

CULTIVATING SUSTAINABLE THINKING THROUGH EMPLOYING A STUDENT-CENTERED LEARNING APPROACH

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Abstract

In order to save both the planet and the human race, society needs to take action and adopt sustainable practices and approaches. The embedded modes of operations and encultured human behavioral patterns are under attack and radical changes are required, to ensure a future that provides sustainable living conditions. Through employing various teaching and learning strategies, educators aim to convert the student's approach and encourage personal awareness that would stimulate responsible sustainability thinking and design. This paper explains how behavioral patterns can be changed through our teaching and learning approach thus contributing towards an environmentally responsible design culture and society.

The paper will reflect on a green design project, introduced to third year interior design students over the past three years. This project aimed to fulfill three objectives – inform students of the sustainability agenda, promote environmentally responsible actions and encourage sustainable thinking practices in design. The teaching and learning strategy employed for the project, focused on a student-centered approach. This approach was considered most suited since it aimed to change or transform not only the student's daily behavioral patterns but also the attitude of the community in which they operate as citizens. This response was possible if the students could experience a deeper learning process, personal growth, a degree of flexibility and an opportunity for personal reflection.

The paper will include feedback from the students and describe the wider impact that the project had on the immediate student and university community. The critical reflection will further discuss both successes and shortcomings of the project and contemplate the project's contributions to shaping a young designer's understanding, actions and design approach.

Keywords: Sustainable design, student-centered learning, sustainable self

Introduction

Over the past 15 years I have noticed two prominent global paradigm shifts that have influenced not only my teaching and learning practices but also the approach towards my community and environment. The first paradigm shift that I refer to in this paper is the call for society to take action against the human inflicted destruction of our planet and depletion of our natural resources. The citizens of planet earth are warned daily against the dire consequences of our irresponsible actions which have already resulted in global warming, extinction of species and a reduction in food sources. The second paradigm shift relates to a radical change in approach towards education and encourages a change from a teacher-centered to a student-centered learning environment. This shift changes the role of the teacher from being the center of knowledge, controlling the student's access to information, to the person that facilitates learning and assists the student in constructing knowledge. Both paradigm shifts demand change at various levels within our societal structures and requires a radical change from the traditional, accepted norms towards embracing and adopting new practices that will alter established patterns.

In this paper I have reflected on the teaching and learning practices that I adopted to incorporate the changes requested by both paradigm shifts in a higher education learning environment. In particular, focus is placed on a recycle monitoring project presented to third year Interior Design students. This project has been presented for three consecutive years and it is therefore possible to reflect over a period of time, on the outcomes delivered through the project. The main research question that the paper aims to answer through the reflection is: How does the student-centered teaching and learning process contribute towards assisting students to be self-motivated responsible sustainable designers?

Research Methodology

The paper utilises a combination of primary and secondary data sources. An investigation into published data assisted in providing existing theories, models and practices that pertain to sustainable design and student-centered teaching and learning. Feedback was obtained through presenting a research questionnaire to students that took part in the Recycle Audit Project in 2012 and 2013. The data is collated and the findings are presented in this paper. The paper further includes the first person voice of the researcher, who was also the facilitator of the project. These reflections aim to enrich the content of the paper through including personal observations and explanations of critical decisions that were made during the teaching and learning process. Due to the author's involvement in the projects it is not possible to exclude personal opinion, specifically in the critical reflection of the project.

Towards a sustainable future

Paradigm shift to environmental responsibility

The drive towards a sustainable future for all emerged amongst environmental activists in the early 1960s. Margolin (2007:5) indicates that these activists proclaimed that the Earth is the collective responsibility of all human beings and that everyone should be involved in combating the abuse and neglect. In 1996, Wackernagel and Rees (1996:125) warned that extensive evidence had determined that the world was in a state of "overshoot" which indicates that humanity's ecological footprint had exceeded the global carrying capacity of the Earth. The continuous warnings and scientific evidence encouraged people across the globe to embrace a paradigm shift which takes human beings from being environmentally irresponsible to environmentally responsible. Jones (2008:5) maintains that this paradigm shift is "the acceptance by the majority of people in a changed belief, attitude, or way of doing things, a fundamental change in people's worldview".

