

FUTURE VISIONS AND VISIONING FOR SUSTAINABILITY IN HIGHER EDUCATION: RESULTS AND EXAMPLES FROM THE NETHERLANDS

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Abstract. *Working on sustainable development means working towards the future, while it concerns periods of more than 50 years covering more than one generation. This implies that concepts and approaches from future studies and future visioning are relevant for both the field of sustainability studies and sustainable higher education. It was noticed in the Netherlands, however, concepts, approaches, and methods from future studies, foresighting and scenario studies are hardly lectured in sustainable higher education, while at the same time there is a growing professional practice in system innovations and transitions towards sustainability using elements from future studies. This issue was explored by the working group Past, Present & Futures that also has dealt with how to enhance future thinking in sustainable higher education. Several outstanding examples of courses and educational projects are described and discussed.*

1. INTRODUCTION

Working on sustainable development means working towards the future (e.g. Vlasman and Dankelman 2002). Sustainable development concerns periods of more than 50 years covering more than one generation. This would enable to achieve both considerable environmental improvement around, a factor 10 up to a factor 50, and strongly increased equity. It has been argued that methods and approaches from future studies, foresighting and scenario studies are necessary, but need to be adjusted so that they can be applied for resolving sustainability issues on the long. It could also be argued that concepts and approaches from future studies including future visioning,

foresighting and scenario methodologies should become part of sustainable higher education. It was noticed in the Netherlands, however, that though sustainable development is future-oriented, techniques and methods from future studies, foresighting and scenario thinking are hardly lectured in sustainable higher education in the Netherlands. On the other hand, both in the Netherlands and abroad, there is a growing professional practice in future studies and foresighting for sustainability. So, why is this? One could argue that if this is happening in professional practice involving government, companies, research bodies and public interest groups, there would be a growing need for people who have been educated on this and that specific course programmes have been developed.

However, this is hardly the case. The Dutch Network for Sustainable Higher Education initiated therefore the working group Past, Present & Futures (PPF). The PPF working group has been dealing with what can be the relevance and potential of future studies for sustainable higher education and how this could be achieved. Both experts in sustainability foresighting, lecturers representing the demand side in education – and interested in incorporating future studies and future thinking in their courses and course programmes – and professionals representing the demand side in society have participated in the PPF working group. Activities included several meetings, exploring examples in practice where future studies or foresighting is very well integrated when working on sustainability issues, and exploring higher education for outstanding educational examples in which sustainable development and future studies are fully integrated. This paper reports on results from these activities (for a full account, Vlasman and Quist 2004).

Interestingly, the Dutch Network for Sustainable Higher Education made only a first attempt for defining a separate competency for long-term or future thinking in 2002 (DHO 2002: 43-45), while other competencies were defined earlier. Briefly, it included competencies like contributing to sustainability from the own discipline, being able to work interdisciplinary, awareness of and able to deal with different interests in society, and being able to use an integral and system oriented view. Yet even when the future and future thinking has been part of courses and has been stimulated, it appeared to be difficult. Quoting Anja de Groene (De Groene 2003: 33, our translation) regarding specific project education on sustainability in a technical college, where the future was part of the course objectives: *"There was too little future and thinking about the future (in this educational project). Students focus on short-term technical solutions."* This might illustrate that it is a difficult issue. Furthermore, it can be mentioned that the combination of sustainability and future (studies) is hardly present in most course programmes in (sustainable) higher education, while it is presently steadily getting stronger in the Netherlands.

What could be an explanation for on the one hand the growth of sustainable higher education and on the other hand the issue of future and sustainability lagging behind? One reason could be that both long-term system innovations and transitions towards sustainability in practice has been the focus of few for quite a period. Only since a decade there has developed increased attention for the long term resulting in a growing number of people involved and a growing awareness and consensus among major parties in both government and the private sector. This has also happened in parts of government and companies that were originally less concerned with sustainability issues or that used to focus on short-term environmental issues. Another reason could be

due to the strong growth in sustainable higher education, both in new course programmes and in ‘greening’ of existing curricula and disciplines. For both students and lecturers the issue of integrating sustainability is new and difficult, and combining this with a future orientation and elements from future studies adds another dimension in this change process. This can be illustrated by the fact that sustainability is often part of multidisciplinary project education also involving stakeholders and society, which brings together a lot of new aspects and issues.

