



## A Socratic approach to teaching sustainability

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### Summary

Because understanding sustainability does not automatically lead to sustainable acting, we feel that additional awareness building should be necessary. Therefore a project is started in which a very old method, namely the Socratic dialogue, is borrowed from the founders and customized for the use in modern sustainable education and tried for its effectiveness in the engineering field. Other fields of education, for instance social work studies and law schools, have done something similar but with a different purpose.

Our purpose is to challenge and motivate students to internalize their understanding of sustainability into actual acting. Engineering education is the obvious choice for developing this 'internalizing approach' because companies expect that the engineering students of today will be the designers of their sustainable solutions in the future. But we also tested the Socratic approach in groups of entrepreneurs, managers and employees of companies.

In the Socratic dialogues we confront students with the inconsistency in the way they speak and act regarding sustainability and thereby challenge them to investigate and get a deeper understanding of what sustainability really is about. It is a completely different didactic approach from the regular methods but must not be seen as substitution. In our vision the method constitutes a valuable addition to the current courses for sustainable development, in fact we hope that it will establish a synergetic effect.

This paper describes the method and how we used it in our education. It gives our vision on its applicability for sustainability in engineering studies, recommendations about its use and some reflections on its contribution to the final goal: insight in sustainability must lead to effective actions in one's personal and professional life.

### Keywords

*Sustainability, teaching, Socratic dialogue, ethics, internalized knowledge, critical thinking*

### 1. Introduction

One of the more perplexing phenomena in sustainable development is the discrepancy between knowing and acting. Discussing the options to make designs, activities and businesses as a whole more sustainable, often leads to the observation that most people accept rationally that sustainable development is necessary but do not implement it effectively into their actual decisions.

Understanding does not automatically lead to proper actions.

As part of implementing 'sustainable business management' in the curriculum, we have tested how this discrepancy works for our students business engineering (2<sup>nd</sup> and 3<sup>rd</sup> years) and also for an international group of engineering students who participated in the European Project Semester from Avans university for applied science.

Before the start of the Socratic dialogues we asked the students (eighty-one in total) if they thought that sustainability was important for them. We also asked the same students if they thought they were acting sustainably. The results of this survey show that the students said that sustainability is important for them (average **7.3** out of 10), but also show that they don't consider themselves to act very sustainably (average **4.5** out of 10).

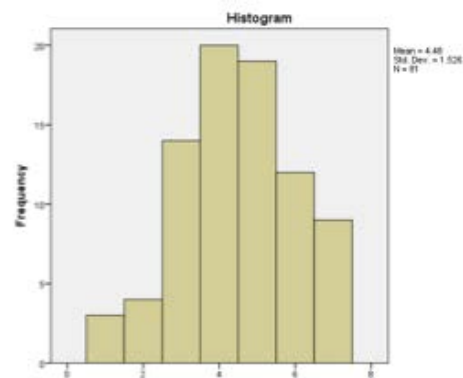
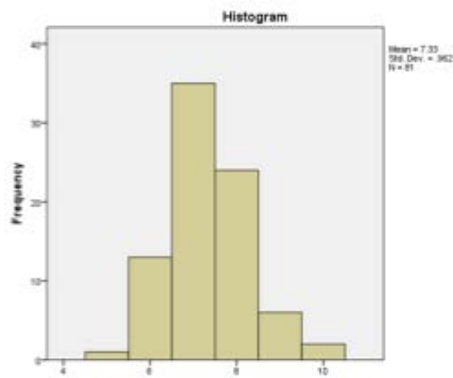


Figure 1: Importance of sustainability Figure 2: Acting in a sustainable way

Taking into consideration that most of these students have followed at least two courses in the area of sustainable development we found the results rather disappointing. The fact that these students have gained knowledge of sustainability and that they say that it is an important issue for them doesn't imply that sustainability has become a principle on which they act in their personal or their professional lives.

Already in 1968 Hardin concluded something identical in his study of 'the tragedy of commons' (Hardin, 1968). He observed that this controversy is caused by the fact that humans give priority to personal interest and believe that their influence is small anyway, 'so it does not matter' while most of them understand that a common interest requires a different private proceeding and action. Before him, Spinoza developed the cognitive theory of affects (Spinoza, 2012). He assumes that rational knowledge alone is not enough to change behaviour. He distinguishes three types of knowledge, namely 'imaginatio' (imagination), 'ratio' (reason) and 'scientia intuitiva' (intuitive knowledge). This latter form of knowledge actually works according to Spinoza, because it is a lived and heartfelt insight, an internalized knowledge that is self affectively loaded, e.g. with a deep desire to achieve something.