The ecological footprinting calculation estimates that South Africa's footprint is 4,02 hectares per person (South Africa, 2008:16). Footprinting is an accounting tool that measures how much biologically productive land is required to support the living standards of an individual, a city or country. The World Wildlife Fund estimates that the global fair share is 1,8 hectares per person - if everyone was to live within the carrying capacity of the planet's ecosystems. In relation to the South African value it means that the world "would need two planets if everyone lived like the average South African" (South Africa, 2008:16). The high footprinting calculation indicates that it is of importance that sustainable practices be considered and integrated at various levels and this paper describes one project that aims to contribute to a change in mind-set and thinking amongst Interior Design students. As a result, the levels of integration that are targeted with the project commence with the individual (student), then student community (class) and thereafter the external community in which the student functions. These various levels are discussed in the paper.

A personal approach towards sustainable education

Paul Murray (2011) argues that change towards a sustainable future commence with an attitude change within each individual on this planet. Murray (2011:ix) observed through his investigation in sustainability that although humanity is aware of sustainability, understands the consequences and is well informed about actions to take then – however we are not changing as people. The author included his personal attitude and approach in his observation. Through introspection the author discovered that as an academic, he approached sustainability as a ‘professional issue’ and his professional experience has barely influenced his personal choice and practices. This realisation had a profound impact on his research focus and through a United Kingdom (UK) funding initiative he developed, over a period of five years, teaching, learning and training techniques that could engage people at a personal level with what he refers to as “the biggest issue of our time” (Murray 2011:x).

This author and curriculum developer encourages individuals to think and reflect deeply on the role that we as individuals should perform in the sustainability agenda. He disagrees with the general focus in society that requests humanity to save the planet, in his opinion this is the wrong message. Murray (2011:1) states firmly “[I]t is not the world that needs saving but us;...to save ourselves we need to embrace fundamental change.” In his opinion human behaviour change starts with the individual and our focus and expectations should not only be invested in institutions, business or governments. Murray (2011:22-23) therefore promotes six attributes or qualities that could assist individuals to move towards a sustainable self. These are: awareness, motivation, empowerment, knowledge, skilful means and practice and are presented in Figure 1 below.



Figure 1: The six attributes for sustainable living (Murray 2011:23)

Murray (2011:22) acknowledges that it is not possible to accept new ways of thinking suddenly, but “they can be cultivated over time if we engage constructively with our internal drivers and mental capabilities”. The role of the educator, facilitating the sustainability teaching and learning process, is therefore not only to present knowledge and develop skills that could inform sustainable practices. A deeper level of approach is required that include; promoting awareness, motivating a deep intention to act sustainably, foster empowering beliefs and promote wise application of knowledge and skill. Murray (2011) explains that this can only be achieved if students recognize the connections between their core values and sustainable behaviour which in turn create conscious awareness on altering our automatic responses and behaviour. Once students transform their self-limiting beliefs they will be empowered to override internal barriers to change. In order to obtain deeper levels of learning and change at an individual level it is therefore argued in this paper that it is essential to employ a

teaching and learning strategy that will assist the student to experience personal growth and possible change whilst also cultivating sustainable thinking. The student-centered learning approach was identified as a suitable strategy and a brief overview is presented of this approach.

Employing a student-centered approach

A student-centred teaching and learning paradigm

Roberto Di Napoli (2004) developed an education guide for the University of Westminster in which he explains the difference between the student-centered and traditional teacher-centered approaches. Di Napoli (2004:2) explains that in the traditional teacher-centered approach the teacher serves as the centre of knowledge and therefore controls the student's access to information. Students are presented with abstract facts or concepts, figures and formulas that are memorised and assessed through conducting exams. Information and data is presented primarily by the teacher and this approach seldom presents the opportunity for students to translate information into knowledge or include personal development in the learning approach.

