

## **AN INVESTIGATION INTO STUDIO-BASED PEDAGOGY FOR BUILT ENVIRONMENT GRADUATES: A NEW MODEL FOR A NEW CONTEXT**

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### **Abstract**

The democratization of South Africa has necessitated a transformation of the education system, it requires basic curriculum concepts and teaching practices to be rediscovered and, rethought. The process of democratisation of South Africa looks easy and many institutions have addressed the issue with regard to alignment, in terms of the curriculum outer structure or exoskeleton which only refers to modules, credits, levels, and outcomes. It is the classroom practices that remain unchanged in many respects. The purpose of this paper is to investigate the studio pedagogy as a possible new method in the education of Built Environment graduates, to meet the concepts as set out for South African higher education. A mixed method of research was followed, firstly qualitative by means of a literature study and secondly quantitative by means of two structured questionnaires. The findings indicate which current educational methods are used and where these methods are lacking. Studio-based pedagogy is a promising educational method to help students acquire the skills and knowledge to be more effective practioners as set out for South African higher education. This paper presents an investigation into the application of this method as a way to address the gap between education and practice, and help improve the current traditional methods of academic instruction.

**Keywords:** Studio-based pedagogy, Construction education, Curriculum development, Higher education, South Africa

### **1 Introduction**

The South African education policy has contributed to a new context of learning. This has been influenced by many factors, especially globalization of the economy since 1994. Ramdass (2012) identifies skills development as a national concern, South African higher education institutions need to meet the expectations and be responsive to many role players including industry, state and society. These changes have led to the requirement of flexibility, adaptability and innovation not only in curriculum alignment, but importantly to new education and training demands in order to remain competitive (Ramdass, 2012). In essence, education institutions are called to be firstly attentive and secondly responsive to the need of the knowledge economy. Graduates need to become well-developed problem-solving individuals who can adjust their body of knowledge and skills to changing environments. The empirical study tests the perception of the students regarding the current curriculum and identifies gaps within current teaching and learning practices. Relating to the above teachers need to understand teaching methods, how students learn and industry requirements in order to bridge the gap as outlined by the study. The paper proposes the theoretical perspective of the proposed

pedagogy of problem based learning in a studio context that Biggs (1999) refers to as ‘alignment itself!’ as a possible solution. For the purpose of this paper, curriculum does not only refer to content but also to the teaching and learning of the programme of study: outcomes, methods, and assessment form integral parts of the curriculum (McDonald and Van der Horst, 2007).

## 2 Literature Review

### 2.1 New Context: Economic and Policy Responsiveness

The National Plan on Higher Education in South Africa provides the framework, and mechanisms for restructuring the system to achieve the vision and goals for higher education system outlined in the White Paper, A Programme for the Transformation of Higher Education (Department of Education 1997). The goals are summarised as three core concepts namely: curriculum alignment, globalization or internationalization, and quality assurance.

*...high-level skills training: the training and provision of person power to strengthen this country’s enterprises, services and infrastructure. This requires the development of professionals and knowledge workers with globally equivalent skills, but who are socially responsible and conscious of their role in contributing to the national development effort and social transformation...Production, acquisition and application of new knowledge: national growth and competitiveness is dependent on continuous technological improvement and innovation, driven by well-organised, vibrant research and development system which integrates the research and training capacity of higher education with the needs of industry and of social reconstruction (White Paper, 1997).*

In terms of the exoskeleton defined by Jansen in Lange (2011) as the outer structure: modules, credits, levels, and outcomes the process of democratisation of South Africa looks easy as far as the curriculum is concerned. It is the endoskeleton that remains unchanged in many respects. What has been neglected is Section 2 of the National Plan is the production of graduates for both social and economic development within South Africa. The objective can be outlined as ‘to produce graduates with the skills, and competencies to meet the human resources needs of the country’ (Ministry of Education, 2001).

