Strategic Timing

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Approximately ninety new students are accepted annually into the undergraduate Architecture programme of the University of the Witwatersrand's School of Architecture and Planning in Johannesburg. They come from a diverse range of backgrounds in terms of schooling and experience of architecture or urban living; cultural and religious contexts, age and language. In the Faculty of Engineering and the Built Environment, as many as 50% of the students in any particular course are the first generation to attend university (ADU, 2018), and in the Architecture class there are usually four to five students who have previously studied for another degree (Janse van Rensburg, 2015). Students come from diverse socio-economic contexts, at both ends of the scale. In South Africa the gap between educational expectations and teaching approaches at secondary school and university level has widened to the extent that university pass rates have dropped in recent years and a Council on Higher Education proposal for undergraduate curriculum reform recommended the introduction of an additional generic bridging year at universities (Scott et al., 2013), which has not been implemented to date. In a field such as Architecture, where the expected types of learning are situated in the upper levels of Bloom's taxonomy of learning, this poses additional teaching challenges.

This paper is a summary of the timing strategies developed during a five-year doctoral research study in the first-year Design studio on how to facilitate successful outcomes for all students (Janse van Rensburg, 2015). The starting point for the study was the observed phenomenon that when students grouped into "comfort zone" working groups with students from similar backgrounds, there was a high differential in learning success between groups, because of more limited peer learning. Over three action research cycles in which many different approaches and interventions were investigated, it was found that the greatest positive impact on learning success came not from any single intervention, but from the integration of various mutually-reinforcing approaches and interventions. The primary impact came from the strategic timing of these interventions in relation to each other, and to student development.

Since there are generally many more applicants to study Architecture than can be accommodated, the School has developed a selection system based on the sum of three equally weighted scores: (1) for a selection exercise, which explores creative and spatial aptitude; (2) an interview, which primarily evaluates attitude and (3) an academic score based on performance at the end of secondary school. The aim is to identify applicants who have the potential to succeed in the BAS degree, without discriminating against applicants who have not had opportunities for formal art training, or exposure to urban environments (Janse van Rensburg, 2015). In each category, applicants who do not meet the fundamental prerequisites are eliminated, while the remaining contenders are ranked according the combined selection score. Places are filled on this basis.

The study was primarily qualitative, but it was triangulated using quantitative results. Although selection score evaluations are not always consistent, there was still an identified positive statistical correlation between students' selection scores and first year Design marks which could be used as a benchmark when comparing students' academic performance in relation to their selection scores. At the beginning of the study there was a 18% differential in this relationship between Black students, with the highest ratio of first-generation rural students, and White students who had the highest ratio of private schooling, architectural experience and academic family histories. By the end of the study, when strategic timing of interventions had been established, this had shrunk to 3%. In practice, this meant that students with similar selection scores were performing within the same range, irrespective of background (Janse van Rensburg, 2015).

