Application of Systems Theory for Analysing the Sustainability Foci and Practices in Universities: A Case Study of a Rural University in the Eastern Cape, South Africa.

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Abstract
In this paper systems theory is applied for analysing the sustainability foci and practices of the faculty of economics and information technology systems. The faculty in question is at Walter Sisulu University. Systems theory is used to analyze various sub-systems of the faculty when addressing emerging local sustainability concerns. Education for sustainable development is an important aspect of this paper as it considers the sustainability concerns in the curriculum from the perspective of current and future alternatives for the economy and socio-ecological aspects of communities. A qualitative method was used to generate data. A purposeful sample was used a method of collecting data. Findings that have emerged from the faculty are related to: Contextual realities related to inequality. Socioecological issues and risks were found to be related to water and sanitation, food security and climate change. The sustainability discourse is related to health and wellbeing, peace, and security. There is an alignment of green skills to the curriculum of the faculty and pedagogical practices which relate to sustainability. The paper concludes with recommendations with regards to the content of various qualifications, future research, and community engagement activities of the faculty in question and the university as whole.

Keywords: Sustainable development, systems theory, sub-systems, higher education curriculum, research activities, community engagement.

Introduction

Walter Sisulu University (WSU) has integrated sustainable development initiatives into its Institutional Strategic Plan. The university acknowledges that "Education, research, innovation, and leadership are crucial" in assisting the society to address sustainable development challenges (Walter Sisulu University, 2021, p. 5). Education and research are two of the main functions of the universities (Bitzer & Botha, 2010). These functions are visible in the day-to-day activities of WSU. The Eastern Cape Province is greatly affected by socio-ecological issues such as food security, climate change, water, and sanitation (Department of Economic Development Environmental Affairs and Tourism, 2015).

Climate change pressure is affecting the vegetation, the supply of water and biodiversity of the province (Chris Hani District Municipality, 2019). Rural development is prioritized by the Eastern Cape Province as the key to addressing sustainable development (Eastern Cape Planning Commission, 2011). None of the 17 sustainable development goals (SDGs) can be achieved without the support of higher education and research (Grobbelaar, 2005). The United Nations (2019) reflects on the following SDGs:

- SDG 1: No poverty
- SDG 2: Zero Hunger
- SDG 3: Good health and well-being
- SDG 4: Quality education
- SDG 5: Gender equality
- SDG 6: Clean water and sanitation
- SDG 7: Affordable and clean energy
- SDG 8: Decent work and economic growth
- SDG 9: Industry innovation and infrastructure
- SDG 10: Reduced inequalities
- SDG 11: Sustainable cities and communities
- SDG 12: Responsible consumption and production
- SDG 13: Climate action
- SDG 14: Life below water
- SDG 15: Life on land
- SDG 16: Peace, justice, and strong institutions
- SDG 17: Partnership for the goals

According to Jackson (2009), the following perspectives on the SDGs are important steps to a sustainable economy, and should be adopted for the purpose of addressing sustainability concerns.

- Assessing the impact of economic growth on natural resources and the functioning of the ecosystem. This corresponds with SDG 7 (Affordable and clean energy), SDG 8 (Decent work and economic growth), SDG 14 (Life below water), and SDG 15 (Life on land).
- Investment in job security, sustaining public assets and infrastructure, and investing in renewable energy. These points correspond with SDG 7 (Affordable and clean energy), SDG 8 (Decent work and economic growth) and SDG 9 (Industry innovation and infrastructure).
- Enhancing public control of money supply and debt, and encouraging savings. These points correspond with SDG 12 (Responsible production and consumption).
- Improving education and training programmes, improving employee incentives and benefits, and supporting the creation of green jobs. These points correspond with SDG 1 (No poverty), SDG 2 (Good health and well-being) and SDG 8 (Decent work and economic growth).
- Addressing systemic inequality, increasing access to good quality education, and enhancing implementation of anti-discrimination regulations. These points correspond with SDG 4 (Quality education) and SDG 5 (Gender equality).
- Enhancing social well-being and prosperity. These points correspond with SDG 3 (Good health and well-being).
- Recognising ecological limits. This point corresponds with SDG13, 14 and15 (Climate action, Life below water and Life on land).
- Promoting technological transfer and innovation. These points correspond with SDG 9 (Industry innovation and infrastructure).

Sustainability practices in higher education institutions
Sustainability practices are activities that are intended to address sustainable development. Maletič et al (2018) state that sustainability practices must be proactively integrated into an organization's strategy for the enhancement of its sustainability performance. Such measures should consider aspects of the environment, the economy as well as social issues and how they are addressed by various organizational systems (ibid). Sustainability practices can be implemented in any organisation, incorporating both the

internal (within the institution) and the external (local community) sub-systems (Togo & Lotz-Sisitka, 2013).

A Global Higher Education for Sustainability Partnership Initiative was established to facilitate the integration of sustainability into higher education curricula worldwide (UNESCO, 2021). Ninety universities across the globe adopted the Kyoto Declaration in 1993 to achieve an important objective in global sustainable development (ibid)).

