student ratio of 1:20 within unit groups of about 40 has been achieved. Attracting full-time staff to the school was found to be difficult and the student staff ratios achieved take into account a considerable number of part-time support staff. As a result in first and second year there are only four and three full-time staff for year groups of over 200 and 160 respectively and the substantial administrative load for this full-time staff remains a problem.

## **7.2 Tutorials**

Having established the desired student staff ratio in year three, it now appears possible to implement the recommendations regarding the frequency and length of tutorials in this year. In year one and two these recommendations are proving difficult to implement consistently.

## **7.3 Crits**

To date promising results have been experienced in respect of the crit process. Staffing numbers have been generally achieved and while time allocation per crit has been in some cases lower than the recommended 30 minutes it was felt that the quality of crits was high. The main issue problem was one of organisation, with crits where the number of panels reviewing in parallel can be as high as eighteen, organisation in respect of man power and space requirements has proved crucial.

## **7.4 Marking**

Marking has proved to be the most problematic area to deal with in as much as the moderation of the work of about 100 to 240 students is virtually impossible. Strict assessment criteria were developed and are being used in year one with the aim to minimise divergence of marking. Only representative moderation takes place at this level. In year two minor projects have been moderated throughout, however this has proved unacceptably time-consuming and alternative methods will be tried. In year three, the level of autonomy across year sub-units has been pushed the furthest, with each unit pursuing completely different design briefs throughout the year. Moderation of marks across different design programmes becomes additionally difficult therefore, it is intended that moderation will take place at the end of the academic year, involving final student presentations and portfolios, as part of the internal / external examiner review process. Marking is still presented to students as a percentage rather than a degree classification.

## **7.5 Studio working**

Studio space is currently provided as per the recommendations, however this is accommodated in temporary buildings and a long term programme for new studio buildings is being developed. Workshop, printing and other technical facilities are being improved and monitored throughout the academic year.

## **8 CONCLUSION**

With increasing pressure from government to increase student numbers most universities and consequently many schools of architecture will sooner or later have to consider how to deal with large cohorts of students.

The study undertaken at Nottingham has highlighted a number of successful pragmatic teaching strategies as well as a number of issues which an architectural academy might consider before adopting a policy of expansion. However, the present study has focussed primarily on immediate issues of resourcing and their relationship to maintenance of the existing pedagogy. A broader examination of intellectual and cultural responses to increasing student numbers has yet to be carried out.

The first month of implementation has already highlighted some limitations that have to be accepted as part of dealing with large student numbers. The amount of organisation required should not be underestimated. Extensive prior organisation is needed at all levels, from room bookings, invitation of critics and the photocopying of briefs to more fundamental and long term strategic direction. Increasing student numbers require additional physical space, additional lecturers and appropriate teaching and assessment methods. These have to be built, employed and developed respectively and these processes

are time-consuming and require forward planning. In Nottingham, many difficulties have been caused by allowing the increase in numbers to precede many of the increases in resource.

Recommendations implemented such as the division of the year groups in sub-groups of 28 students, three critics per crit, enhancement of workshops and technical facilities and allocation of studio space have, however, worked well to date and a complete review at the end of the academic year will hopefully confirm these interim results. But even with a well-structured and organised system, dealing with large numbers allows little scope for tolerance. On a practical level booking a lecture hall for 240 students cannot happen at the last minute, but more importantly, the rigid teaching schedule leaves little scope for providing additional tuition should students require it.

Any programme for expansion needs to be considered and planned carefully. To prepare for such expansion, which may for some schools appear inevitable, there is a need to enhance the architectural academic world's understanding through further studies of studio teaching and teaching of large student numbers. Arguably the most important question, however, remains unanswered. It will take some years for the architectural profession, its clients and colleagues to report back on whether increasing student numbers have changed standards of education.

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