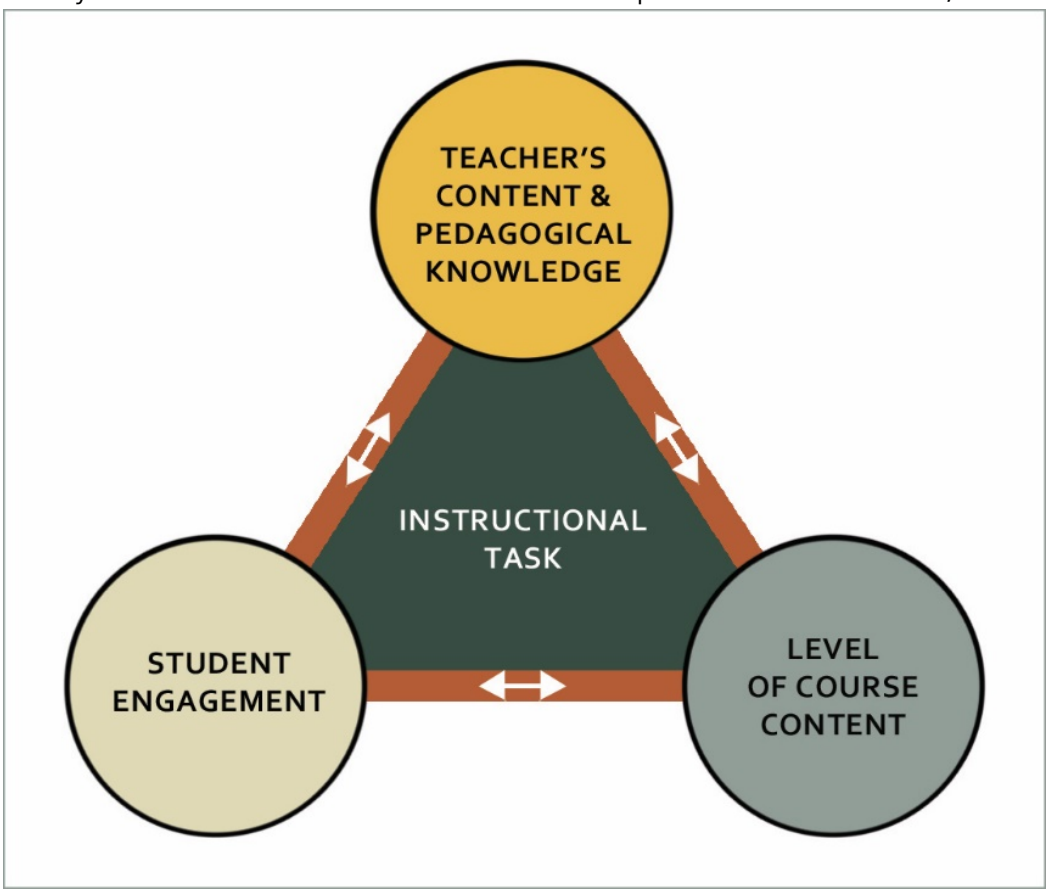

Fig 1. Instructional Core Model (City, Elmore, Fiarman & Teitel: 2009)

According to City, Elmore, Fiarmann and Teitel's Instructional Core theory (2009), learning happens in and is measured in the instructional task. Quality of learning is determined by the student engagement, teacher knowledge and skill and curriculum content. To produce an improvement in learning, all three of these factors need to be addressed in relation to each other. The most important aspect identified in the study group was student engagement, which in studio contexts translated into active engagement with critiques, with clear consequences in terms of design learning (Janse van Rensburg, 2015).

Student confidence or diffidence to engage with learning can be attributed to many different factors, but a fundamental starting point is college readiness, as defined by Conley, who summarises it under four main headings of key cognitive capabilities, key content, responsible academic behaviours and contextual skills and awareness (Conley, 2008). Key cognitive strategies include problem formulation and problem solving, research, reasoning, argumentation and proof and interpretation. Architectural key content includes a sound foundation in Mathematics and preferably also Physics, a good working knowledge of the language of instruction, which is spoken and written English, as well as observation and drawings skills.

Conley (2008) describes Academic behaviours as self-awareness, self-monitoring and self-control of processes and actions necessary for academic success, including notably time management, in architecture. Contextual skills and awareness enable a student to negotiate the academic terrain. These skills range from knowing how to access the available, to understanding one's learning responsibilities in higher education, to understanding the policies and systems within which one needs to operate. In the South African context, these skills which are required in tertiary learning are often not all present when students start university. This should ideally be addressed immediately to reduce the differential in learning pace between more and less prepared students (Janse van Rensburg, 2015). The combination of these skills, combined with dominant literacy and a dominant voice, enables a student to engage effectively with architectural learning, and therefore a backlog in these skills needs to be addressed by setting educational tasks and providing teaching and content that enables students to learn academic and contextual skills.

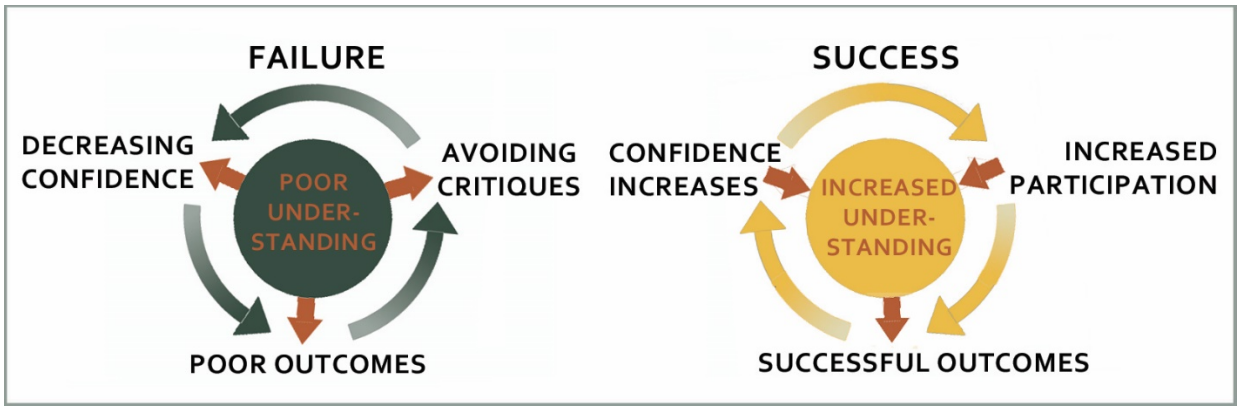

Fig 2 Spirals of Failure and Success

Peer learning in the studio is one of the richest resources available to students in terms of addressing both academic and architectural learning, but this latent potential is only activated when students move outside their social comfort zones and start to interact with peers with different skills and experiences. At the same time, social learning across diversity is an essential learning outcome for professionals who will be designing for a diversity of clients and users throughout their careers.