Internalizing the knowledge of sustainability must become a part of engineering education. Otherwise students of today will not be the intended designers of sustainable solutions needed in the future. Many employers already expect this already from the engineering students of today and in the future this will become even more important.

The authors therefore sought a method that could complement the regular courses in the field of sustainability making students aware of the discrepancy between the way they talk about sustainability and the way they act in daily life. The method should stimulate students to reflect on their beliefs and it examines what keeps the students from acting sustainably.

This paper suggests a method which can give meaning to these wishes, it is not a new didactic or a pedagogical innovation but an approach which has its roots in ancient Greece and is called the Socratic Dialogue [SD].

That method is borrowed, customized for sustainability and tried for its effectiveness in the engineering field. The SD is a structured quest for better views and the ultimate aim of this kind of inquiry is to give participants, e.g. students, a deeper understanding of what sustainability really is about. This reflective method has a completely different didactic approach in comparison with the current courses in sustainable development, so therefore the SD must be seen as a valuable addition to these courses.

This paper gives a first account of our results testing whether and how this SD reflective conversation method creates awareness of the inconsistency in the way students talk and act concerning sustainability and if the SD can contribute in transferring knowledge of the ratio into this intuitive knowledge that we call internalized knowledge. (Van Reijen, 2008)



## 2. The Socratic dialogue

### 2.1 Historical and theoretical background

According to Plato's dialogues Socrates (469-399 BC.) held dialogues about everyday issues with passers-by at Athens central market (the Agora), in wrestling schools and with his pupils. At the start of the dialogues the interlocutors were always very sure about their view on a specific matter, but by systematically asking questions the interlocutors became less sure of their views and they finally end up in a state of ignorance (elenchus). To get them in this position Socrates often confronted his interlocutors with the gap between the things they said or thought and what they actually did. According to Plato this state of ignorance was necessary before people were able to join an investigation and gain new knowledge.

The figure Socrates and especially the way he worked was admired by people during twenty five centuries. But it lasted until 1922 (Nelson, 1965) before the practical application of how he asked questions was rehabilitated. It was the German philosopher Leonard Nelson (1882-1927) who together with Gustav Heckmann (1898-1996) transformed this manner of questioning into a structured method and he called it the Socratic Dialogue [SD].

It was Nelson's conviction that a group of people in a joint ethical reflection would be able to investigate their own beliefs and principles because they can be derived from their views. These views are implicit and arise when people try to give meaning to experiences.

Systematically asking questions makes it possible to reason back (regressive) from a judgment about a particular experience to the underlying arguments. In the same way the basic principles (abstraction) can be derived from the arguments.

The theory of reasoning back from a specific judgment of an experience to generic principles is called 'regressive abstraction' (Nelson, 1994).

The main task for a researchgroup in a SD is to find these backing rules and to investigate if they are true and valid in relation to the particular experience under investigation.

### 2.2 Structure

Since the introduction of the SD by Nelson it has developed worldwide. Several variants of the SD emerged but the essence, namely the structure and theoretical background, remain the same. In this paper we use the hourglassmodel (Kessels, 2008), see figure 3, because in our opinion this model gives a good survey to explain the structure of the SD.

#### *Question:*

The first step is to make an inventory of questions and select one question. A good question is one which is easily and well formulated, has a general character and can't be answered empirically.

#### *Experience:*

Participants bring in personal experiences that can be related to the question. The group selects one experience, which will be the basis of the analysis throughout the dialogue. A useful experience should have a connection with the research question, is (recently) completed and is simple which makes it possible for other participants to empathize.

#### *Core Sentence and judgement:*

After selecting the example the role model talks extensively about his experience and his role and/or decisions during that experience. After relating the experience to the research question the role model makes a core statement and this is the starting point of the inquiry.

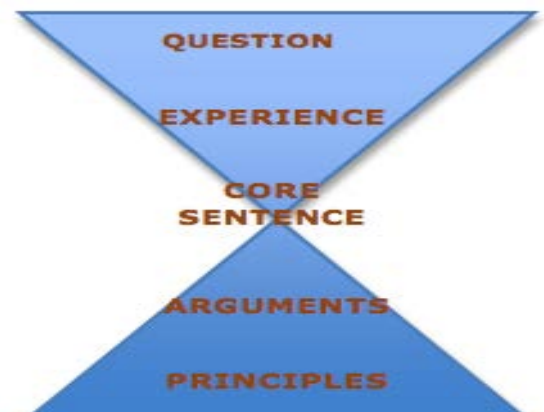


Figure 3: hourglassmodel



*Arguments:*

Then the inquiry shifts to the other participants. Like the role model they also have to take a position. The arguments for the positions, which are based on the experience of the role model, are compared and investigated. These arguments should justify the position they have taken. In this phase of the inquiry there are often discussions about semantic aspects of everyday words that are not clear to all participants.