Di Nappoli (2004: 3) explains that the role of the teacher changes in the student-centered approach, since the teacher acts as a facilitator and his/her role is to assist the student in accessing and processing information. The student has access to multiple sources of information (e.g. online databases and community members) and they solve problem/tasks by utilising these resources. The student-centered syllabi is not only constructed around facts but presents students with the opportunity to engage in the process of learning and therefore construct meaning through talking, listening, writing, reading and reflecting on themes, concept, ideas and issues. Group work and group interaction therefore becomes an important component in the teaching and learning approach.

Bonk and Cunningham (1998:28) however also acknowledge the impact of technology in the introduction of alternative teaching and learning approaches. These authors explain that technology has become increasing interactive whilst the cost of internet connection is rapidly declining, making it affordable for students to have easy access to complex information networks. Bonk and Cunningham (1998:26) identify that "vast resources at our fingertips are restructuring the way we humans work, live, learn, and generally interact". It is therefore impossible to ignore the technological changes and the influence that these changes have on teaching and learning processes and learning environments. Bonk and Cunningham, 1998:28 explain that the traditional teacher-centered model is influenced by the technological changes and alternative models of instruction, such as the student-centered, constructivist and sociocultural approaches are required to accommodate the changing learning environment. These authors further indicate that the teaching and learning challenges that are associated with individual rather than group development could be addressed through the student-centered approach. It could enable educators to incorporate and accommodate the student's linguistic, cultural and social backgrounds in the teaching and learning process.

Student centered learning: class sessions and group project

In this section of the paper a thorough explanation is presented of the third year project that employs a student-centered learning approach. The student centered learning approach does not only aim to facilitate learning but also to encourage personal and group development as already explained in this paper. The project is developed to address one aspect of sustainable design which is, recycling. The concept of sustainability is introduced to the students through using a combination of contact sessions (almost six hours), execution of the group recycling audit project as well as a class presentation.

Class contact sessions

The principles, theories and concepts that relate to sustainability are introduced to students during class sessions. A PowerPoint presentation is used to guide the class discussion. The visual presentation includes images, graphs and statistics that are relevant to the topic. It is important for me, as the facilitator of this teaching and learning process, to focus on the following topics rather than overemphasise definitions and principles;

- Inform students of the dilemma of the worldwide sustainability problem without placing overt attention on doomsday and end-of-the-world theories.
- Discuss the concept of sustainable responsibility and present practical examples that explain the everyday contributions of individuals in society.
- Introduce the concept of “overshoot” and discuss South Africa’s ecological footprinting in relation to countries such as America, India and Denmark.
- Explain the concept “green at heart” and show examples of “Green at Heart” initiatives that are available in South Africa.
- Discuss the role of the Green Building Council of South Africa and the Green Star evaluation framework.

The contact sessions employ the student-centred teaching and learning process and aim to elicit interest in the topic and determine the student’s general knowledge and understanding of sustainability. As the facilitator, I present questions to the students and I guide the discussion through reflecting on answers provided by the students. The discussion commences with questions such as:

- Do you think that human beings have a negative impact on the planet?
- Why do scientists predict that we will experience drastic global warming?
- Who are the people that can make a contribution to a sustainable future?

The discussion is guided by presenting images that show the students the impact of global warming, the overshoot statistics of different countries and positive outcomes of intervention employed by sustainable thinkers.

Recycling audit project

The Recycling Audit project is a group project and enables students to gain first-hand experience in employing basic quantitative and qualitative research techniques, whilst conducting an audit of a recycling station located on the university campus. The execution of the project takes place over a six week period and the class sessions are offered parallel to the execution of the project. Students are divided into groups of their choice and are requested to identify a group leader in each group.

The project presents the students the opportunity to observe their immediate environment and continue their learning experience through reflecting on their campus environment. The facilitator allocates a recycling station to each group and presents the project expectations and outcome in a written brief that is discussed during the class sessions. The students are required to document the usage of the recycling station daily at two hour intervals over a five day period between 08h00 to 16h00. The groups monitor the type of waste that is recycled, peak recycling periods, bin cleaning periods and any behavioural patterns of people using the recycling station.