What does ‘globalizing’ the curriculum mean? According to McDonald and Van der Horst (2007) it is a curriculum that is different in three ways namely: content (i.e. what is taught), form (i.e. delivery methods), and structure (i.e. the organization of the learning experiences and content of programmes). Teaching always involves firstly teaching something (content and skills) to someone somewhere (context). According to Jansen in Lange (2011) curriculum should be viewed as an institution, which reiterates the concept that knowledge is not only transmitted through syllabus content, but also in a tangible manner through classroom practices. It can be argued that too many policymakers and educational leaders are focused on traditional assessment approaches rather than answering the question of whether our students are learning what they need to know. If we are to align teaching to higher-level outcomes it is important to start asking the following questions of how it is carried out as well as how understanding develops within the curriculum. The need for globally competitive skills require these students to have firstly well-developed problem-solving skills and to be able to adjust their body of knowledge and skills to changing environments. Higher education focus should shift to providing students with broad, generic and transferable skills in contrast to the current context of specialised knowledge. Furthermore according to Griesel (2002) attributes considered to be most important by employers can be summarised as follows:

- Critical and analytical ability;

- Flexibility and ability to apply knowledge to new situations; and
- Ability to plan and execute tasks independently.

A University education is not just transmission of knowledge to perform a given profession, but should also include attributes such as rational debate and conceptual thinking. Schon rejects the ‘established procedure in professional education of building application upon basic science and theory; he dismissed the notion that professional practice was based on the rigorous application of theoretical knowledge’ (Green and Bonollo, 2003). This paper will argue that the studio-based pedagogy can provide construction professionals with an education in a real life context (Nompunga, 2013).

## **2.2 Studio-based Pedagogy: History**

Educational theory offers five broad models as indicated by Long (2012) namely (1) behaviourist, (2) humanist, (3) cognitivist, (4) activist, and (5) situated learning. Understanding these is essential in assessing the value and potential of studio pedagogy for Quantity Surveyors and Construction Managers. As seen in the data collected our program approaches educating Quantity Surveyors and Construction Managers predominantly from a lecture point of view (behaviourist). Not to mention assessment, also approached by traditional practices of essays and problem-type examinations. The pedagogy of this model can be seen as ‘learning that exists in a traditional didactic format, where the lecturer is seen as the expert in disseminating knowledge’ (Long, 2012), also translating in the lecturer controlling the environment and offering rewards for students predetermined responses. According to the literature reviewed studio pedagogy can be placed in the ‘situated learning theory’ model because learning is centred on a problem or activity and the context becomes key, where learning is different for each student based on their abilities, knowledge and competency (Long, 2012).

It is important to examine the history behind the studio, since this will lead to an understanding of the educational approach that ultimately shapes its delivery and provides a guideline for its implementation. The model discussed in this paper can be seen as based on Plato’s model of teaching, the free exchange of knowledge later known as Platonism. Academia Platonism is a humanistic discourse; a free, sociable and informal means of discussion (Green and Bonollo, 2003). The architecture studio is an adaptation of this and the atelier-based training at the Ecole des Beaux-Arts in 19th Century Paris (Kuhn, 2001), it offers a teaching model which blends the social and technical aspects associated with design and provides interesting possibilities for other technical fields of education.

*Architectural education is based primarily around the design studio as a pivot and gathering point of all knowledge and skill accreted throughout the curriculum (Mostafa and Mostafa, 2010).*

The ‘studio’ is used to describe two concepts, firstly the physical space (the place where learning and teaching takes place) and secondly the mode of engagement (pedagogical strategy). It is based on the historic model as explained of apprenticeship, where the master educates the student (Crowther, 2013). Crowther (2013) refers to the ‘studio’ as a place of learning where the two concepts of physical space and pedagogical activities merge to form one. Ochsner (2000) states that there is potential for the pedagogy of the design studio to have wider application in other disciplines and professions. Architects have been educated through a process that revolves around the ‘studio course’ and this paper explores to apply the studio method of teaching to the education of other allied construction professions such as Quantity Surveying and Project Management.