However, if sustainable higher education wants to educate students that are familiar with combination of future and sustainability in a way that they can contribute to system innovations and transitions towards sustainability in ‘real life’ practice, then barriers must be overcome and the combination of sustainability and future (studies) must become established in higher education and course programmes. It is an emerging topic (e.g. Vlasman and Dankelman 2002, Dobbinga and Vlasman 2004). It has been the focus of the PPF working group, while this paper aims to report on its results. It is structured as follows. Section 2 elaborates upon the relationship between sustainability, future and future studies, distinguishing between three types of futures. Section 3 deals with participatory approaches for the future using normative future visions or scenarios. Section 4 describes outstanding examples from the Netherlands of courses in which sustainability and future has been combined successfully. Section 5 compares the examples, while Section 6 contains conclusions and includes a discussion on the broader relevance, a future vision for the integration of future and sustainability in higher education and the needs and problems of lecturers when starting with it.

2. SUSTAINABILITY AND FUTURE STUDIES AND HIGHER EDUCATION

Like any other future, sustainable futures are complex, uncertain and cannot be known in advance. Future thinking and future studies on sustainable futures are therefore not meant for forecasting or designing detailed ‘blueprint’ futures, but are meant for identifying and exploring possible sustainable futures, get a better understanding of their possible implications and consequences, and get a better idea of what we can start doing now. Though numerous typologies in future studies and scenario approaches are known (see for instance Van Notten et al 2003), we propose to make a simple distinction that seems very useful for broader application in (sustainable) higher education:

1. Future studies and thinking on *likely* futures;
2. Future studies and thinking on *possible* futures;
3. Futures studies and thinking on *desirable* futures.

Likely futures are often constructed using trend extrapolation using historical data, sometimes in combination with modelling. The objective is in general to sketch the most likely future. Economic predictions by Planning Bureaus are a good example in most countries. Traditional market forecasts and weather forecasts are other examples. The traditional Delphi study aiming at reaching consensus among experts (through individual interviews or questionnaires in several rounds of which the results are each time presented anonymously) on feasibility and likeliness of new technological options could also be positioned in this category.

Possible futures are in general constructed by varying trends or parameters in different ways, which results in several possible futures. This can be based on quantified

models as was done in the famous studies led by Dennis Meadows (Meadows 1972) and in the emission scenarios developed by the IPCC (www.ipcc.ch). However, quantification is not necessary. A famous approach in this category is the strategic scenario approach originally developed and applied successfully at Shell in the 1970s. The key of this approach is that driving forces - driving major changes and developments in the context - are identified that are both highly uncertain and have a high potential impact. By varying and combining in driving forces, the outlines of possible futures can be sketched. This enables to prepare for different futures and develop strategic action plans for those futures without knowing which one may become reality and from multinational companies it is known that they investigate if major investment decisions do well in several scenarios. Decisions and actions that fit in more than one future are considered to be more robust. Of course, the success of this approach depends highly on how well the set of futures has been constructed

Desirable futures differ fundamentally from possible and likely futures, as they are based on normative future visions. The relevance for sustainable development is that it enables to develop and focus on sustainable futures and how possible trajectories towards these futures could look like (Grin 2004, Vlasman and Quist 2004). Furthermore, it is possible to explore sustainable alternatives for dominant developments and that differ radically from present situations and regular dominant options, while it can also be used to identify and guide actions now that would support such an sustainable alternative development. This can be described as turning long term future visions into action and activities now (Jansen 2004, Vergragt 2001). Important aspects of such desirable future visions having the potential for guiding actions and possible implementation trajectories relate to quality, credibility, exposure and feasibility. Though it could be argued that these aspects might affect creativity and radicality of such future visions, it must be acknowledged that from the viewpoint of sustainability, we urgently need visions that can be realised and are sufficiently attractive to a wide range of stakeholders. This is why broad stakeholder involvement and participation is so important. Future visions that are the result of processes of social interaction and stakeholder participation might be more feasible and might generate broader social support and acceptance. So, future studies and thinking for desirable futures is clearly of great importance for sustainable development.