*Principles:*

In this phase the personal principles of the participants are investigated to justify the arguments which are based on what they have experienced. These principles should apply in all circumstances and enable the participants to answer the research question. But due to lack of time the dialogue will sometimes have to stop without having consensus about the answer to the research question. Sometimes this open end gives an opportunity to continue the inquiry later on.

## 2.3 Requirements

### 2.3.1 Participants

Most SD's have a minimum of five and a maximum of twelve participants and the dialogue can take three hours but can also go on for five days. All this time the participants should concentrate and focus on the inquiry. Therefore it is important that they are curious and prepared to investigate their own thinking and how this relates to the thinking of others. To make the inquiry possible it is necessary that participants share their thoughts even if it causes discomfort. The American philosopher Martha Nussbaum described this attitude very aptly as the Socratic eros<sup>1</sup>.

During the dialogue participants have to obey some rules, the most important rules are according to Hans Bolton (2003):

- 1) Say what you think
- 2) Be concrete
- 3) Try to understand the other

### 2.3.2 Facilitator

During the inquiry, the facilitator uses the format of the hourglassmodel, see figure 3, consistently. The freedom for participants lies in the contents of the inquiry, they are free to say, think and investigate whatever they want.

The role of the facilitator is to stimulate the participants to investigate the selected research question and the associated experience. The facilitator leads the process and has to make sure that participants mutually understand each other. Important statements are written down on a flap by the facilitator to give the participants a survey and to show the sequence of the inquiry. Under no circumstances should the facilitator contribute to the content of the dialogue. This is because the participants are responsible for the content of the inquiry.

## 2.4 Experiences of others

Internet research shows that there are some applications of the SD in higher education. Most of the examples take place in law schools, however the Socratic method is also applied in Social Work education. Interestingly, the learning objectives of the SD in both situations are different and also differ from the goals that we want to achieve with engineering students in the field of sustainability.

### 2.4.1 Law schools

Elizabeth Garrett published an article about the role of the Socratic Method in Modern Law schools (Garret, 1997). According to her the objective of the SD is to teach law students how to analyse legal problems, to reason by analogy, to think critically about one's own arguments and those put forth by others, and to understand the effect of the law on those subjected to it. She also suggests that the SD makes students more confident when talking to large groups.

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<sup>1</sup> The Socratic eros is the love that is not only the love for the truth, but also passion for the joint search for the truth and affection for your companions on this quest. Without eros the truth is not to be found. (Martha Nussbaum)



#### 2.4.2 Education in Social Work

Miriam van Reijen used the SD with first year students in the subject of Social Work (MWD) at Avans Hogeschool already in 1998. She organized seven meetings with several groups in a period of two months. Her reason to choose for working with the SD was to make students aware of their own beliefs, values and norms (their process of socialization) and to realize that other people have different beliefs. In her meaning the awareness of their own and other people's beliefs was achieved, but accepting the diversity was accomplished to a lesser extent. Another objective to choose for the SD was to teach students an interview technique in order to help them asking the right open questions to clients (with a problem) to get to the real problem.<sup>2</sup>

### 3. Practise

#### 3.1 Example

The example below is not an extensive case study but summarizes the results of the different steps during a SD<sup>3</sup>. This specific dialogue took two hours and was partly filmed. Nine international EPS-students<sup>4</sup> with an engineering background participated in the dialogue.

##### *Research Question:*

When is a product sustainable?

##### *Personal Experience:*

'During my study I was given a project to redesign a product. I chose to design a child's product which has the possibility to change characteristics, by adding new parts, as the child develops from age 1, 2 and 3. In the first instance the product is designed for children from age one. After one year the parents can buy a new part for the product and by adding this part to the original product the characteristics of the product will change which makes the product attractive for two year old children. Another part is available in the shop to change the product again and make it attractive for three year old children. The idea of this product is to stimulate reuse and to eliminate the throwaway character of the product.'<sup>5</sup>

After explaining this example the researchgroup questioned Margaret about the different parts of the product and the way it is produced. Then the participants took different positions in the judgement whether the toy is or isn't sustainable.