In addition to the audit, each group member conducts an open-ended interview with a student that uses the identified recycling station. The interview process adheres to ethical requirements and all participants sign an informant's consent form prior to the interview. The projects brief further requires of students to investigate questions relating to sustainability. These questions focus on the theory and principles of sustainability, advantages of recycling and a critical review of the sustainability situation in South Africa. The final report therefore comprises; the consolidated audit results, audit observations sheets, completed interviews sheets, informant's consent forms and an investigation into the theoretical component.

Students' project feedback

The outcomes of a qualitative questionnaire, which aimed to obtain project feedback from the students, resulted in the formulation of the findings as well as Table 1 and 2, presented in this paper.

The questionnaire was presented to 11 students that participated in the Recycling Audit project in 2012 and 23 students in 2013. Student participation, calculated over a two year period, is as follows;

- Class of 2013 - 25 students out of a class of 30 students (83 per cent completed a questionnaire)
- Class of 2012 - 11 students out of a class of 23 students (48 per cent completed a questionnaire)

The findings therefore reflect the opinion of 68% of students that took part in the project over a two year period.

Personal value of the project

Three themes were explored in the questionnaire and each theme was presented in a separate question. The first question asked students if the project was of personal value to them. The majority of students (89%) answered yes to this question. The main aim of the questionnaire was to identify if the project assisted students in transforming their thinking and approach towards sustainability. Paul Murray's (2011) six attributes were used as a reference to match the answers provided by students with the attributes that move individuals towards a conscious sustainable self. Table 1 below, lists the categories that were identified in the first question as well as the number of observations identified in each category;

Table 1: Student feedback identifying the value of the project

Feedback categories explaining the value of the project	Number of observations
Made me more aware of recycling/sustainability/environment	12
Became more aware of the actions of people around me	8
Gained knowledge about the sustainability	3
Learnt more about recycling and/or importance thereof	11
Sparked interest to take action	1
Important to teach other people about recycling/sustainability	2
Showed me how I/community can change to make a contribution/difference	4
Motivated me to change my behavior/ contribute to a sustainable future	2
Enabled me to put into practice what I learnt	3

Table 1 shows that the students' feedback presented a wide range of answers that ranged from gaining awareness of the sustainability problem to the need to take action and contribute to solving the problem. The majority of students identified that the project increased their awareness of sustainability, recycling, their

immediate environment and also the impact of the actions of people around them. The second highest observation count indicated that students gained knowledge of sustainability, recycling and the importance of recycling. The project therefore contributed mostly towards two attributes; awareness and knowledge. The remaining four attributes, motivation, practice, empowerment and skilful means, were evident - but to a far lesser degree than the first two attributes.

Four students (11 per cent) did not consider the project of any value. One of the four students considered it as unnecessary to take part in recycling; "People at the dump sorts the rubbish and makes money of it" (Respondent 35). Another student explains that her behaviour remained unchanged "My schedule/pattern did not change much prior and after the assignment" (Respondent 11).

Cultivating change in behaviour

The second question aimed to focus on the individual's ability to change or incorporate a new approach towards sustainability in their everyday existence as an individual and/or as a member of a community. Four questions were presented to the students and the outcome is presented in Table 2.

Table 2: Personal behavioural change in recycling patterns

Questions relating to change in recycling behaviour		Yes	No
1	Did you recycle waste at home prior to the execution of the project?	44%	56%
2	If you answered NO in previous question, did you start to recycle waste after you completed the project?	65%	35%
3	Did you share the importance of recycling waste with family/friends or fellow students after you completed the project?	81%	19%
4	Did the project encourage you to improve your contributions to a sustainable future?	100%	0%

Table 2 indicates that less than 56 per cent of the students did not recycle waste at home and that the project encouraged a change in recycling behavior for 65% of these students. A surprising finding identified through the feedback was that 81% shared the importance of recycling waste with their family or friends and the project encouraged all the participants to improve their contributions to a sustainable future. The following responses describe some of the actions and contributions that were identified in the questionnaires;

"I am becoming more actively involved in recycling initiatives after the audit" (Respondent 17).

"I have applied principles of sustainability in my own home and started researching more about how I can integrate it further into my design" (Respondent 11).