To effectively facilitate successful architectural learning, it is therefore necessary to design educational tasks that simultaneously address learning outcomes on personal, social, academic and architectural levels, set goals and provide content at all these levels, while the teacher must approach teaching with the same multivalency. Until some academic and architectural confidence has been established in beginning design students, social and personal engagement is the most accessible entry point into this triangle of learning, and the extension of City et al's model proposed in my study starts to work on all four levels, with greater emphasis on personal and social learning at the beginning of the year, moving into academic learning early on and expanding the depth of architectural learning as the year progresses.

The strategic sequencing of educational tasks to establish foundations that can support architectural learning before that learning is required, becomes critically important. The aim can be defined as follows, to

1. strategically structure the sequence of learning in first year so that students first establish themselves socially as individuals before academic comparisons can be made
2. introduce students to the university context and learn contextual skills as a by-product of informal, social activities so that these are established before they are academically required
3. throw students into group activities with diverse group members in contexts that are new and challenging to all, establishing relationships that are not based on previous experiences
4. teach academic skills by embedding this learning in primary vocational assignments
5. provide moments of reflection and perspective where students can see and celebrate their progress
6. allow teachers to gradually withdraw social scaffolding as peer support and learning networks develop in the studio and engagement becomes students' own responsibility.

Fig 3 Expanded Instructional Core Model

In the final iteration of the study the strategic sequence was structured as follows:

1.First two weeks: Orientation programme before formal classes start: social and contextual grounding

2.First teaching quarter: Establishing necessary skills defining the architectural field
safe learning in group projects – picking up clues and peer learning

3.Personal interviews with all students to confirm choice of study; discuss challenges and strategies to address them

4.Second teaching quarter: Applying the skills that have been explored in design projects
Encouraging experimentationand exploration
Scaffolded individual assignments supported by guided group exploration
Structured sequenced subdivision of assignments into bite-sized outcomes

5.Mid-year oral review of all work to date – formative feedback on learning outcomes, not for marks

6.Four-week vacation with skill-building take-home exercises where students require support

7.Start the next teaching semester with a best-work exhibition to showcase what has been achieved in a semester

8.Second teaching semester: Integrating different established skills and understandings into more complex projects; Less structured project sequences; larger chunks of outcomes; Lessening scaffolding; Exploring and presenting individual identity in projects – learning from diversity

9.Final oral assessment of students' understandings and whether they have met the learning outcomes for the year, in relation to the work they produced.

The academic orientation programme that was developed for Achitecture and Planning students together ran during the general university orientation week and included the first week of the first teaching block. It consisted of excursions, light-hearted group competitions and social events, introductions to staff and resources, talks by professionals in the field and space-making exercises in studio. Activities were designed to address learning on the following levels:

PERSONAL	SOCIAL	ACADEMIC	ARCHITECTURAL
briefing: available help & resources; importance of real identity; sustainable survival; introduction to student mentors	mix & meet opportunities establishing studio groups; alternative values to cultural capital challenging inter-nalised constructs & preconceived ideas	**briefing:** university rules; knowledge construction; principles of learning; course structure academic facili-ties & support introduction to academic skills	The profession & the field Excursions show-Ing Context & practice; Field-specific skills And ways of documenting

Examples of activities included an "amazing race" in which students were randomly grouped into teams of six, which had to find their way around campus, addressing challenges that required team work, creative problem-solving, a variety of non-academic skills and put everyone into unfamiliar situations. One challenge was to find a way for the whole team to cross the pond in front of the Architecture building without getting wet and without leaving traces behind, or to pass an egg (unbroken) from team member to team member down the spiral staircase without using their hands.

Fig 4 Amazing Race event at Orientation Week – 2014

There was another race in which teams of two had to divide up and each find a special place on campus, draw a map with graphic instructions on how to get there and then swop maps. Each contestant had to use the map to find that place and collect evidence they had been there. The first team to both return, having accomplished this successfully, won. The subsequent discussion was on the clarity of the instructions, and all and the maps were exhibited.

Walks and excursions included a metropolitan bus tour through different, unfamiliar parts of the city in which students were given some historical context, had to observe and journal. Afterwards they had to identify the two words that they thought best described the identity of Johannesburg and then make posters graphically exploring the full meaning of these words. They were also given two very different literary descriptions of one of the places visited to read, critically analyse and comment on afterwards.