It is important for Higher Education Institutions (HEIs) to align their curricula to the 2030 Agenda for sustainable development (UNESCO, 2017). This agenda acknowledges universities as centers of knowledge in our communities, committed to conveying knowledge to their local communities while providing technical support (ibid). This type of support provides a mechanism for responding to the direct needs of the society. Hence, "university curriculum across the globe is experiencing significant pressure to transform its insular, distant form" (Maphosa et al, 2014).

The global community is uniting as university leaders commit to integrate sustainable development into their institutions' curricula (Cotton et al, 2007). This commitment reflects a strong advocacy for Education for Sustainable Development (ESD) in the curriculum (ibid). ESD is recognised in universities all over the world as one of the factors contributing to sustainability (Togo & Lotz-Sisitka, 2013).

Good sustainability-management practices in university campuses have been recognised in the United States, Europe, Asia, and Africa (Salame, 2011). Motivating examples of international universities that are not celebrated often enough are: The University of Hong Kong that has a system for conserving the natural environment; the University Autonoma of Madrid that has an innovative eco-campus that engages students and staff in sustainability practices; Mabada University in Lebanon which generates electricity through recycled water (ibid). The implementation of sustainability practices begins within the institution by influencing staff and student behavior and then involving local communities (Tilbury, 2012).

Sustainability practices in higher education institutions across the globe

ESD has been one of the top priorities on the global agenda since the 1992 Rio Conference (UNDP, 2020). A Global Higher Education for Sustainability Partnership Initiative was established to facilitate the integration of sustainability into higher education curricula worldwide (UNESCO, 2017).

Ninety universities across the globe adopted the Kyoto Declaration in 1993 to achieve an important objective in global sustainable development (UNESCO, 2006). The Kyoto Declaration emphasizes the global perspective for higher education, which focuses on the responsibility that universities have to students and the larger community (ibid).

Higher Education Institutions (HEIs) have been progressively undertaking active measures to contribute to sustainable development (Amaral et al, 2005). In 2003, the United States (US) established a national network partnership that included higher education institutions, sector institutions, religious organizations, businesses and communities for the purpose of responding to ESD and beyond (Rowe, 2017). In the US, hundreds of HEIs are involved in sustainability committees that facilitate Green Campus Programmes, focusing on the following:

- Learning that focuses on the acquisition of sustainability knowledge.
- Sustainability skills application
- Film festivals that are sustainability-orientated
- Sustainability-related campus events
- Specialised sustainability qualifications
- Global and regional collaborative approaches to sustainability
- Collaborations with high schools and primary schools for sustainability initiatives (ibid).

The Western Sydney University in Australia is implementing sustainability practices by supporting local communities that are close to the university (Gaspariri, 2021). The University of Sydney also offers qualifications with a sustainability focus and has also partnered with the industry and communities in

running sustainability-related projects (Galang, 2010). Spinoffs that have emerged from these partnerships include a watershed management system community-wide recycling, and a compost scheme that addresses waste issue (Salame, 2011). The University of Sydney also developed renewable energy sources in the form of smart solar benches through research related activities (Galang, 2010).

The University of Gloucestershire in the United Kingdom (UK) has partnered with various stakeholders in addressing local sustainability changes (Galang, 2010). Through this partnership an edible garden for promoting food awareness is one of the many sustainable development programmes that is being implemented (ibid).

In Asia, the Green Schools initiative is coordinated by the University of the Philippines (Galang, 2010). The green schools initiative is inspired by the global framework on sustainable development and other environmental conversation laws. The initiative united the students, university staff, the local communities, and local stakeholders (ibid).

In Africa, universities have also embraced sustainability as method of enhancing the relationship between universities and the community. According to Lots- Sisitka (2012), African universities are making a remarkable contribution to local communities by focusing on issues related to peace and security and HIV/AIDS. Sustainability challenges that are addressed by universities in Africa are not limited to peace and security and HIV/AIDS. For example, The University of Malawi, Uganda Martyrs University, and the University of Zambia are involved in the Mainstreaming of Environmental and Sustainability in Africa (MESA) University Programme (Lotz- Sisitka et al, 2015). These universities have implemented change projects that impacted positively on either curriculum improvement, policy development, community engagement or research (ibid). The activities of the change project range from: capacity building sessions and several projects that focus on environmental management and climate change, projects on household disposable income, food security, and water conservation (Lotz-Sisitka et al, 2015) (Adekunle and Fatunbi, 2012).

On the Southern side of the African continent universities are also involved in implementing sustainability practices in their institutions and local communities. For example, Rhodes university is home to the Environmental Learning and Research Centre that is implementing sustainability projects, programmes, research and community engagement endeavors (Togo & Lotz-Sisitka, 2013). Rhodes university has also integrated sustainability practices using an integrated approach in several departments (Togo, 2009).

Methods

Research Design
The research methodology that was used in this study is a qualitative research method. Through my use of qualitative research methodology, participants were enabled to share with me their experiential knowledge. This means they expressed what they believe, what they had an idea of and what they had experienced (Matthews & Ross, 2010). These types of experiences were reflected in the structured interviews that consisted of open-ended questions. The use of open-ended interviews allowed the participants to express themselves spontaneously in their own voice (Glaser & Grit, 2013). The interviews also added the human element of the voices of multiple subjects, while also allowing the researcher to cross-reference multiple opinions from various participants (Fontana & Frey, 1991).