*Judgement / assumption:* **This toy isn't sustainable**

##### *Arguments:*

- 1) The toy is painted with paint that contains toxic and Volatile Organic Compounds
- 2) The manufacturing process of the toy makes use of fossil energy and is wasteful with clean water
- 3) After the using the toy for three years it is not 'reusable'

##### *Principles:*

- 1) Paint that contains Volatile Organic Compounds is not sustainable
- 2) If a product is not produced in a sustainable way it's not a sustainable
- 3) If there are no plans for the end-of-life cycle of a product then it is not sustainable

<sup>2</sup> This information is provided by Miriam van Reijen per email at 7th March 2013.

<sup>3</sup> The dialogue took place on 24<sup>th</sup> September 2012 at Avans university of applied science in s'-Hertogenbosch, the Netherlands.

<sup>4</sup> EPS stands for European Project Semester

<sup>5</sup> Margaret Osei, student Product Design at Nottingham Trent University (United Kingdom)



*Judgement / assumption: This toy is sustainable*

*Arguments:*

- 1) The life-cycle of the toy is extended two times (less waste)
- 2) The toy encourages people to reuse items (discouraging the throwaway society)
- 3) The intention to design the toy more sustainably was existent

*Principles:*

- 1) If the life-cycle of a product is extended (two times or more) then a product is sustainable
- 2) If a product stimulates reuse in society then a product is sustainable
- 3) If the designer has the intention to create a sustainable product then a product is sustainable

*Assessment of the discussion:*

This SD started with a dialogue of a more technical than philosophical nature. Because the intention of a SD is to investigate the thinking and reasoning of the participants the facilitator intervened in the inquiry. He asked the group to investigate what the arguments had in common that supported the view that the toy was (or was not) sustainable. One group concluded that every aspect of a product has to be sustainable before we can speak of a sustainable product. But they also realized that it is very difficult, if possible at all, to get a complete and detailed view on every aspect of the product - from raw material until the final product, the user phase and the after-life-cycle. And even then it is possible that in the future you have to change your opinion because of new insights, e.g. technical developments. The other group concluded that a product is sustainable if the product is more sustainable than comparable ones currently available (improvement). This raised the question what sustainability really was and the group tried to give meaning to this word. Then the inquiry shifted towards the question 'is less bad no good?' and this helped the group to investigate their reasoning instead of getting entangled in a technical discussion. The new insights that occurred during this discussion helped the students to give substance to the concept of sustainability.

### *3.2. Research questions and themes*

Last year (2012) we organized seven SD sessions about sustainability with students. Recently (2013) also two dialogue sessions with entrepreneurs, managers and company employees were organised. The following research questions were investigated during these sessions:

- 1) What keeps people from being sustainable?
- 2) When does responsibility stop?
- 3) When can our activities be justified?
- 4) Should we be worried about sustainability?
- 5) When do you stop being sustainable?
- 6) Am I doing the same things at work as I teach my children at home?
- 7) Is there need to be sustainable?
- 8) How much is enough?
- 9) When is a product sustainable?

We observed that some themes reoccurred in many dialogues. Those that we recognize are responsibility, justice, solidarity, prosperity, risks and the relation human and nature. It seems that these themes have a strong relationship with sustainability.

### *3.3 Socratic dialogue involving students*

In total eighty-one students were asked just before (fig. 1 and 2 on page 2) and just after (fig. 4 and 5) a SD session how important sustainability is for them and if they act sustainably. The results of this survey show that one dialogue has no significant influence on either of these issues. This means that the inconsistency between thinking of sustainability and acting still exists. Further research should be



conducted to develop a solid statement whether the SD can lead to internalized knowledge of sustainability and sustainable behavior. This requires a research over a longer period of time in which multiple SD's are conducted with the same student population.