There are two more aspects that we would like to mention here with respect future studies and thinking for desirable sustainable futures. First, it enables an orientation on action and activities by those involved and thereby on realising it – while acknowledging the social dynamics and the plural and democratic nature of (many) societies (Grin 2004). Second, developing and exploring normative future visions enables to work on problems for which present socio-technical systems are not prepared. This is due to that socio-technical systems are always based on institutions, sets of rules and structures that have been developed to deal adequately with existing and past problems, while it does not include the structures and institutions for new or persistent problems like congestion, healthcare in ageing societies and major unsustainabilities (Grin et al 2004, Quist 2003). As these existing institutions, rules and structures are often part of the problem, the desirable future is likely to include changes on this too.

The emphasis on the importance of *desirable* futures here does not imply that likely futures and possible futures are not important, nor that the approaches and

methodologies to investigate are so. For instance, they can be very useful and relevant when analysing major unsustainabilities and studying conditions and options for sustainable development, as was shown by Meadows and the IPCC. Furthermore, many tools and methods that have been applied in frameworks for analysing likely or possible futures - including from fields like technology assessment and impact assessment - can be applicable for exploring desirable futures if adjusted properly. The major difference is then how the future under study, has been constructed.

3. APPROACHES USING NORMATIVE FUTURES

After having argued that the concept of normative and desirable futures is of great importance when working on sustainable development, the emerging question is if, and what approaches are available? This question can be answered positively and in this section we would like to describe the backcasting approach and introduce a few more that have been applied in practice.

3.1 Backcasting

Backcasting means literally looking back from the future, but as an approach it means more. Backcasting can be defined as first creating a desirable (sustainable) future, followed by looking back on how this desirable future could have been achieved, before defining and planning follow-up activities and developing strategies leading towards that desirable future. In this way it can be seen as the opposite of forecasting and most foresighting that take the present as the starting point for looking towards the future.

The advantage of backcasting for sustainability problems has strongly to do with the idea of taking desirable (here sustainable) futures or a range of sustainable futures as a starting point for analysing their potential, feasibility and possible ways how these futures can be achieved. Backcasting is particularly useful if it concerns highly complex problems, if there is a need for a major change, if dominant problems are part of the problem, and if scope and time-horizon are wide enough to leave room for very different choices and development ways (Dreborg 1996). It has been argued that the distinctive features of backcasting make it more appropriate for sustainability applications than regular foresighting and scenario approaches.

Backcasting originates from the 1970s and was originally developed as an alternative for traditional energy forecasting and planning. It was originally considered as an additional policy analysis tool for energy planning, while later on since the 1990s the emphasis shifted towards its potential for identifying and exploring sustainability solutions, first in Sweden, Canada and also the Netherlands. This included backcasting for regions like the Baltic Sea, for mobility systems and the variety of the Natural Step for transforming companies into sustainable ones. The development towards participatory backcasting using broad stakeholder participation and interaction and aiming at social learning among stakeholders took also place in the 1990s in Canada (Robinson 2003) and the Netherlands (Vergragt 2004). An overview of backcasting is provided elsewhere (Quist and Vergragt 2003).

In the Netherlands backcasting has been applied as a participatory approach to identify and explore system innovations towards sustainability, while also aiming at follow-up and implementation in public research, at companies & public interest groups, and at the government. Backcasting has for instance been applied at the

Sustainable Technology Development programme (Weaver et al 2000, Vergragt 2001, Jansen 2004), and it got a EU funded spin-off focussing on sustainable households (Vergragt 2001, Quist et al 2001). Systems as meant here contain both technical and non-technical or social elements and must be seen as socio-technical systems, while it is acknowledged that technology and society mutually influence each other and evolve in a co-evolutionary way. Key elements of participatory backcasting include (Quist & Vergragt 2003): (1) the construction and use of desirable normative scenarios and goals; (2) broad stakeholder participation (from government, companies, research and public interest groups) and stakeholder learning (on the level of paradigms and values); and (3) combining process, participation, analysis and design using a wide range of methods within the overall backcasting approach.

Five major stages or steps can be distinguished in participatory backcasting (see also Quist et al 2004, Quist and Vergragt 2003):

STEP 1	Strategic Problem Orientation (including defining normative assumptions & goals)
STEP 2	Construction of sustainable future visions or scenarios
STEP 3	Backcasting stage (backwards-looking analysis)
STEP 4	Elaboration (design & analysis) and defining follow-up activities and action agenda
STEP 5	Embedding of action agenda, activities and generating follow-up & implementation

3.2 Other participatory approaches using based on normative futures

The backcasting approach is not the only that combines normative futures and stakeholder involvement for working on sustainable development. For instance, Rotmans et al (2000) report on an approach on normative scenarios for sustainable areas in Europe in which stakeholders were involved, while Street (1997) reports on the use of scenario workshops as a participatory approach to sustainable urban living. Concerning the latter, which involved four groups, namely citizens, local policy makers, the private sector and technology experts, the scenario workshop approach included (1) creating visions and (2) looking at ways of turning those into reality. Van Asselt (2004) mentions an approach for envisioning futures using scenarios and creativity emphasising the analytical dimension.