Data Collection
Data was also collected using document analysis and observations. The use of multiple data collection tools was a way of triangulating to validate the data. Bowen (2009) confirms that researchers seek to provide credible information while reducing potential biases that can occur in the study through triangulation.
A case study approach was used in this study. This approach enabled us as researchers to establish and present a detailed view of the situation (Rule & John, 2011). Selection of a case study approach for this project also assisted in acquiring in-depth understanding of the sustainability focus of the curriculum of the Faculty of Economics and Information Technology Systems. A case study approach is suitable for

portraying the reality of a particular situation and acquiring a rich description of the participants' experiences, thoughts, and feelings of the situation of interest (ibid).

The type of case study that was used in this paper is an intrinsic case study. I opted for an intrinsic case study as it focuses on all the activities of the subject in question (Durepos et al, 2020), in this case the FEITS. The case study of the FEITS focuses on activities that include teaching and learning, research, and community engagement activities. Unlike a reflective case study which requires the researcher to engage only with "the topic and researcher's feelings, issues and reflections on experiences and interactions" (Hamilton and Corbett-Whittier, 2014, p.15). Nor, a longitudinal case study that is expanded to a longer period in order to give the researcher an opportunity to acquire in-depth understanding of the changes that may occur (ibid).

Theoretical consideration
Systems theory has been applied in this study for analysing curriculum implementation of the faculty in question. The main purpose of systems theory is to emphasize the importance of integrating sub-systems in addressing sustainability concerns (Barbara et al., 2009). According to Von Bertalanffy (1972) systems theory is concerned with "wholes and wholeness", which means that sub-systems form part of a larger entity.

Defining systems may be tricky due to different perceptions that emerge from different fields (Schaveling and Bryan, 2018). However, the following attributes are often resembled by various systems:
- A system consists of components.
- Different components of a system can also be classified as a whole system in a different analysis.
- All the elements of a system are interrelated.
- A system is bounded and identified by a boundary, which also differentiates it from its surrounding environment.
- Systems are hierarchical (ibid).

Systems theory also emphasizes how sub-systems complement each other in addressing sustainability challenges that exist in the entire institution. Systems theory also emphasizes how sub-systems complement each other in addressing sustainability challenges that exist in and outside the institution (Von Bertalanffy, 1972). Hence systems theory is applied for analysing the sustainability foci of the FEITS.

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Discussion
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The main sustainability foci and practices in the FEITs have emerged from some qualifications, community engagement activities and research projects. Systems theory was applied as various sub-systems of the faculty were assessed on how they complement each other in addressing sustainability changes. These sub-systems include students, community affected stakeholders).The focus of the considered two main concepts which are: sustainable development and higher education curriculum. Consideration of these two main concepts was directly linked to the implementation of the Sustainable Development Goals (SDGs). The implementation of the SDGs requires an inclusive approach that encompasses the institution's internal and external environment.

The sustainability foci of the FEITS are related to contextual realities, socio-ecological issues and risks and sustainability discourse.

Contextual Realities
The contextual realities that have emerged from the FEITs are related to inequality.
Inequality
Inequality is reflected in the curriculum of the FEITs as a contextual reality that exists in society. Inequality is revealed in the Public Economics module as one of the major discrepancies caused by inefficient

distribution of resources, rendering of services by the government to the public, and rent seeking[1]. Public resources are initially aimed at improving the welfare of people (Black et al, 2011). However, due to inefficiencies in resource allocation and distribution, inequality is rampant (ibid). Castells-Quintana et al. (2019) confirm that inequality has a negative effect on sustainable development. The curriculum in the FEITs also reflects that equality does not only affect the economic sector, but also has a negative effect on various sectors such as human resource management and the business sector.

In the Public Economics module, the Nozick's Entitlement Theory is applied to address inequality through redistribution of income from the rich to the poor . This theory considers three principles, namely: justice in acquisition, justice in transfer, and rectification in transfer (Black et al, 2011). The theory is also aimed at rectifying historical injustices related to the three above mentioned principles.

The Supply Chain Management module considers the assessment and selection of suppliers in various institutions. Preferential procurement is considered in the module. It is suggested that this be done by prioritizing emerging and local suppliers to allow them to participate in the economic mainstream, thus curbing the inequality gap among business owners. According to the lecturer for Supply Chain Management, the supply chain management process helps these institutions to comply with policies such as the BBBEE (Broad Based Black Economic Empowerment Act), while also "responding to concerns related to small business as reflected in the Integrated Development Plan (IDP) of the local municipalities". All the municipalities within the Chris Hani District (where the FEITs is located) take into consideration the BBBEE Act, mentions the lecturer.

In the Labour Relations 2 module, students are given real case examples to analyze South African labour relations issues. This exercise demonstrates their practical application skills. The relationship between the employer and the employee is considered. The labour legislations and laws, such as the Labour Relations Act, Affirmative Action Act, Employment Equity Act, and Skills Development Act, protect employees against exploitation that may result from discrimination and bias that may possibly result in inequalities in the working environments. The lecturer for this module expresses the view that "labour legislations play an important role in ensuring that inequality is curbed in the working environment".