"I am more willing to go out of my way to throw rubbish in the correct recycling bin, especially at varsity because many recycling bins are available. Before I would just throw it in the general bin" (Respondent 22).

"[T]he project showed me that the little contribution that I can make actually plays a huge role in preserving our planet" (Respondent 7).

Project improvement suggestions

The third question requested students to present recommendations in relation to the Recycling Audit project. An important and valuable suggestion was presented by Respondent 4. This student suggested that the word "waste" should be changed to "recycling material", because the word has an incorrect connotation and refers to material that is not of value. The student explained that "everything disposed can contribute to a new product" (Respondent 4). The knowledge and insight that was gained from the project provided this student

with insight to critically reflect at a deeper meaningful level. This observation addresses the core of the waste recycling problem and shift in thinking paradigm required to incorporate sustainable practices. In addition, this student also presented the following question “Why do we still have general waste?” This observation identifies that the student fully grasps the concept of recycling and considers a general waste bin on campus to defy the objectives of recycling stations on campus.

A number of students emphasized the value of the understanding and awareness that they gained into recycling and consider it of importance to share the project with the wider student community. The following statements explain these recommendations;

“Incorporate a recycling project across the university during Green Week” (Respondent 12).

“More people (students) should be made aware of the recycling bins. I did not use them before this project because I was unaware of their particular use” (Respondent 21).

“The project needs to be introduced at first year level to create more awareness and therefore greater contribution from students” (Respondent 20).

“Make other students more aware of recycling and the impact they can make” (Respondent 25).

Conclusion

The paper acknowledges the importance of the sustainability agenda in design education and explains how the topic is introduced in an Interior Design project. The sustainability agenda requires of people to adapt to new ways of thinking and embrace personal change. The research and curriculum development work conducted by Paul Murray (2011) explains that human beings do not accept change easily, but that it is possible to cultivate change over time and therefore accept new way of thinking and approaches. Murray indicates that it is the role of the educator to assist students in cultivating sustainable thinking and motivate students to act sustainably. In order to cultivate this change in students, the paper explores the application of a student-centered learning approach and describes the manner in which the teaching and learning process assisted in promoting awareness amongst students and motivated them to alter their behaviour and become self-motivated responsible designers.

The student-centered learning and teaching process aimed to present the student with the opportunity to engage with the topic through both personal and group experiences. The students obtained personal insight in the recycling practices of the student community through observing their daily recycling habits. They conducted individual interviews with students and discussed the observations and findings in groups. The theory and principles of sustainability as well as the immediate sustainability challenges that South Africa face, were explored by the students through using on-line data-bases and accessing published literature. The lecturer facilitated the process and assisted the students in monitoring the time management of the project, interpretation of findings and final execution and presentation of the group project.

The feedback presented by students gives valuable insight into the personal value that they gained through their engagement with the topic during class sessions and execution of a Recycling Audit group project. The findings of a qualitative questionnaire indicated that the teaching and learning process increased the students’ awareness of sustainability and recycling, they gained knowledge and it motivated them to change and include sustainable practices in their daily life and design practices. The student feedback indicates that all the students were encouraged by the project to improve their personal contributions towards a sustainable future. A surprising finding revealed that 81 per cent shared the importance of recycling waste with their family or friends and 56 per cent of students, who did not recycle waste prior to the project, commenced to recycle waste.

The teaching and learning process described in the paper, is considered to be not only of value for the students but also presented valuable insight to the facilitator. It was possible to employ the students-centered

teaching and learning approach in the context described, because the class sizes were small which made it possibly for students to discuss, interact and debate issues in class. The students were at a third year level of study and already gained fundamental knowledge and exposure towards the topic in previous study levels which enabled a more focused and informed discussion in class. These factors played an important part in facilitating the teaching and learning process because a deeper level of thinking and debate was reached in a short period of time which assisted in shifting awareness and encourage motivation into the topic. It is observed that the outcome of the projects could have been very different if the students were at a first or second year level, if the class sizes increased above 35 and if the students were not familiar with the context and the individuals in their group. The project was therefore executed in a familiar teaching and learning context and environment. Overall the project is considered as a success and students presented positive and encouraging feedback.

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