In 't Veld (2001) has also proposed an approach to future studies using normative future designs, stakeholder involvement, orientation and analysis for the field of spatial planning policy. In 't Veld (2001) makes a clear distinction between this approach and what he called (1) normal science (within the assumptions of the regular paradigm focussing on detailing and elaborating the ruling paradigm) and (2) regular future studies (assuming rationality, objectivity and a focus on analysis). While most future studies is of the regular type aiming at reducing uncertainty, it is less equipped to acknowledge the connections and interactions between sociotechnical systems and the dynamics within and between such systems. Three pillars can be distinguished in this approach:

- *Orientation* reflects the heterogeneity and assumes a broad and integral outlook.
- *Research* reflects the analytical component, but acknowledges the multi-actor setting too.

- *Design* combines dialogue among stakeholders involved aiming at constructing normative future images and support for these images.

Possible goals include agenda-setting and generation of alternative policy options, stimulating dialogue and coalition formation, vision development, initiating awareness and learning processes, insight in opportunities and impossibilities of future (options) leading to reflexivity and anticipation. Assumptions include (In 't Veld 2001: 27-37): transdisciplinary research connecting different types of heterogeneous knowledge, the utilisation of experts, actors and stakeholders for connecting heterogeneous knowledge (which also requires initiation, creativity and reflexivity), and taking into account ambiguity and uncertainties.

4. EXAMPLES FROM HIGHER EDUCATION

In the introduction we have argued that the potential future studies and future thinking is quite underutilised in sustainable higher education, while it should be a key element. We have also argued that approaches for working on desirable futures seem to have the widest potential for working on sustainable development, while approaches can be found in (professional) practice. But can examples be found in present higher education in the Netherlands that could be communicated to all interested when working on integrating sustainability in higher education? Actually, we have found a few examples in a limited number of studies, though it has certainly not widely diffused yet and is limited to specific studies, elective courses or postdoctoral courses aiming at professionals. Here, we would like to describe a few examples cases (for a more detailed elaboration see Vlasman and Quist 2004).

4.1 TiSD Colloquium course, Delft University of Technology

Delft University of Technology (TU Delft) has decided (1) to integrate sustainability in all engineering curricula and (2) to create in all curricula the possibility of a graduation specialisation in sustainability, in stead of developing separate sustainability course programmes. This was motivated by the idea that each student should have a basic knowledge of sustainability, sustainable technologies and how sustainability relates to each engineering discipline. The TiSD (Technology in Sustainable Development) course is the key compulsory element of the graduation specialisation on sustainability, while the specialisation includes also sustainability related graduation project and 11 ects (or 8 credits of 40 study hours) from two clusters of sustainability related courses. For a more detailed description of this course, see Quist et al 2004). This course runs twice a year, once in Dutch and once in English. Each time 25 students from all faculties can follow it and since this course has started more than 150 students have completed it. As mentioned above, the course has two distinguished parts that are strongly related.

The first half of the course takes place during the boat trip offers an intensive programme in which lectures, site visits, excursions, workshops, creativity sessions, videos, discussions and role-playing games alternate. It includes guest lecturers, working as leading professionals in the 'real world', presenting state of the art cases of complicated sustainability problems and their social context. The second half of the course is devoted to project work using the backcasting approach, which takes place at the university during a 4 to 6 week's period (see also Quist et al 2004). Groups carry out

a backcasting project using a methodology derived from the backcasting approach described in Section 3.1 adjusted for educational purpose around fulfilling future societal needs or functions in a sustainable way, based upon the themes addressed during the boat trip.

Since the TiSD Colloquium course started in 2001, more than 150 students have completed the course and almost 30 backcasting projects have been done on a wide variety of topics like mobility, water, energy, clothing, food production, river basins, regions and issues in developing countries and more. Groups are very capable of making a strategic problem orientation for a (need) area like water, energy or land usage, develops and elaborates a future vision for sustainable need fulfilment in which identified unsustainabilities are solved. Furthermore, each group makes a backcasting analysis in which they identify technological, cultural-behavioural and structural-economic changes that are necessary for achieving the sustainable future vision and has to elaborate a follow-up proposal and a possible development and implementation trajectory. They are also capable of contacting stakeholder for obtaining more information, opinions and feedback on their ideas and vision. Results are presented at the end.