The Development Economics module reflects an instruction to use the Human Development Index (HDI) as a tool of evaluating sustainability concerns. The HDI is used for "assessing sustainability aspects such as levels of literacy and acceptable standards of living", among others, mentioned the Lecturer for Development Economics. However, the points concerning the HDI do not include the inequality-adjusted Human Development Index (IHDI) as a special indicator. An annexture (semester test) of Development Economics reflected the following assessment question: "To make the biggest impact on development, societies must empower and invest in women. How can that help turn communities from underdevelopment. to development?". The empowerment of women begins with acknowledging diversity and embracing it. Encouraging students to embrace diversity can impact positively on reducing inequality. During an online discussion forum in this same module, rules are set whereby students are instructed to embrace diversity and respect each other, regardless of their race, background, or cultural beliefs.

Socio-ecological issues and risks

Socio-ecological issues and risks that emerged from the FEITS are related to water and sanitation, food security and socio-ecological matters.

Water and Sanitations

The chairperson of the faculty Research Committee argues that the FEITS' research projects will contribute towards the socio-ecological transformation of the Chris Hani District. It is hoped that the partnership

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[1] Rent seeking is an economic concept that focuses on individuals or institutions who seek to acquire or increase their financial gains by manipulating economic resources without producing any wealth for the society. Rent seeking has a direct impact on efficient allocation of resources, that in turn increases the levels of inequality.

between the Walter Sisulu University, Enoch Mgijima Local Municipality, and the Chris Hani District Municipality will make this contribution possible. This partnership is led through the FEITS' research projects that are assisting the municipalities to improve service delivery, especially with matters related to quick responses to the needs of the community. Development of a phone-based service delivery application system for the municipality is one of the rapid response techniques that will contribute to the socio-ecological transformation of Enoch Mgijima Local Municipality through this partnership. It is envisaged that the above-mentioned phone-based application will address challenges related to water and sanitation challenges that exist in the Enoch Mgijima Local Municipality.

According to the chairperson of the research committee, the project related to clean water and sanitation is known as 'smart water', which will be made possible by the above-mentioned partnership that also includes the Council of Scientific and Industrial Research (CSIR), stated the chairperson of the FEITS' research committee. The above-mentioned partnership reflects systems thinking in addressing sustainability concerns. Development of the above-mentioned application is an integrated approach to address water and sanitation challenges that exist in the district municipality. Water and sanitation problems are evident in several local communities in the Chris Hani District Municipality (CHDM). The residents of Newville township under the Enoch Mgijima Local Municipality continue to experience a sewage nightmare, despite numerous complaints having been lodged with the CHDM, which is responsible for water and sanitation services in the area (The Representative, 2020).

Figure 1 reflects the sewage nightmare that is experienced by the residents of Newville township mentioned above. The Smart project will be implemented to address water and sanitation challenges such as the one reflecting in figure 1.

Figure 1:*:Sewage nightmare at Enoch Mgijima Local Municipality (The Representative, 2006).*
Backstrand, (2006) describes the above-mentioned partnership as a multi-stakeholder approach. The above-mentioned multi-stakeholder approach is like that of Rhodes university reflected in Figure 2.
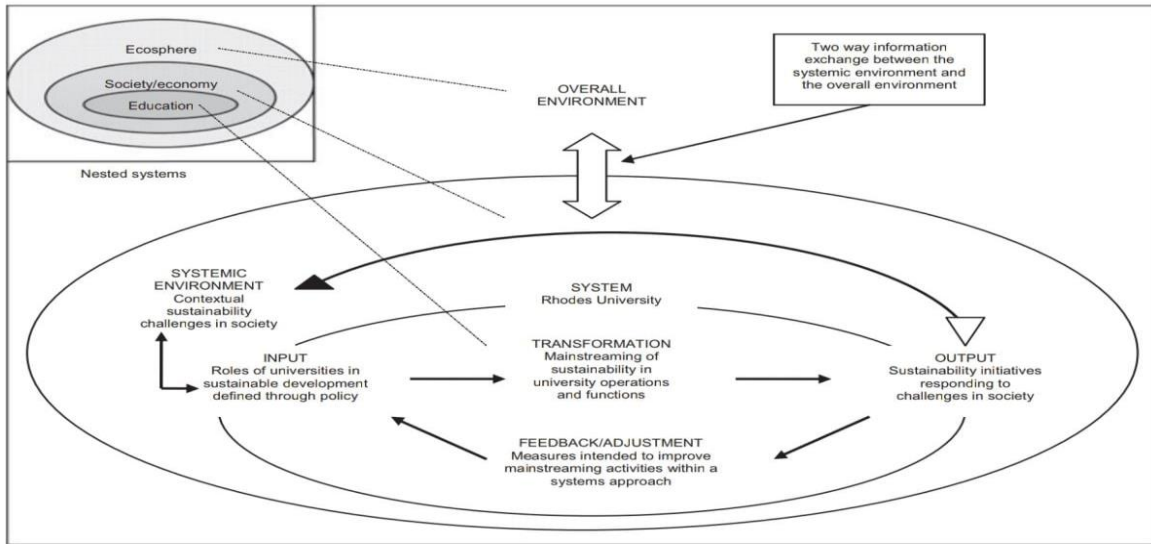
Figure 2: *Rhodes University system in relation to its environment (Togo & Lotz-Sisitka, 2013).*

Figure 2 shows the interconnections between the sub-systems of the above-mentioned university. The community's sustainability challenges drive university inputs which are guided by university roles (Togo & Lotz-Sisitka, 2013). The university's response mechanism (transformation and feedback/adjustment) is grounded in systems thinking as it integrates units such as "the Centre for Community Engagement, the Environmental Committee as well as other university academic departments and support departments" (Togo & Lotz-Sisitka, 2013. p.10). The sub systems approach used at Rhodes University is similar to that of the FEITS, as addressing water and sanitation challenges in the Enoch Mgijima Local Municipality is also as interconnection between internal and external stakeholders through the Faculty's community engagement and research committees.

