WESSA
uMngeni Valley

e-STEAM: A new focus for uMngeni Valley Education Centre

An overview of education for a change as a long-term solution to a more sustainable future.

In a world where life-supporting resources (such as air, water, soil, plants and animals) are being degraded at an alarming rate it is crucial to turn the situation around. Since it is us, as people, who are causing the degradation, surely it can only be through people and Education for Sustainable Development (ESD) that a long-term solution can be found. At WESSA uMngeni Valley Education Centre (uMngeni Valley) we are thus committed to work with all who care for a more sustainable future. The e-STEAM framework (explained below) and Action Learning processes are well-placed to do this! Indeed, we are delighted to note that UNESCO is recognising action learning as a key process for achieving the Sustainable Development Goals[1] (Leicht, Won et.al., 2018).

Resulting from the changes in school curricula and trends in education, uMngeni Valley, which was established in 1976, has seen numerous shifts in focus, as well as the adoption of new and improved learning methods. The Centre is currently reviewing and re-shaping it's ESD work in KwaZulu-Natal. Working with our partners the centre's vision is to become a leading education centre in southern Africa!

In an ever changing social, environmental and economic context, different strategies are needed to stay relevant and for education centres to be regarded as the fore-runners in ESD. This has led to the uMngeni Valley taking on e-STEAM as a framework for learning as well as incorporating state of the art field work technologies. uMngeni Valley is one of the first outdoor education centres, in Africa, to do this.

This paper will focus on Action Learning processes and the e-STEAM educational framework that is applied by the Centre, and will focus on the Siyabonga Helping hands case studies to illustrate how the Centre is working for change.

Action learning to bring about change

Action Learning is a process that has been developed at the WESSA education centres. Action Learning includes the 5 T's (**t**une in, **t**alk, **t**hink, **t**ouch and to **t**ake action) as processes that are proving effective and reliable in bringing about change and learner agency (Taylor and Venter, 2017). The approach compliments instructional approaches and reflects a learner-centred environment which is better situated, more deliberative, open-ended and thereby enables learners to take action for sustainable development (O, Donoghue et.al., 2017; Taylor and Venter, 2017). Earlier studies at uMngeni Valley showed that if the learning processes were to bring about changes through sustainable living they needed to include action taking as the part of the learning process (Taylor and Venter, 2017).

[1] (insert information on SDG's here)

The most import facet of action learning for facilitators, is tuning in and carefully planning the programme with the group leader. What the learners already know and their view of the world in which we live, is extremely important for planning the educational programmes and the methods to be used by facilitators (as can be seen in figure 1). It is crucial that the learning is appropriate and relevant to the social and cultural context of the group/course participants. This enables participants to mobilise the prior knowledge and experience which they bring to the learning (Taylor and Venter, 2017). A focus for the learning programme can then be established, based on a relevant issue or matter of concern. Together with tuning in, touch (real life encounters such as field work), thinking (reflecting on what is being learned), talking (dialogue on what we already know and what we are finding out) and taking action (to do something about the issue being learned about) forms part of the Action Learning process. These Action Learning processes enable learners to make choices and take further action within their local community, including their school and home environment.