Students are very positive about the course, the backcasting approach and about working with students from all faculties interested in sustainability issues. They start realising that other disciplines look at (sustainability) problems with a really different view and basic assumptions. They are also positive about working with students from other faculties and exchanging methods and ideas. Though students like the broad multi-aspect and integral approach, they also consider it difficult, as it is not part of their study. Students indicate that they learn considerably about stakeholders, their interests, their behaviour and strategic motives and start realising that these are part of the barriers for sustainable development. Students also consider it difficult to take into account social acceptance, democratic legitimisation, the influence of existing parties and existing interests and the social dynamics around development and implementation of alternative options aiming at sustainable system innovations.

4.2 Transdisciplinary project education, University of Amsterdam

The Expertise Centre on Sustainable Development at the University of Amsterdam has – in co-operation with other universities – developed a model for transdisciplinary education in sustainability meeting the following three demands: (1) it must be multidisciplinary and students from different disciplines must participate; (2) stakeholders from different societal groups, like research, government, companies and public interest groups must be involved; (3) Students must as a group develop an operationalisation of sustainable development applicable in their project. Long term thinking and developing future visions is stimulated, while it is important that the problem is articulated or suggested by a stakeholder that also acts as a principal.

Since 1999 more than 30 (multi-disciplinary) project groups were initiated, all of them multi-disciplinary. Examples of particular projects include the future sustainable (re)development of the banks of the Schie River in the city of Delft – where companies involved in the area were in need of a joint future vision for combining functions in that area and the development of a future vision for the IJssel River in 2030.

Students are in general very positive about the projects and especially about multidisciplinary co-operation and the opportunities to interact and co-operate with

stakeholders from different societal groups (government, companies, public interest groups). Principals are in general also positive and appreciate the contributions to their discussion and vision development. Proposals from the project groups are hardly put in practice, however, even if these are meant for implementation, mostly due to practical problems and 'real-life' feasibility or the long-term nature of ideas and proposals. Students learn especially to broaden the problem and develop long-term ideas and visions that may overcome present bottlenecks in addition to working multi-disciplinary and from (working with) stakeholders.

4.3 River21, international educational project on the future of river basins¹

During the World Water Forum in 2000 there was considerable attention for strategic vision development, integral approaches for sustainable water management and international co-operation, especially in case of river basin systems that are located over more than one country. Universities from Belgium (Antwerp, Arlon, Gent), France (Lille, Montpellier) and the Netherlands (Wageningen, Delft, Zeeland) initiated the River21 project for developing a methodology for vision development, formulating goals and action plans for international river basins that can be applied in educational projects. This methodology was applied for the river Schelde for several years. This river starts in Northern France, goes through Belgium (along Antwerp) and ends in the Netherlands in the province of Zeeland in the tidal inlet known as the Westerschelde.

In the River21 project students were from different disciplines, different universities and different countries. So, they had different disciplinary and cultural background, knowledge, attitudes, mother tongue and different expectations regarding water management, working in teams and the English language. The project consists of an orientation and a preparatory study in the months before the actual project of two intensive fulltime working weeks that start with an excursion of three days along the river that includes site and stakeholder visits. Sustainable development, international co-operation and co-operation and broad stakeholder involvement were seen as prerequisites for the future of river basins (management). The River21 methodology includes (participatory) methods for problem analysis, system analysis, actor analysis, scenario development and participatory methods for (future) vision development, while brainstorming, consensus seeking and other creativity techniques have also been applied. It is an important aim of the approach that students develop a joint language and shared definitions. More details can be found in Ruijgh-van der Ploeg and Verhallen (2002).

Students have developed the following future vision for the Schelde river basin. In brief, the transportation function, the drinking water function and ecological functions must be guaranteed, also in the future. This is possible through functional differentiation of the main (Schelde) river, side rivers and canals. Migration of species should be stimulated. Lack of water in summer should be dealt with by demand management and enhancing filtration of water. Harbours from Le Havre up to Hamburg need to co-operate and specialise in order to increase opportunities for safety and ecological functions (Ruijgh-van der Ploeg and Verhallen 2002).