Food security
Food security interventions are considered in the FEITS through stakeholder platforms such as community engagement. These stakeholder engagement platforms echo the Statistics South Africa report (2019) that emphasizes that food security is one of the major socio-ecological issues experienced by South African Citizens. The concerns of the chairperson of the Community Engagement Committee regarding the urgent intervention needed to address food security challenges experienced by farmers in Whittlesea, links with the work of Baiphethi and Jacobs (2009), who find that food challenges are also most prevalent in the former homelands in South Africa.

Food security and climate change interventions that are seen in the FEITS are similar to those that were addressed by the Uganda Martyrs University, which include: household disposable income, food security, and water conservation (Adekunle and Fatunbi, 2012).

Climate Change
The FEITS' community engagement report reflects that the Faculty Research Committee often makes use of stakeholder engagement platforms (at all spheres of government: local, district, provincial and national levels) to enhance current research projects within the faculty. These platforms are generally in the form of organized stakeholder meetings, summits, and *indabas*. Such sessions usually take place quarterly, or by invitation from various stakeholders.

The faculty's research committee report reflects the urgency of integrating climate change concerns into agribusiness-related qualifications. This integration may possibly contribute to quality education, as it will equip local farmers with skills that will contribute to their survival.

Recontextualization of the curriculum for the purpose of enhancing quality may not be enough (Lotz-Sisitka et al, 2021), which is why a stakeholder-integrated approach of addressing climate change concerns through local economic development projects is necessary. This approach can be achieved by bringing together university sub-systems (ibid). University sub-systems are external as well as internal partners. Each partner can play a role in assisting local farmers in dealing with climate change challenges according to their areas of specialization. However, it is essential to constantly monitor development initiatives throughout their lifespan, to ensure that they are sustainable (De Beer & Swanepoel, 2011).

Sustainability discourse
The international village has become cautious of the urgency to address the SDGs (Landorf et al, 2008). The FEITS reflects sustainability discourses related to health and well-being, peace and justice, inclusive and sustainable economic growth and health and well-being.

One of the prevalent sustainability discourses that surfaced in the data from the FEITS pertains to peace and security. The Labour Relations module reflects that disruption of peace and security results largely from dissatisfaction with service delivery by local municipalities such as the Enoch Mgijima Local municipality, where the FEITS is situated. Development of the phone-based application mentioned earlier reflects an integrated approach to addressing one of the threats to peace and security prevalent in the Enoch Mgijima local municipality. An inclusive approach to implementing SDGs. The abovementioned integrated approach echoes Gupta & Vegelin (2016), who emphasize that an integrated approach to addressing SDGs involves many sectors, such as the education sector, the environmental sector, and the economic sector.

Peace and security interventions that are seen in the FEITS are like those made by the University of Malawi, Uganda Martyrs University and University of Zambia. These interventions include change projects that impacted positively on either curriculum improvement, policy development, community engagement or research; green initiatives; outreach programmes on environmental management; and capacity building sessions (Lotz-Sisitka et al, 2015).

Sustainability practices
Sustainability practices are important for HEIs as they are the agents of transferring knowledge to the local communities (UNESCO, 2017). Sustainability practices that have emerged from the FEITS are related to green skills, green jobs, pedagogical practices, and work integrated learning (WIL). These practices resonate with the sentiments of Amaral et al (2005), who maintains that HEIs are gradually beginning to take active measures to contribute to sustainable development.

Alignment to green skills and green jobs
The Development Economics module reflects an approach to inclusive and sustainable economic growth and prosperity through the application of HDI. The latter is applied in a pedagogical approach that reflects green skills in the curriculum of the FEITS. The application of the HDI in Development Economics echoes the sentiments of Jenkin et .,al (2017), that that green skills are essential across the main sectors such as the economic sector.

Health and well-being discourse is reflected in the Public Economics module. Public Economics students are equipped to apply theories and regulatory measures that may have a negative effect on one's health and well-being, such as negative externalities. This exercise echoes the sentiments of universities that provide academic qualifications with a green curriculum (UNESCO, 2017). The Council of Australian Government (2009) argues that green skills are not only technical skills; they comprise of knowledge, values, and attitudes. The attributes of the green skills mentioned above are reflected in the pedagogical approach of Public Economics as suggested by the Council of Australian Government (2009).