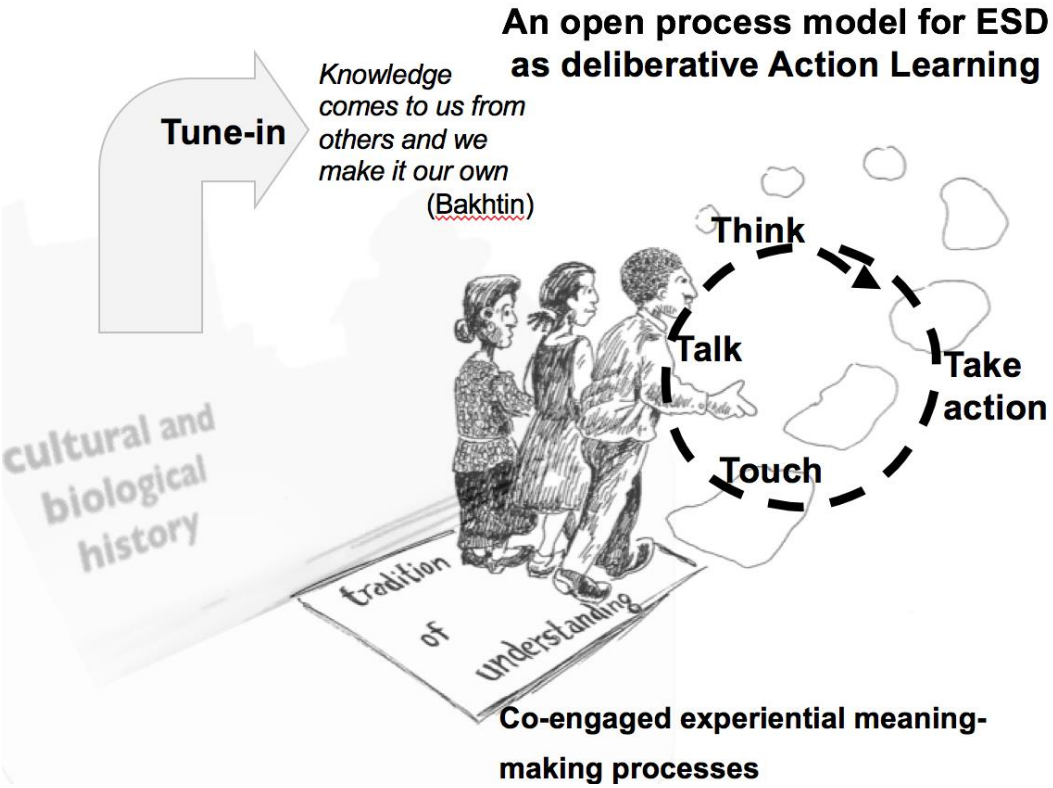

Figure 1: Action learning with an emphasis on drawing on prior knowledge and understanding of course participants through Tuning in

We are encouraging that the learners at our Centre are connecting their work to "Hand prints for change" as positive actions. The handprint approach, rather than always emphasizing on the negative impact of our foot-prints, is a pedagogy of hope. Handprint actions, involve learners taking positive actions towards a more sustainable future (Leicht, Won et.al., 2018, Taylor, 2017).

So what is e-STEAM?

e-STEAM is a teambuilding, leadership and personal development- focused learning framework that builds self-esteem and works toward solving environmental issues through science, technology, arts and mathematics. At the same time, this approach to ESD exposes students to key subjects and

integral skills for their educational development and future preparation for either tertiary education or entrepreneurial development.

The e-STEAM framework encourages creativity through problem based learning. Learners/participants are guided by an 8-step process (see figure 2), where they develop and present an action project around their chosen topic. Participants are encouraged to present their ideas in a variety of inventive ways, from building models, posters, presentations, social media posts and reporting their action through videos.