### **2.3 New Model: Pedagogical Responsiveness**

In a study conducted by Nompunga (2013), third year level Construction Management students at the Cape Peninsula University of Technology were asked to complete an online survey. The data revealed that a professional discipline requires theory to be applied to practice in the classroom setup. Students preferred direct face-to-face teaching which centres around the student rather than a conventional teacher-centred approach which typically focusses on what teachers teach rather than what students learn. Nompunga (2013) confirms this by stating that students do not want to learn basic concepts first and then apply them later on, but rather prefer to be involved in immediate, direct and first hand experiences. Research has also shown that students feel unprepared for their jobs because the integrating of theory learnt at institutions into their professional practice leaves a gap. A study conducted by Dlamini and Fester (2012) argues that students currently being trained are not acceptable for the construction industry which already is challenged by a skills shortage.

Lange (2011) refers to the development of a student into a critical being, persons that can exercise critical reason, critical self-reflection and critical action. In order to educate a critical being we need to provide a space for education where students can become themselves and bring their knowledge to situations (Lange, 2011). Nompunga (2013) encourages a deep approach to learning, this can be summarised as the following: Firstly the teacher should guide the learning process within his or her field of knowledge and secondly select the correct approaches that communicates this knowledge. This can further be summarised as teaching being the process of sharing knowledge to create better understanding (Nompunga, 2013). Assessment plays an important role to simulate the real world of construction. Assessment should encourage students to engage in problems that use and apply knowledge facilitating as discussed above in terms of deep learning approaches.

Chan (2012) advocates the use and growing teaching approach of construction undergraduates as Outcomes Based Teaching and Learning (OBTL). Academics can no longer teach in ways that were appropriate in the past, a paradigm shift has placed the focus on the learner and how to facilitate the best learning outcomes for them (Nompunga, 2013). Teachers should continually learn and adapt their practice to be seen as Dewey (1993) refers to them as ‘teachers as learners’, ‘teachers as researchers’ and ‘teachers as practitioners’. Design studios typically employ the semi-structured learning strategy of experimental learning; particularly, the project (Crowther, 2013) which as discussed above includes aspects of problem-based learning. This form of learning centres on dialogue, beginning with students given a project while tutors/mentors offer feedback weekly. What is the unique value of studio pedagogy in the education of Quantity Surveyors and Project Managers? Firstly its value lies in teaching ‘synthesis,’ ‘learning-by-doing,’ and ‘reflection-in-action’ while also incorporating or exposing the students to ‘real-world problems’ (Long, 2012), further he identifies the following as key learning objectives and contributors to learning of studio courses.

- Teamwork
- Professional socialization
- In-depth problem
- Adapting procedures to real cases
- Field experience

Furthermore, the complex and flexible nature of the architecture studio can be seen to accommodate three types of learning as indicated by Crowther (2013):

- Learning about design (knowledge development);

- Learning to design (development and application of skills); and,
- Learning to become (where learning transforms a student).

### 3 Research Methodology

A mixed method was used, firstly a literature review was done prior to data collection in terms of structured questionnaires. Two structured questionnaires was sent out to groups of students at the University of the Free State. The questionnaire was developed and constructed based on the literature review. It was aimed at assessing the student’s opinion of their learning experience, in terms of preparedness for work, current teaching practices and lecturers. For the purpose of the research conclusions will be made from the data collection in order to establish the gaps in the teaching practices as well as provide possible solutions for implementation.

#### 3.1 Questionnaire construction

Both questionnaires were structured the same, the first part consisting of personal questions and the second of employment details. The third part of the questionnaires required the students to answer questions relating to their education. They had to rate the importance of education practices on a five point Likert scale, graded from one which is least- and five which is most appropriate. There were also open-ended questions where they were required to give their own opinion and respond with views or comments. Table 1 below shows the two sample populations, the response rate was 100%.