Pedagogical practices
The pedagogical approaches that emerged from the FEITS show the use of both traditional and non-traditional approaches to assessment. The traditional approach used in the faculty is an approach whereby

the flow of information and knowledge is regulated by the instructor (Communications, 2006). In contrast, the non-traditional approach used in the FEITs resonates with the work of Bjorke (2016), who suggests the use of the constructivist and socially critical learning approaches reflected in Figure 3.
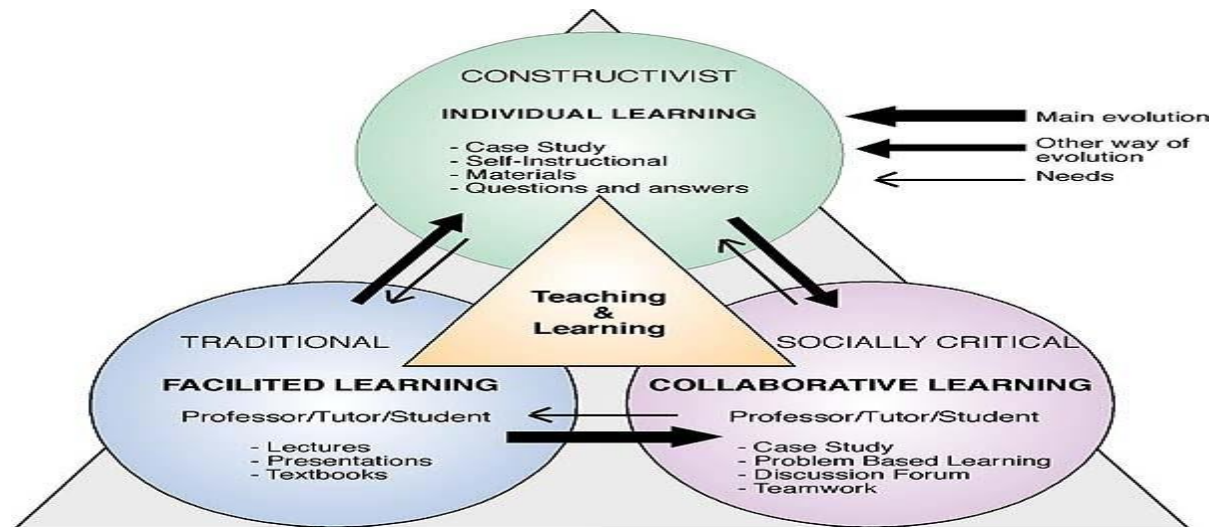

Figure 3: Curriculum response methods (Bjorke, 2016)

Communications (2006) argues that a traditional approach is also prevalent in e-learning, that makes use of presentations, lectures, and textbooks. In the FEITS the traditional approach is reflected during group presentations and discussion forums on black board.

Work Integrated Learning
Students who participate in Work Integrated Learning (WIL) implement in practice what they have learnt in theory states the lecturer for Entrepreneurship Skills. The students who are registered for Entrepreneurship Skills and undergo WIL also contribute to addressing the local sustainability challenges experienced by Small and Medium Enterprises (SMEs). These students conduct feasibility studies for SMEs in the CHDM at no cost, as part of their WIL. This type of WIL seeks to address SDGs 9, and 11 which are Industry innovation and sustainable cities and communities respectively. The exercise of conducting a feasibility study reflects an inclusive approach of responding to SDGs, as referred to by Togo & Lotz-Sisitka (2013). This inclusive approach also reflects a systems-thinking approach to addressing sustainability measures, such as that of Chambers (1994). Systems thinking in Entrepreneurship Skills involves internal sub-systems (students, course content, module pedagogy, the Community Engagement Committee), and the external sub-systems (local SMEs and relevant government institutions). The intervention made by the FEITS through the Entrepreneurship Skills module confirms the commitment that universities have to students and the larger community specified by Wright (2004).

Conclusion
Universities all over the globe are implementing measures to address sustainable development challenges (Lotz-Sisitka et al, 2015). South African universities such as Rhodes University, University of Fort Hare and Nelson Mandela University are implementing sustainability practices (Togo & Lotz-Sisitka, 2013), (Grobbelaar, 2005), (Lotz-Sisitka et al., 2015). Therefore, I have sought to understand how sustainability concerns and practices are reflected in the curriculum, community engagement and research foci and practices of the Faculty of Economics and Information Technology Systems of Walter Sisulu university. Systems-theory was applied to analyze the sustainability foci and practices of the faculty. Insight was received with regards to the following areas:

• Contextual realities that exist in the faculty
• Socio-ecological issues and risks
• Sustainability discourse
• Alignment of curriculum to green skills and green jobs
• Pedagogical practices
• Work integrated learning

Recommendations regarding the curriculum, community engagement initiatives, and the integration of sustainability practices into the operations of the faculty is also made.

References

Adekunle, A., & Fatunbi, A.O., (2012). Approaches for setting up multi-stakeholder platforms for agricultural research and development. *World Applied Sciences Journal*, *16*(7), 981-988.