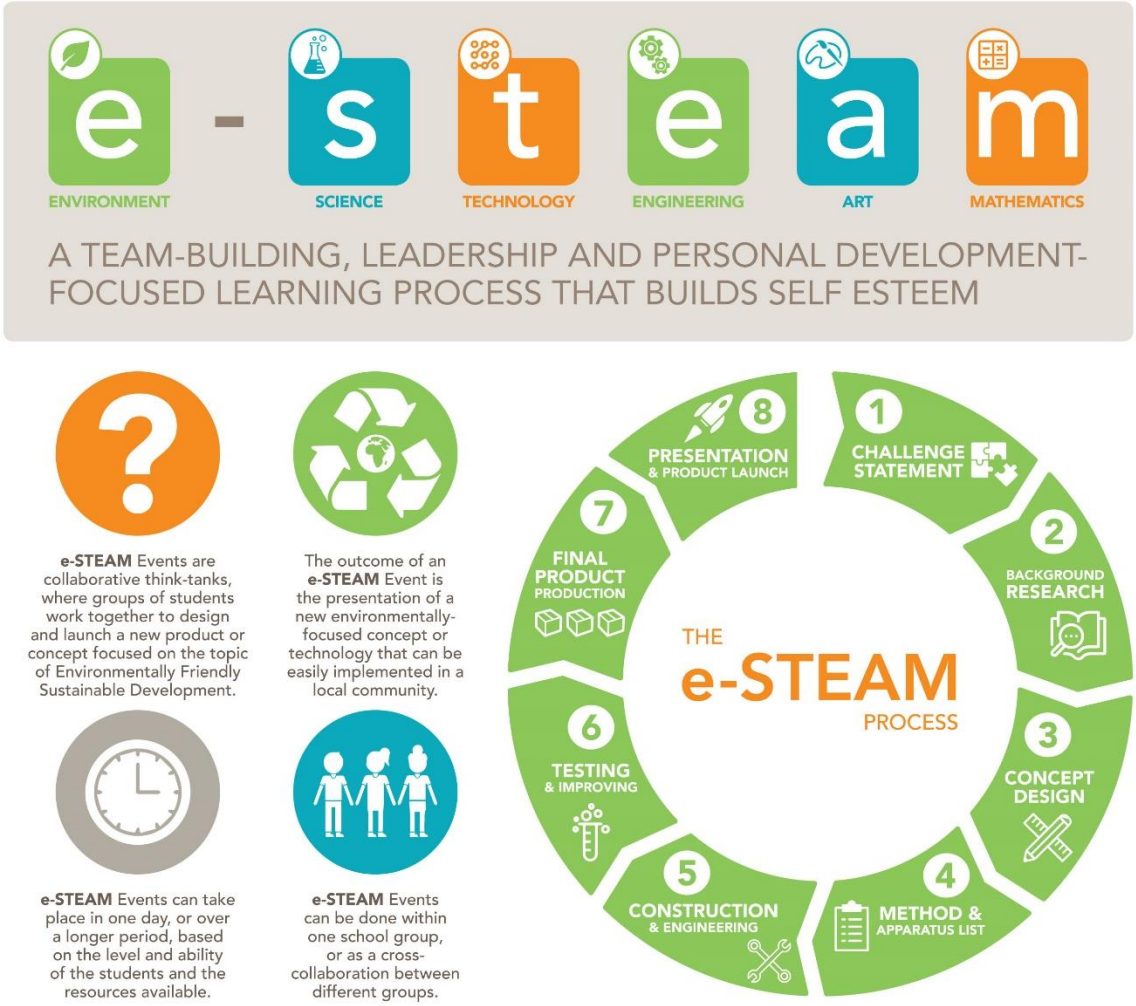

Figure 2: The e-STEAM process

The Siyabonga - Helping Hands for Africa e-STEAM project

uMngeni Valley was approached by *Siyabonga – Helping Hands for Africa* to link with the programmes offered at their centre. The process of meeting and planning (Tuning in) an e-STEAM programme soon followed. Once the environmental topics of concern were identified and discussed the programme started to take life. The initial factor that contributed to the success of the programme was the information which *Siyabonga – Helping Hands for Africa* willingly shared with the uMngeni Valley facilitators beforehand. This painted a picture of the context of the Centre, the environmental issues faced, as well of the community in which the centre is based. The

communication ranged from answering specific questions through email, to the exchange of photos of the issues.

The learners from the GAP programme (learners who have finished matric) and a handful of staff members from *Siyabonga - Helping Hands for Africa* were able to take part in a two-day programme at uMngeni Valley. The participants were divided into three groups, each with a focus on a different topic or environmental issue. The issues identified in their community included incorrect waste management, alien invasive plants and the mismanagement of a wetland and stream on the piece of land opposite their centre. The groups then set out to write their challenge statements on their selected topic. Background research were initiated by introducing learners to work done by various groups in the community of Howick which are related to the environmental issues identified. The groups were taken to visit the Wildlands recycling depot as well as the DUCT (Duzi-uMngeni Conservation Trust) trash boom below the Howick bridge. The uMngeni Valley field staff demonstrated the different methods of clearing alien invasive plants as well as introducing the participants to a variety of different citizen science tools used to monitor streams. The tools used included a miniSASS test, the clarity tube and the riparian health audit. These tools were developed by WESSA and Groundtruth, with support of the Water Research Commission.