**Table 1. Sample population 1 and 2**

Sample 1			Sample 2		
Under Graduate	55	88.7%	Under Graduate	10	19.2%
Degree	7	11.3%	Degree	34	65.4%
Honours	0	0%	Honours	7	13.5%
Other	0	0%	Other	1	1.9%
<b>Total</b>	<b>62</b>	<b>100%</b>	<b>Total</b>	<b>52</b>	<b>100%</b>

### 4 Findings and Discussion

#### 4.1 Important attributes to be prepared for a long term career

When asked to what extent the students practise self-study, the results revealed only 3.8% of students regarded it as important. Vorster (2011) states that the goal of education ought to be to create independent, autonomous learners who take responsibility for their own learning. Improvements as seen in the literature can be achieved by moving toward learner-centred teaching (Vorster, 2011). Firstly the attitudes as well as abilities for this need to be cultivated in our classrooms. Lecturers need to shift the focus more on our students and how we can encourage them to become more independent learners, and this paper aims to show that the possible solution lies in studio-based pedagogy through the literature review and further research of implementation. Students will not be developed if lecturers still, as the data shows take responsibility for their learning. When asked to evaluate the important attributes for a long term career, Table 2 shows the mean score on a scale of 1 to 5, where 1 is the least important and 5 is the most important, 51.6% of the students rated analysis of problems as well as 45.2% creativity as most important.

**Table 2. Important attributes to be prepared for a long term career**

	1	2	3	4	5
Analysis of problems	0	0	9.7	38.7	51.6
Creativity	0	6.5	25.8	24.2	43.5
Application of knowledge	0	1.6	4.8	48.4	45.2
Evaluation of ability	0	0	25.8	40.3	33.9

#### **4.2 Importance of elements in professional development**

When asked to rate the importance of certain elements in terms of professional development, communication (50%) and people skills (46.1%) were rated as most important as indicated in Table 3 below. Toor (2008) supports this when he states that industry requires academia to produce professionals with not only technical but also soft skills as indicated by the data. Toor (2008) states that ‘technical coursework should be complemented with elements of flexible education, and emphasis on soft-skills development.’ The data shows a lack in the education of these soft skills in our current programme. Chan (2012) states that assessment efforts should also be made to involve ‘soft skills’, students should not only be evaluated on content-based knowledge but also on transferable skills which include as shown communication, problem solving, interpersonal relationships and teamwork.

**Table 3. Importance of elements in professional development**

	1	2	3	4	5
Communication	0	0	11.5	38.4	50
People Skills	0	0	15.3	38.4	46.1
Leadership	0	0	30.7	36.5	32.6
Motivation	0	1.9	21.1	51.9	25
Ethics	0	0	5.7	55.7	38.4
Creativity	0	7.69	30.7	48	13.4
Research methods	0	3.8	21.1	67.3	7.6

#### **4.3 The impact of educational elements in terms of knowledge gained**

The techniques used by construction education programs can have an important factor contributing to the type and quality of graduates and the success of these graduates in industry. When asked to indicate the impact of each of the following educational techniques in terms of knowledge gained while enrolled as indicated in Table 4, practical classes (9.6%), site visits (11.5%), group work (1.9%), research projects (0%) and computerised classes (5.7%) were rated as having the least impact. Students were then asked to name which of these elements were inadequately addressed and results reiterate the findings above listing practical classes, computerised classes and site visits. Study material was also found to be 0% but not listed as an inadequacy in the follow up question. The data indicates that the curriculum exoskeleton was not rated as an inadequacy but most of the educational elements that were lacking refers to the endoskeleton as indicated in the literature review. This proves predominant use of traditional assessment practices that cannot adequately test for creativity, reflection and critical thinking as stated by McDonald and Van der Horst (2007). Practices namely practical classes, site visits, group work etc. can have an impact on the qualities mentioned above but are not being implemented as indicated by the data. As indicated above the students have limited learning activities that encourages them to be able to think critically, reflect on problems and apply knowledge or concepts to new problems.