Amaral, L.P., Martins, N., & Gouveia, J.B. (2015). Quest for a sustainable university: A review. *International Journal of Sustainability in Higher Education, 16*(2), 155- 172. https://doi.org/10.1108/IJSHE-02-2013-0017

Bäckstrand, K. (2006). Multi-stakeholder partnerships for sustainable development: Rethinking legitimacy, accountability and effectiveness. *European Environment*, Wiley InterScience, *16*(5), 290–306. https://doi.org/10.1002/eet.425

Baiphethi, M. N., & Jacobs, P. T. (2009). The contribution of subsistence farming to food security in South Africa. *Agrekon, 48*(4), 459-482. https://doi.org/10.1080/03031853.2009.9523836

Barbara, S., Corners, H., Espaciais, D. P., Giglio, L., Crutzen, P. J., Andreae, M. O., Shindell, D. T., Walter, B. P., Faluvegi, G., Ataie, F., Irannezhad, P., Farahani, M. M., Chobari, O. A., Walter, B. P., Heimann, M., Henderson, F. M., Lewis, A. J., Clark, D. A., Lelieveld, J. (2009). Contextualising curriculum through issues-based approaches: A case of eco-schools in Kenya. *Atmospheric Chemistry and Physics*, *7* (1), 1–13. https://doi.org/10.1029/2008GB003237

Black, P, Calitz, E., & Steenkamp, T. (2011). *Public Finance for South African students*. Cape Town: *Oxford University Press*.

Bitzer, E., & Botha, N. (2010). *Curriculum Inquiry in South African higher education: Some scholarly affirmations and challenges*. Stellenbosch: SUN MeDIA.

Bjorke, A. (2016). E-pedagogy. *E-teaching and e-learning.* Retrieved from https://eteachingandlearning.wordpress.com/e-pedagogy/

Booth-Sweeney, L (2007). All systems go. *In Developing a generation of systems smart kids.* http://lindaboothsweeney.net/SOW17_ch12-systems-thinking, pdf

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2), 27-40. http://doi.org/10.3316/QRJ0902027

Chambers, R. (1994). The origins and practice of participatory rural appraisal. *World Development*, *22*(7), 953–969.

Castells-Quintana, D., Royuela, V., & Thiel, F. (2019). Inequality and sustainable development: Insight from an analysis of the human development index. *Sustainable Development*, *27*(3), 448-460. https://doi.org/10.1002/sd.1917

Chris Hani District Municipality. (2019). *2019-2020 Draft IDP Review 2019*. Queenstown. Chris Hani District Municipality.

Communications. (2006). Online learning vs print learning. Which provides the better result? *Development and Learning in Organizations 20*(6) 29-31. 1477-7282. https://doi.org/10.1108/14777280610706211

Cotton, D. R. E., Warren, M. F., Maiboroda, O., Bailey, I. (2007). Sustainable development, higher education and pedagogy: A study of lecturers' beliefs and attitudes. *Environmental Education Research, 13*(5), 579–597. https://doi.org/10.1080/13504620701659061

Council of Australian Government. (2009). Green Skills Agreement: Learning in the Workplace: Review of Research. *National Centre for Vocational Educational Research.* http://www.ivet.com.au/cgi-bin/user.pl?download_file=1&file=17

Department of Economic Development Environmental Affairs & Tourism. (2015). *Annual Report 2014/ 2015. 2015.* King Williams Town: Department of Economic Development Environmental Affairs and Tourism.

Dube, C. (2012). *Implementing education for sustainable development: the role of geography in South African secondary schools*. [Doctoral dissertation]. University of Stellenbosch and Dissertations Archive. http://scholar.sun.ac.za/handle/10019.1/71683

Durepos, G., Mills, A., Wiebe, E., (2020). Management Information Systems Research Centre, *SAGE*, 27(4)*, 597-636* https://dx.doi.org/10.4135/9781412957397.n183

Eastern Cape Planning Commission. (2011). *National Strategy for sustainable development and action plan 2011-2014.*

https://www.gov.za/sites/default/files/gcis_document/201409/sustainabledevelopmentactionplanstrategy0.pdf

Fontana J, F. A. (1991). Group interview in social research. *The Social Science Journal*, *28*(1). 281-307. https://0 www.sciencedirect.com.wam.seals.ac.za/science/article/pii/036233199190003M

Galang, A. (2010). Environmental education for sustainability in higher education in the Philippines. *International Journal of Sustainability in Higher Education*,*11*(2),173-183. https://doi.org/10.1108/14676371011031892

Gasparri, E. (2021). School of Architecture, Design and Planning, The University of Sydney, Sydney, NSW, Australia. *Rethinking Building Skins: Transformative Technologies and Research Trajectories*, 231.

Glaser, J., & Laudel, G. (2019, September). The discovery of causal mechanisms: Extractive qualitative content analysis as a tool for process tracing. In *Forum Qualitative Sozialforschung/Forum: Qualitative Social Research* (Vol. 20, No. 3).

Grobbelaar, S. (2005). Developing an innovation ecosystem through a university– coordinated innovation platform: The University of Fort Hare. In Banks, L., Cloete, N, & Van Schalkwyk, F. (eds) *Anchored in place. Rethinking Higher education in South Africa*. Cape Town: African Minds, (pp. 107-122). Cape

Town: African Minds.

Gupta, J., & Vegelin, C. (2016). Sustainable development goals and inclusive development. *International Environmental Agreements: Politics, Law and Economics, 16*(3), 433–448.

Hamilton, L., & Corbett-Whittier, C. (2014). *Using Case Study in Education Research.* SAGE. London.

