



Developing key competencies for sustainable development in higher education

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Abstract

Purpose – To date, little attention has been given to the circumstances in which the process of developing key competencies for sustainable development may take place. The purpose of this paper is to consider, the possibilities both of formal and informal learning and their relationship to competence development within higher education.

Design/methodology/approach – An explorative, qualitative study based on focus groups was designed using different groups from formal and informal learning settings.

Findings – The development of key competencies is based both on cognitive and non-cognitive dispositions and asks for multiple contexts. Through combining formal and informal learning settings within higher education – as part of a new learning culture – a variety of contexts can be given and competence development can be enhanced.

Research limitations/implications – While aspects of both formal and informal learning settings could be identified, the interdependencies between them remain elusive.

Practical implications – Based on the findings, some main aspects for acquiring competencies can be pointed out that may be crucial in higher education settings.

Originality/value – The paper analyses the implications for both formal and informal learning settings of new ways of developing key competencies within higher education. Particular attention is given to interdisciplinarity and students' self-responsibility.

Keywords Sustainable development, Higher education, Competences, Learning

Paper type Research paper

Introduction

Science and technology are the crucial structural driving forces in all societal spheres. Sustainable development is the ethically founded response to a worldwide process in which not only research is increasingly carried out on the basis of private and economic interests but where these interests are also shaping the profile of academically educated young people (Altner and Michelsen, 2005).

Against the background of globalisation and increasing complexity, higher education for sustainable development (ESD) aims at enabling people to not only acquire and generate knowledge, but also to reflect on further effects and the complexity of behaviour and decisions in a future-oriented and global perspective of responsibility. Higher ESD has to participate in the discussion about sustainable ways of living and working. Acquiring relevant competencies within and by academic work cannot be a private concern of faculty, staff or administration. Absolutely essential is a new learning culture which does not confirm academic tradition but examines its potential for a sustainable future, in an open-minded and participative process. It has to be related to one's own sphere of influence and desires. On the other hand, individual



and societal learning should be related, for sustainable development is a matter of negotiation. Within this perspective, it seems vital to consider the university as a learning and life world. In general, universities are seen as formal educational institutions. When discussing the role of academia for competence development the focus is mostly on study programmes and courses – thus formal learning settings. But universities also offer opportunities for learning in informal settings, such as volunteering in student groups. The potential of the different settings and their relationship are discussed theoretically and with regard to their meaning in practice[1].

Theoretical framework

Competencies and key competencies

The term “competency” echoes throughout the country. It is discussed not only within the work environment or in the context of educational issues, but has also become a concern in personal and societal everyday life. Societal change, the progress of technology and globalisation are accompanied by new challenges which have to be mastered: increasing individualisation and growing societal diversity, accompanied in parallel by expanding economic and cultural uniformity, the availability of a rapidly growing amount of information, as well as the necessity to cope with increasing complexity and uncertainties (Rychen, 2001).

However, no agreement exists about what (key) competencies actually are, which are of importance and how the approach of competence acquisition finds its way into higher education.

In a general approach, competencies may be characterised as dispositions to self-organisation, comprising different psycho-social components, existing in a context-overlapping manner, and realising themselves context-specifically. They may be acquired gradually in different stages, and they are reflected in successful actions.

Furthermore, the term key competency seems of importance as it represents a qualitative extension that points out the special significance of certain competencies. Key competencies are relevant across different spheres of life and for all individuals (Rychen and Salganik, 2003). They do not replace domain-specific competencies which are necessary for successful action in certain situations and contexts. They rather bear a different, a wider focus, pooling different competency classes and being situated transversely to them. They comprise different domain-specific competencies and point out the most relevant competency fields.

In order to render this concept, relevant in practice, we need not only a defined understanding of the term, but also information about which key competencies are of particular importance. The attempt to compile a comprehensive scheme about all possible and necessary key competencies is bound to fail right from the start since such a list must end in arbitrariness (Weinert, 2001).