**Table 4. The impact of educational elements in terms of knowledge gained**

	1	2	3	4	5
Practical classes	9.6	11.5	34.6	28.8	15.3
Site Visits	11.5	11.5	21.15	34.6	21.1
Computerised assignments and classes	5.7	9.61	30.7	42.3	11.5
Group Work	1.9	34.6	46.1	15.3	1.9
Research projects	0	7.6	34.6	53.8	3.8
Attending seminars and Conferences	11.5	9.6	30.7	40.3	5.7
Study material	0	13.4	38.4	36.5	11.5

#### ***4.4 Studio-based pedagogy solutions addressing gaps in current educating practices of Built Environment graduates***

The studio-based pedagogy addresses these issues above as seen in Table 5 below, in the following ways. Generally studios and students who participate in them, possess a set of common characteristics as summarised by Jones et al (1994):

*Engaged learners are responsible for their own learning. These students are self-regulated and able to define their own learning goals and evaluate their own achievement. They are also energized by their learning; their joy of learning leads to a lifelong passion for solving problems, understanding, and taking the next step in their thinking. These learners are strategic in that they know how to learn and are able to transfer knowledge to solve problems creatively. Engaged learning also involves being collaborative – that is, valuing and having the skills to work with others.*

Studios traditionally begin with an open-ended problem that gives students some choice in the direction but leaves a certain area for creativity. The problem takes account current issues and deals with ‘real world and client’ scenarios. The studio is a place where the project is executed and it should reflect professional practice (Green and Bonollo, 2008), he continues to state that this should not be isolated but rather complementary to other modules. This can and should include structured conversations with outside experts with knowledge of the problem, which comes back to the importance of industry development. Assessment usually takes place in the form of a critique, derived from architecture and fine art teaching. This is central to the studio and can also be termed review, assessment or evaluation. The studio also encourages a high degree of contact between the instructor and the student which again contribute to the development of soft skills such as communication and people skills. According to Long (2012) the students work is regarded as iterative, where the problem and the solution of the problem is revisited repeatedly. Knowledge is socially constructed and thus group work is crucial to developing a student’s knowledge base and people skills. Studios always include a degree of group assignments, as well as attempts to work across disciplines and promote collaboration. Studio courses teaches ‘practice’ for which there is no substitute pedagogy (Long, 2012). The next stage of the evolution, as stated by Long (2012) include questions such as how to engage technology and social media in new ways to teach within the studio setting. Studios as indicated by Long (2012) should be places where,

*...creativity can be taught, where theory can be tested, where research can be conducted, where outreach and service activities can be deployed, and where different modes of practice can be explored.*

**Table 5. Studio-based pedagogy solutions addressing gaps in current educating practices of Built Environment graduates**

Identified gap	Studio-based pedagogy solutions
Self-study	Student-centered learning
Analysis of problems	Critical reflection
Creativity	Open-ended problem Iterative work pattern
Communication	Critique – Formal and Informal Contact between instructor and student
People skills	Social environment Professional socialization Present work to peers and instructor for review and discussion
Group work	Multi-disciplinary and collaborative team assignments
Practical classes	Learning by doing
Site visits	Industry involvement- engaging experts
Research projects	Precedent Case studies
Computerised classes	Further research into applicable uses of technology (E-learning)

## 5 Conclusion and Further Research

It is time that academics not only address the curriculum as content but also in terms of how we teach to address what the students need to learn. The data suggest that a conventional teaching approach is still followed which typically only focus on what teachers teach and not how students learn, thus the teaching and learning environment need to change. There is definite potential as seen in the literature review for the pedagogy of the design studio to have a wider application on unrelated or related disciplines. Long (2012) states that: “Experience-based learning – including studios and internships – Is the most appropriate approach of teaching practice.” As shown teaching should be student-centred rather than teacher-centred to minimise and overcome the gaps in construction graduates education. This research should now be implemented in the department as a pilot or case study and aid the development of a studio-based module to assist current modules offered.

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