Jenkin, N., Lotz-Sisitka, H,.Ramsarup, P., Rosenberg, E & Ward, M. (2017). Enabling green skills : Pathways to sustainable development. Grahamstown,: *Rhodes University Learning and Research Centre.*

Landorf, H., Doscher, S., Rocco, T. (2008). Education for sustainable human development: Towards a definition. *Theory and Research in Education*, *6*(2), 221–236. https://doi.org/10.1177/1477878508091114

Laszlo, K. (2001). Learning, design, and action: Creating the conditions for evolutionary learning community. *Systems Research and Behavioural Science*, *18*(5), 379–391. https://0-onlinelibrary.wiley.com.wam.seals.ac.za/doi/abs/10.1002/sres.442

Lotz-Sisitka, H., Hlengwa, A., Lauriks, S., Naituli, G., Neeser, M., Ogbuigwe, A., Pradhan, M.,Salami, A., Ward, M. (eds) (2015). *Mainstreaming environment and sustainability in African universities: Stories of change.* Grahamstown: Rhodes University Environmental Learning Research Centre.

Lotz-Sisitka, H. (2012). The "event" of modern sustainable development and universities in Africa. *Journal of Education for Sustainable Development*, *6*(2), 41-57.

Lotz-Sisitka, H., Rosenberg, E., & Ramsarup, P. (2021). Environment and sustainability education research as policy engagement*:* (re-) invigorating 'politics as *potentia'* in South Africa, E*nvironmental Education Research*, 27(4) 525-553, DOI: 10.1080/13504622.2020.1759511

Maletič, M., Maletič, D., & Gomišček, B. (2018). The role of contingency factors on the relationship between sustainability practices and organizational performance. *Journal of Cleaner Production*, 171, 423–433. https://doi.org/10.1016/j.jclepro.2017.09.172

Maphosa, C., Mudzielwana, N. P., & Netshifhefhe, L. (2014). Curriculum development in South African higher education institutions: Key considerations. *Mediterranean Journal of Social Scinces*, *5*(7), 355–366. https://doi.org/10.5901/mjss.2014.v5n7p355

Matthews, B. and Ross, L. (2010). Research Methods. Scientific Research: *An Academic Publisher*, 4(4), 7625. https://www.scirp.org/(S(351jmbntvnsjt1aadkposzje)/reference/ReferencesPapers.aspx?ReferenceID=1745585

Rieckmann, M. (2018). Learning to transform the world*:* Key competencies in ESD In Leicht, A., Heiss, J., & Won Jung Byun (eds.), *Issues and trends in Education for Sustainable Development* (pp 39-61). Place de Fontenoy: UNESCO Publishing.

Rowe, D. (2017). Education for a sustainable future. *Emerald Insight*, *317*(5836), 323-324.

Rule, P., & John, V. (2011). *Your guide to case study research*. www.vanschaiknet.com

Salamé, R. (2011, November 23-26). *Higher Education Commitment to Sustainability in the Arab States* [Paper presented at the 5th GUNI International Barcelona Conference on Higher Education, Barcelona, Spain].

Schaveling, J., & Bryan, B. (2018). What Is Systems Thinking? Making Better Decisions Using Systems Thinking, *Authenticity Consulting, LCC*, 5–11. Shttps://doi.org/10.1007/978-3-319-63880-5_2 https://0-www.sciencedirect.com.wam.seals.ac.za/science/article/pii/S0040403911016443

Senge, P. M. (1990). The fifth discipline: The art and practice of the learning organization. *Human Resource Management*, *29*(23), 3-12 http://www.seeingeverything-in-a-new-way.com/uploads/2/8/5/1/ 28516163/peter-senge-thefifth-discipline .pdfs

Statistics South Africa. (2019). *The Extent of Food Security in South Africa.* http://www.statssa.gov.za/?p=12135

Swanepoel, H., & De Beer, F. (2011). *Community development: Breaking the cycle of poverty.* Juta and Company Ltd.

Tilbury, D. (2012). Learning to connect: Reflections along a personal journey of education and learning for a sustainable future in the context of Rio + 20. *Journal of Education for Sustainable Development*, *6*(1), 59–62. https://doi.org/10.1177/097340821100600112

Sewage Nightmare at Enoch Mgijima Local Municipality. (2020, November) The Representative, p. 11

Togo, M., & Lotz-Sisitka, H. (2013). Exploring a systems approach to mainstreaming sustainability in universities: A case study of Rhodes University in South Africa. *Environmental Education Research, 19*(5), 673-693. https://doi.org/10.1080/13504622.2012.749974

United Nations Development Programme (UNDP). (2020). The Next Frontier: Human Development and the Anthropocene. *Human Development Report 2020*. http://hdr.undp.org/en/2020-report

United Nations Educational, Scientific and Cultural Organization (UNESCO). (2006). Reorienting teacher education to address sustainable development guidelines and tools series. *Education Today Newsletter.* UNESCO. http://portal.unesco.org/education/ en/ev.php

UNESCO. (2017). UNESCO moving forward: The 2030 Agenda for Sustainable Development. *The United Nations Educational, Scientific, and Cultural Organization*.

Von Bertalanffy, L. (1972). The History and Status of General Systems Theory. *Academy of Management Journal*, *15*(4), 407–426. https://doi.org/10.5465/255139

Walter Sisulu University. (2021). *2020-2030 Walter Sisulu Strategic Plan.* https://www.wsu.ac.za/index.php/research-innovation/policies-documents