Important (learning) results according to the students include development of joint languages, terms and defining the topic, jointly exploring different interests in a river

¹ Section 4.3 is based on Ruijgh-van der Ploeg and Verhallen (2004).

basin system; developing joint long-term goals, doing a system analysis in a structured way, international and interdisciplinary co-operation, and learning how to communicate a future vision with all stakeholders involved.

5. COMPARING THE CASES

After having described the three cases, it is interesting to compare them, which is summarised in Table 1 below.

	<i>TiSD course TU Delft</i>	<i>Transdisciplinary projects, Un of Amsterdam</i>	<i>River21, international.</i>
Size	4 ects (3 weeks)	20 ects (14 weeks)	6 ects (4.5 weeks)
Type of education	Project education with fulltime intensive period	Project education with fulltime intensive period	Project education with fulltime intensive period
Participants	Students from all faculties of TUDelft	Different disciplines in higher education	Different disciplines from 6 universities in 3 countries
Stakeholders	Through interviews and invited lectures/presentations	Principal and research question	Interviews, site visits and project presentations
Type of futures	Desirable/normative	Likely, possible and also desirable/normative	Possible, desirable/normative
Design, Analysis, Orientation	Yes	Yes	Yes
Approach	Backcasting: 1 stratetic problem orientation 2 future vision 3 backcasting 4 elaboration, design, analysis, defining follow-up proposal and outline development trajectory, and (social) conditions	Transdisciplinary, to be elaborated by the project group, but meeting criteria like integral, multi-stakeholder, vision developmetn	River21 1 problem analysis (multi-actor, multi-aspect) 2 system analysis 3 possible futures (scenario methodology) 4 Desirable futures (long term goals) 5 Identification of means, activities, strategies 6 Communication with stakeholders
Implementation, action plan	Important	Very important	Very important
Social Dynamics & barriers	Important	??	??
Dissemination	Very limited	Via principal stakeholder	Via on-site presentations to stakeholders

Table 1: Comparison of the three courses

As can be seen from Table 1 there are considerable similarities, but also differences. Starting with the similarities, it can be said that all courses included participation of students from different disciplines, interaction with stakeholders, development of normative desirable future visions, combining design, analysis and (broad integral)

orientation, and considerable attention for implementation (strategies, activities, or plans). Furthermore, students evaluate each of the courses rather positive and indicate that they especially learnt about interdisciplinary co-operation, from interaction with stakeholders, about having different viewpoints (that can originate both from different disciplinary backgrounds and from different stakeholder views and interests) and using an integral, system and future oriented approach. Student evaluations seem to indicate that conceptual or higher-order learning is achieved in these courses.

However, there are also differences between the three courses. This includes the size of the course, the topic studied, how stakeholder involvement is organised, if only is worked with desirable or normative futures, the exact elaboration of the approach applied, specific methods, how is dealt with realisation and implementation and the role of dissemination.

Some of the differences might be due to specific characteristics of the different topics and the size of the course. But it is not likely that this can explain all differences. For instance, in the TiSD course and the River21 project student groups use inputs from stakeholders, while in case of the transdisciplinary projects, there is a stakeholder who has suggested the problem that is mostly in a multi-actor setting and the stakeholder acts also as the principal. Dissemination and communication at the end seems also quite different. In case of the TiSD course, stakeholders are sometimes present at the final presentations, while in case of the River21 project special presentation sessions for stakeholders are organised and in case of the transdisciplinary projects there is a principal who has a clear interest in the project. However, it has been mentioned that also in the latter example, results were used in a conceptual way, while specific proposals were hardly put in practice. Finally, it could be mentioned that the desirable future vision is the central element, while development of possible or likely futures is applied for orientation and increasing understanding.

6. CONCLUSION

In this paper we have dealt with the issue of sustainability, future and future studies. We have argued that future (thinking) and future studies are important for sustainability and the field of sustainability studies, as sustainable development is about the future and can only be realised in the future, while we have to start now working towards that future in order to bring it about – without knowing exactly what future it will be and how it exactly can be achieved. We have distinguished between three types of futures, namely *likely* futures, *possible* futures and *desirable* futures and have argued that each type is related to methods and approaches in future studies that are relevant when working in the field of sustainable development. However, we have argued that – especially when considering the emerging issue of system innovations and transitions towards sustainability, desirable futures and the related approaches and methods seem the most important at present. The concept of desirable futures enables to include normative assumptions, make these explicit and enables to put sustainability as what should be brought about.