The creative juices were flowing and the learners couldn't wait to start planning solutions to their identified issues. Through careful planning and creative think tanks, each group designed their project concepts. Once they had gathered all the materials needed on their method and apparatus list, the building, painting and serious fun started. The groups were satisfied with their projects and models built and presented three fantastic projects. One group presented the construction of a bridge for school children, using alien invasive plants removed from the wetland. Another group converted the impacted wetland space into a recreational space for the community and a place for tourists to visit. The restored wetland they presented, includes a garden, an office, a fenced off playground as well as a recycling village. The last group decided to tackle the waste issues in their community. The core of their proposed project included the establishment of a recycling village which will also be a means of creating jobs.

Upon reflection, it came to light that the participants grew in confidence and self-esteem(agency), when they realised what they were capable of and were proud of what they have achieved.

Five months later, the WESSA field-staff went to check in with the group of instructors/staff which attended the e-STEAM project and were astounded by the change projects that had been inspired by the e-STEAM weekend. Some of the stories (although not all) are captured below.

Change projects as a critical evaluation

Change projects are reflections of what we have learned and how this learning has enabled us to take action and make changes within our home and social environments as well as in our workplaces. These are usually represented as a short story with pictures (Taylor, 2017). These change projects assist us with evaluating the work we do and help us determine how effective our learning programmes are.

Story of change/Change projects: Noluthando Hlongwane

My name is Noluthando Hlongwane I work at the Siyabonga helping hands centre in Imbali as an educator. I am currently studying education through UNISA. I am a quiet person that enjoys working with the young children in the primary school.

In the community of Imbali, there is an immense drug problem. Our centre offers an escape to learners from these social problems, a place which they visit on Friday afternoons after school. Vulnerable learners come here to receive a proper meal and to do their homework. I am inspired daily by the experience that I get here and believe that I am workplace ready once I have graduated.

Figure 3: Noluthando with a group of learners at the Siyabonga Helping hands centre.

While at WESSA, the topic chosen by my group was wetlands. We said that we would create a wetland park, which the tourists visiting our centre could visit when they visit our centre every Monday and Wednesday. Our project was quite intimidating, especially at the point that you come to realise that you are able to do something that big. It was a bit frightening not knowing how it would turn out, but you have hope so you know it can be done.

I have learned to appreciate wetlands, since there are only a few wetlands present in our areas, which are sometimes used as dumping sites. I have passed the knowledge that I have gained onto my family and the people around me. Every time I learn something new, I share it with my two children. I saw wetlands on the news one Sunday and immediately called my children to come and look at it, and told them that it is so important that it even made it onto the news.

The biggest environmental problem in Imbali is litter. When we came back from WESSA we started an enviro club for the Grade 6's and Grade 7's at our centre. We started the club and told the kids that they should pass on what they learn here to their parents and other learners. We've been teaching them about litter, and the litter seems to be getting less.

Figure 4: A wetland park was designed by a group as their e-STEAM project.

When we came back from WESSA, we came back as young visionaries, we were very excited, we were focused, and we knew what we wanted to do and we did it right away. We had ideas of separating the litter on both sides of our centre, so we set up drum bins. The dumping at the sides of our centre is much better now, unfortunately there are still people dumping next to the bins.

During our programme at WESSA we visited the Wildlands recycling village and we discovered that there is a lot of things that can be done with plastic. Upon our return, we shared the pictures we took at Wildlands of school benches, made from recycled plastic, with the learners. With the help of these pictures and books, we taught the learners about plastic and the uses thereof, we explained how harmful plastic is to the environment and how it is not degradable. This motivated the kids to also start to recycle.

A recycling bin setup was put into place at our centre and the Enviro club kids now recycle the paper, plastic and metal that are being used. We have volunteers that take the waste away. The enviro-club, which we named the Protea enviro club, are starting with gardening next term. We want to sell our vegetables to the Siyabonga staff and teachers at the surrounding schools. The money made from the vegetables will be used to go on a trip.

Story of change/Change projects: Mbali Mfeka

I am Mbali Mfeka, I am a social worker by profession and work at the Siyabonga Helping Hands for Africa centre in Edendale.

When I grew up, I never had an opportunity where I was taught about the environment. I was clueless and I did not mind littering myself. As a child I was even asked to dump a wheelbarrow filled with items into a stream. During the WESSA programme I received information, I especially remember a video clip showing people throwing litter into the uMngeni river. I reflected on this and realised that if I had the opportunity to have been taught about the environment, I might have said no at the time and would not have done it.