These post-excursion projects formed their first short individual assignments when the teaching quarter commenced, giving lecturers some indication of students' graphic and literary skill sets and the level at which tutorials were to be pitched before moving into group assignments.

The first teaching quarter activities addressed the following outcomes:

PERSONAL	SOCIAL	ACADEMIC	ARCHITECTURAL
students present own id establishing equal value of different cultures personal support from student mentors	facilitating group discussions projects with group interactions exposure to diverse cultures establish class feedback & respond to it	practicing skills learned in orientation, embedded in course work language & writing skills; critical thinking	exposure to urban diversity introduce basic spatial concepts; experiential learning architectural vocab basic knowledge with diverse cultural examples

An example of embeded skills training was the critical writing course, in which students had a weekly tutorial in which they examined literature on the city of Johannnesburg as examples of good writing, learning basic writing constructs from these examples. They then practiced their writing skills in short assignments based in Design or History courses (e.g. writing a well-structured paragraph explaining their design concepts) on which they received feedback from writing tutors. This intervention is fully discussed in an article by Mania, Bird and Janse van Rensburg (2017) in the South African Journal for Higher Education.

A design project which was ideally placed at the end of the first quarter was the design of a "memory box", an 18 cm cubed container to meaningfully exhibit small objects that hold significant personal memories for students. This became a spatial self-portrait at 1:1 scale, spatially exploring relationships between memories and the dynamics of hiding and revealing. Students produced this during the mid-term break when many of them went home (Janse van Rensburg, 2015). This provided a reflection point for self-definition before starting on more individual design projects, but above all it gave an opportunity for all students to present their narratives to each other and to teachers, establishing an awareness of the richness of diversity represented in the class, an understanding of cultural contexts, a respect for the insights, skills and achievemnets that others bring into the studio. The project also broke through students' resistance to vulnerability in critiques, estabishing a good basis for peer learning.

Fig 5 Examples of the student Memory Box project

This was followed by personal progress interviews with students, which in most cases confirmed teacher-student relationships of concern, facilitating future communication and engagement. This was the cue for a class discussion on time management strategies before students were ready to launch into full-blown architectural learning. The second quarter addressed the following learning:

PERSONAL	SOCIAL	ACADEMIC	ARCHITECTURAL
listen to students support/refer re personal challenges open door for discussions	constant feedback from class reps on group experience exposed to wider activities & discourse	personal advice on academic skills / strategies	add in lectures on knowledge gaps tutorials on lacking skills feedback to class in lectures on generic issues pro-actively connecting skills, knowledge & practice; Iterating skills

By the end of this first semester, many students were exhausted after hitherto-unknown levels of academic engagement combined with the demands of adaptating to a new environment. There was a one-month vacation which provided an opportunity for recovery, and for students who were struggling with drawing skills or lack of architectural vocabulary to establish this gently bit frimly with short, daily exercises.

By the time students returned for the second semester they had generally gained some perspective on what they had achieved and had regained their confidence and energy. It was then the right time to launch into new challenges, integrating and consolidating what has been established. This addressed the following agendas:

PERSONAL	SOCIAL	ACADEMIC	ARCHITECTURAL
personal warnings & recovery strategies to underperfornng students	Exhibition of sem1 work	Academic skills Established; Introduction of Research & review Scaffolding lessened	Basic content Complete; Application Discussed in crits

The final assessment for the year examined whether students had met the prescribed learning outcomes for the year. This was an oral examination in addition to the continuous assessment of design projects during the year, which gave an opportunity to confirm students' readiness for the next year of study. A student who started with low levels of college readiness may have struggled to catch up for much of the year, with resulting low marks for projects. If however, she achieved all the required

learning outcomes by the last project, the final assessment could tip the balance and allow her to proceed to second year. We also encountered cases of students who showed great growth during first year without catching up enough to meet all the outcomes. When they were encouraged to recognise their progress and to view repeating the year as an opportunity to become proficient rather than merely adequate. They often blossomed to their full potential and became strong students.

The strategic timing model developed in this study facilitated optimal development in students who chose to engage with learning, allowing the majority of students who started the year with learning deficits to catch up sufficiently to proceed successfully with the course and to graduate, even if this required the repetition of first-year. Once students had acquired new skills, approaches to learning and the confidence to engage constructively, they generally continued with their studies successfully. We also found that the diverse social relationships and peer learning that had been established in studios were valued and these remained a positive factor in students' learning in subsequent years (Janse van Rensburg, 2015). The groups which established the strongest and most diverse social networks continued to produce the best designs.

NOTES

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All figures, photographs and diagrams are the work of the author and were originally produced for her PhD thesis (Janse van Rensburg, 2015).

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