Concerning desirable futures, it seems relevant to relate these to undesirable futures and utopian thinking. Interestingly, *undesirable* futures can be seen as the opposite of desirable futures, but from a methodological viewpoint it can also be said that they might belong to the same category of normative futures. The key then is how to avoid an undesirable future and looking for trajectories and activities that may contribute to

this.

Another interesting issue is if there is relevance for the concept of desirable futures in utopian thinking that in Europe goes back to Thomas Moore's *Utopia*, originally published in 1516 and Francis Bacon's *Nova Atlantis*, originally published in 1629. One could argue that these books contain future visions and ideas how societies should be. It is not surprising that in the previous century several ecological utopian books appeared (e.g. *Ecotopia* by Callenbach 1975). However, Dutch philosophy professor Hans Achterhuis (Achterhuis 1998) has argued that he would not like to live in any of the utopian worlds described in often famous books, as societies are too restrictive for their citizens and do not acknowledge that society is plural in itself covering a wide range of values, norms, opinions and mental frameworks. He has also argued that bringing utopian ideas into reality without acknowledging fundamental rights and the plural nature of society may lead to what has been described in dystopian books, while communist dictatorships are according to him the result of putting utopian ideas in practice. The lesson might be that desirable futures can have a strong social influence and maybe useful, but must be worked on within the framework of democracy and the plural nature of societies for which sufficient checks and balances must be created, which are also institutions.

We have also argued in this paper that if the concept of desirable futures and the approaches are of great importance for sustainable futures, it should become part of (sustainable) higher education. This paper has also described three courses from higher education in the Netherlands, in which the development of desirable sustainable futures and translating these into action and activities that can be initiated now and can contribute to realising such futures. It was found that these courses were also systemic, stakeholder oriented and aimed at applying integral approaches. Courses had similarities and differences. So, it is possible to bring such a complex and integral concept to education in courses of limited size. However, none of the courses presented in this paper were meant to educate experts in facilitating and managing system innovations or transitions towards sustainability using desirable futures, stakeholder involvement and related methods and tools. Those courses can be seen as a first introduction to this issue and practising concepts and approaches in a multidisciplinary setting including interaction with stakeholders. This might be sufficient for obtaining competencies for participation in such change process on a basic level, but educating professionals familiar with a wide range of tools and methods requires more.

More examples have been identified, but were not lectured as regular courses or were part of postdoctoral education. Future visioning and sustainability has been part of postdoctoral course on the approach of the STD programme (University of Amsterdam) and sustainable business (University of Nijmegen). Furthermore, several special projects were found that were not part of the regular course programme but were specially initiated. This includes the transdisciplinary graduation project at InHolland University (Van Weenen 2004) and in which several students from different disciplines worked on the issue sustainable water supply and management in the city of Alkmaar. At Zeeland University, there has been the 3DZ project (Dynamic Sustainable Delta Zeeland), in which young people (18-25) from different backgrounds and disciplines worked together on long-term future visions for the province of Zeeland (De Groene 2003, Van Steensel et al 2003).

Finally, despite the relevance, the growing interest and the cutting edge examples, the combination of future studies, development of future visions and sustainability has not widely diffused yet. Therefore the PPF working group has developed a normative desirable future vision for the integration of sustainability, future and future studies in sustainable higher education for 2015 (Vlasman and Quist 2004), which is summarised here. *First*, the relationship between sustainability, future and future studies including desirable futures will be fully integrated in all curricula in higher education. *Second*, this topic will be part of elementary courses on sustainability in higher education. This can be on a basic level, but much more explicit than nowadays. *Third*, all students in (sustainable) higher education have done a transdisciplinary course focussing on generating and exploring desirable futures for sustainable system innovations including involving of stakeholders. *Fourth*, there will be specialised course programmes for educating experts in future visioning and sustainability. *Fifth*, there will be sufficient lecturers that can teach about this topic including approaches, concepts and methods on several levels and who can relate this to sustainable system innovations. Of course, the changes necessary for realising this in the entire higher education are quite huge and many actors need to be involved and have to contribute actively. However, many are interested and ideas for a pool of experienced professionals and the establishment of a (virtual) centre for integrating future, sustainability and future studies are elaborated.

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