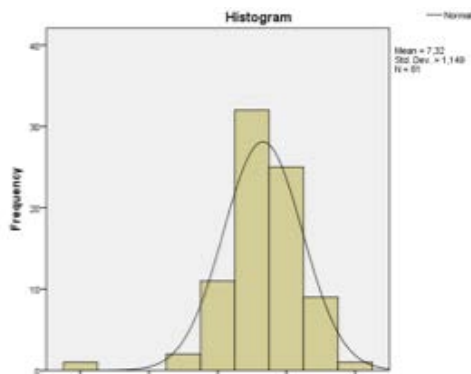


Figure 4: Importance of sustainability

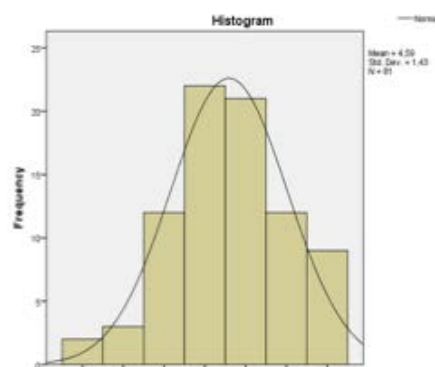


Figure 5: Acting in a sustainable way

Because of the discrepancy in the way students speak about their thinking and acting ('logos et ergon') in the field of sustainability the SD is a very suitable didactic approach to investigate this discrepancy. This is because the core of a SD is to make participants aware of the difference in the way they talk about it in everyday and professional life and to investigate this inconsistency.

This is also consistent with what we experienced with this method, however we will note that it is crucial that the research question and the personal experience, which are under inquiry, don't give students the space to have a conversation about technical arguments instead of an inquiry into their own thinking. This danger is lurking because especially engineering students tend to talk on technical issues. If this phenomenon occurs it takes a lot of driving skills of the facilitator, in the form of appropriate interventions, to redirect the inquiry and stimulate students to investigate their own thinking. We ourselves have experienced this problem in the example which is described in this paper with the research question 'when is a product sustainable?', see section 3.1.

After the SD we asked eighty-one students about their opinion of the SD compared to regular didactic approaches. Though there is no proof as to the conclusions we can say that in general the students are quite enthusiastic for the following reasons:

- they learn to listen to each other with an open mind (objective);
- they learn new things about sustainability in a completely different way;
- they are challenged to investigate other opinions (broader and deeper thinking).

The disadvantage students mentioned was that, although they had to think continuously, the speed of the thinking-process was relatively slow.

### 3.4 Socratic dialogue involving entrepreneurs, managers and company employees:

Like the engineering students the SD-participants from companies sometimes had a problem to focus on one's own thinking and to examine the assumptions that follow. In the first dialogue there was one participant who tended to speak in a general sense about sustainability and another participant used a theory out of a book (authority). In the second dialogue a participant tried to give advice to the role model instead of investigating his own thinking. And despite all good intentions this stagnated the inquiry.

In those situations it takes, again, a lot of driving skills of the facilitator in the form of appropriate interventions to redirect the inquiry. The facilitator has to remind the participant of the rules. Not in an authoritarian manner, by telling this directly to him or her, because that is not the style which suits a SD (Van Rossem, 2006). It has to be an intervention in the form of a question which helps participants to investigate their own thinking.



#### 4. Conclusions and further research proposed

SD appears to be effective to make engineering students aware of their and other people's values and beliefs in the area of sustainability. It gives them insight in the inconsistency in the way they talk about sustainability and the way they act. This awareness and insight makes the SD a valuable addition to the current courses for sustainable development.

So in our vision the SD can be used in higher education for engineering students

However further research is needed to review if the SD can actually and effectively change the behaviour of students in a more sustainable way. Such a research requires multiple SD's with the same student population over a long period of time. An additional advantage of such an approach is that the participants gain more experience with the SD and this will lead to a better research discipline and will give more depth in the inquiry than a group who joins a SD for the first time. (Pihlgren, 2008)

The need for an experienced facilitator to conduct the SD became clear. It must be prevented that only a technical discussion occurs instead of investigating one's own thinking.

In the beginning of the dialogue a facilitator must ascertain that the research questions and the personal examples which are brought in meet the requirements. So a task of the facilitator is to help the contributor of the specific research case to clarify it in such a way that it is completely understandable for all participants.

The most important and difficult task for the facilitator is intervening appropriately at the right time and in a 'Socratic manner' to stimulate the group to investigate and be explicit about their thinking. Because of this, teachers and professors who want to implement the SD in their education should first get an appropriate training. (see <http://www.philosophisch-politische-akademie.de>)

Furthermore, we have found that other methods aimed at supporting companies to introduce sustainable management, such as the Fociss approach (Venselaar 2010), are also less effective due to that same discrepancy between 'knowing and acting'. The objectively positive outcome of sustainability strategy studies does all too often not result in really effective actions by the companies involved. So the SD may be a valuable and indispensable part of our further development of models and tools for sustainable business operation. This might involve that SD is integrated in such methods.

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