After the e-STEAM project I saw a need to teach my son about taking care of the Earth. I ask him to take our empty milk bottles to his primary school to recycle it.

After UVNR we started a project which is called one home, one garden. We are starting this with our grade 1 group. All the grade 1's has to collect a soil sample from their homes and bring it back to the centre. They are currently busy with this. We shall then look at the soil and try to determine what would grow well in the garden back at their home and will then send seeds home with them to be planted. We specifically chose the grade 1's, since they are still young and will adapt to the idea. There is a saying in Zulu: "umsenge ugotshwa usemncane", which means to bend a branch while it is still young. If children can see what comes out of the soil, they would be motivated to continue. The concept came from the idea of eradicating poverty at their homes. We are going to call a parent meeting to inform the parents of what we are doing.

Before, I didn't have an interest in the enviro side at my workplace, but after the workshop I learned a lot and I see the need for me to also be involved in the projects at the centre.

Figure 5: Mbali (left) busy constructing a section of the e-STEAM wetland project.

It is not a lack of not caring about nature, it is a lack of information and understanding. e-STEAM is the future, especially if it can be implemented at primary school level.

Story of change/Change projects: Asande Ngcamu

My name is Asande Ngcamu, I am 23 years old. I grew up as a Siyabonga learner, sponsored by the programme. I am a staff member now, my position is as an educator, where I teach Environmental studies and Geography. The projects that I am working on are the GAP year programme, the peace park wetland and one home, one garden. I also run an eco-club at the centre, I consider the learners in my club to be a great inspiration.

Figure 6: Asande (left) at WESSA uMngeni Valley showing of the project which his group has created.

What was beautiful about the programme at WESSA was going to the stream to do water testing and to see the results, it was so interesting. I will soon be doing water testing with the children in my eco-club. My highlight is that we can use what is negative in our community as something positive and that will be a benefit to a lot of people.

The e-STEAM project that our group conceptualized, was to make a bridge from alien plants. When I came back, I found that the alien trees weren't big enough to make a bridge, so we decided to just cut down all the alien plants. DUCT (the Duzi uMngeni Conservation Trust) assisted us with clearing the alien plants. Since we couldn't make the bridge, we decided to implement the e-STEAM project designed by another group, which was to create a wetland park. With the help of others, we created a peace park (see figure 7.) which we now use for lessons when the weather is good. We cleaned and opened up the wetland area opposite our centre and planted a few indigenous plants in the park.

We are currently busy making eco-bricks, which are 2 litre cooldrink bottles filled with waste such as small chip packets. We have made 33 already, which will be used to fence of our park. This will also help to encourage the community to use it to fence their small gardens.

Figure 7: The peace park created by the enviro-club and others, are now often used as an outdoor classroom.

One thing that I have learned after the e-STEAM project is that one can actually make an income from environmental activities, whereas I previously had the assumption that you can only volunteer. We planned a 360 degree clean up around our centre for the 4th of January. We included the community associations (schools, a church, the taxi rank and the community hall) around the centre, and ended up having 213 people participating. We were able to acquire funding for the event, which was for bags, gloves, tape, t-shirts, sandwiches and the professional fees of the organiser and marshals.

The GAP year learners bought into the vision of the litter pick up event after visiting WESSA uMngeni Valley, whereas before I had to constantly argue with them and remind them to be helpful with picking up litter. This has changed, they now understand that they need to be the change that they want to see.

This article commenced as an evaluation of the e-STEAM project for Siyabonga Helping Hands for Africa, which took place at WESSA uMngeni Valley Education Centre. It noted how Action learning as a process and the e-STEAM framework assist us to facilitate learning in a way that course participants are enabled to make lifestyle changes and to take action for a more sustainable world.

It was vital for the success of the programme to ensure that learning approaches should consider the context of the participants and relate to the socio-physical environment of the individual. The learning sought to be relevant and to connect with issues of concern. Prior knowledge and understanding was mobilised and participants were presented with an opportunity to engage in practice-based learning

The e-STEAM project supported Action learning by offering the learners from Siyabonga- Helping hands for Africa the opportunity to engage, do practical field work, to share and report on ideas and most definitely enabled the participants to take action in their communities and work place.

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