Sustainable development as a normative framework for selecting key competencies

Sustainable development can be seen as a normative starting point for selecting relevant key competencies. On the international level, the concept of ESD is – amongst others – shaped by the foundational documents of the UNESCO (2004). Here, the acquisition of life skills is particularly emphasised and focused on. Thus, UNESCO (2004, p. 20) formulated in its “draft international implementation scheme” about the ESD World Decade:

ESD requires a re-examination of educational policy [...] in order to focus clearly on the development of the knowledge, skills, perspectives and values related to sustainability. This [...] requires a review of recommended and mandated approaches to teaching, learning and assessment so that lifelong learning skills are fostered. These include skills for creative and critical thinking, oral and written communication, collaboration and cooperation, conflict management, decision-making, problem-solving and planning, using appropriate ICTs, and practical citizenship.

In Germany, developing “Gestaltungskompetenz” (shaping competence; de Haan, 2006) has been discussed as the central educational objective of ESD. “Gestaltungskompetenz” encompasses a set of key competencies which are expected to enable active, reflective and co-operative participation toward sustainable development. The term is used to describe the “forward-looking ability to modify and to shape the futures of those societies we live in via active participation in terms of a sustainable development” (de Haan and Harenberg, 1999, p. 62). “Gestaltungskompetenz” comprises the following eight key competencies (de Haan, 2006, pp. 22-5):

- (1) competency in foresighted thinking;
- (2) competency in interdisciplinary work;
- (3) competency in cosmopolitan perception, transcultural understanding and co-operation;
- (4) participatory skills;
- (5) competency in planning and implementation;
- (6) capacity for empathy, compassion and solidarity;
- (7) competency in self-motivation and in motivating others; and
- (8) competency in distanced reflection on individual and cultural models.

Sustainable development necessitates societal modernisation and may only be realised via the active participation of competent citizens; therefore the concept of *Gestaltungskompetenz* is characterised in particular by key competencies that are required for forward-looking and autonomous participation in shaping sustainable development.

Competency acquisition

Acquiring competencies is hardly comparable with learning as knowledge acquisition. Competencies are described as learnable but not teachable. This leads to the increasing relevance of the question whether and how they may be acquired via learning programmes (Weinert, 2001). Methodical notes about competency acquisition or about didactic conceptions of imparting competence are usually of a rather general character, which is often not least due to a rather vague competency concept (Arnold, 1997). If we understand key competencies – as it is outlined in this text – as the interplay of cognitive and non-cognitive components, then at least these two elements must be considered in any approach of competence acquisition. In addition, two different explanatory approaches might be drawn on (Barth, 2007):

- (1) The development of higher stages of consciousness as an indication of increased cognitive complexity and thus enhanced cognitive components is traceable, considering the construction of mental models.

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- (2) The acquisition of non-cognitive components is explained with the concept of value interiorisation. In this sense, competence acquisition may be understood as learning of values and thus it assumes interiorisation processes: production and reproduction, reception and communication of values are central points. The learning individual must be enabled to discover and to analyse his/her own value system, and to revise it with respect to its adequacy to reality. To successfully impart competencies, those methods that involve an affective component are increasingly necessary, breaking through established patterns of action and leading to a re-evaluation of action possibilities.

Higher education and competence acquisition

Higher education understood as the answer to the outlined challenges, and focusing on the development of key competencies needs a reorientation of learning processes and therewith of one of its core tasks. For that purpose a “new learning culture”[2] is necessary, which moves away from a culture of learning based on the principle of indoctrination and is “enabling-oriented, based on self-organisation and centred on competence” (Erpenbeck and Rosenstiel, 2003, p. XIII)[3]. Arnold and Lermen (2005, p. 59), in this context also deal with the necessity of establishing an “enabling didactic”. The goal in this case, in addition to professional training, is to promote personality development, enabling a person to be able to cope with complex situations, to be able to act upon reflection and to make decisions. It is also about being able to take on responsibility, to consider ethical standards when acting and to be able to judge consequences. Learning processes which consider the requisites of such a new learning culture can be characterised on the basis of three consequences:

- (1) *Competence-orientation*. The focus of learning processes is on attaining relevant key competencies. This requires a normative framework for the justified selection of such competencies in the same way as an educational concept is necessary which offers contents for developing competencies and helps to identify learning opportunities.
- (2) *Societal orientation*. Learning for sustainable development is always also societal learning. Learning takes place in real-life situations which question and change societal living.
- (3) *Individual centring*. Learning by the individual is seen to be active in the societal context. For formal learning processes this means a change from teacher to learner-centring. Additionally, informal learning processes should be taken into consideration for developing competencies, also and in particular at the university, because individuals not only learn in formal settings; informal settings but also play an important role. About 70 per cent of all human learning processes belong to informal learning (Overwien, 2005, p. 340).

Requirements for learning in formal settings

For a new orientation of academic teaching, which places the focus on key competencies and the key principles of higher ESD (Barth *et al.*, 2007), at least two central challenges, amongst others, can be identified:

Orientation towards interdisciplinarity. Interdisciplinary cooperation – regardless whether in the context of teaching or research – requires new forms of communication

and cooperation. Working out solutions for complex problems in heterogeneous teams necessitates including and understanding various perspectives in order to combine them profitably.

So far, however, teaching at universities has been shaped very much by disciplinary structures. Universities are structured according to faculties and education is based on traditional disciplines, to which a specific socialisation of graduates is linked. Interdisciplinary opportunities, which would support developing the required competencies, are rare. Opportunities would have to be created which aim:

... to reflect in education the disciplines with regard to their relation to the world, to life-worldly goods and to other disciplines; to support their understanding of each other and to prepare future researchers to approach complex questions in a comprehensive way and thus to attain an integrated whole again (Defila and Di Giulio, 1996, p. 133).

Strengthening self-reliance and self-direction in the learning process. To develop and to stabilise competencies in various contexts, students actively shaping the learning process should be encouraged right from the start in order to strengthen their self-reliance. Self-direction relates to learning processes as well as to the choice of appropriate methods, dealing with information and firmly establishing the given subject framework with regard to contents.

In order to encourage the principle of self-direction, two different but complementary approaches come to mind: Firstly, a step-by-step opening from very guided to self-directed learning. This opens the opportunity for gradually testing and applying self-reliance and self-control within the learning process. It also allows less experienced learners a substantial amount of autonomy in the learning process. Secondly, independent project work which is the student's sole responsibility can serve to be a test of self-direction in a real-life situation.

Consequently, it can be concluded that for successful self-directed learning, first and foremost competencies or rather personality traits are necessary, which however cannot be directly influenced. They can, nevertheless, form the basis for adapting an individual learning strategy (Barth and Godemann, 2007).

Characteristics of learning in informal settings

Informal learning has to be distinguished from formal and informal education. It does not only take place outside the formal educational institutions, e.g. during free time, but also inside these institutions where learning is not a part of the education process intended by the curriculum (Schugurensky, 2000, p. 2). Thus, informal learning is "any activity involving the pursuit of understanding, knowledge or skill which occurs without the presence of externally imposed curricular criteria" (Livingstone, 2001, p. 4).

Against this background we can refer to universities as learning environments that also offer settings for informal learning, such as discussions with fellow students or volunteering in student groups on campus where students learn outside the organised academic learning processes.

Referring to Schugurensky (2000) three forms of informal learning can be differentiated:

- (1) *Self-directed learning.* Learning projects undertaken by individuals (alone or as part of a group) without the assistance of an 'educator' both intentional and conscious.

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- (2) *Incidental/experiential learning*. Without any previous intention of learning, but after the experience the individual becomes aware that some learning has taken place; unintentional but conscious.
 - (3) *Socialisation*. Tacit learning; internalisation of values, attitudes, behaviours, skills, etc. during everyday life; unintentional and unconscious.

In the case of experiential learning, “sensory impressions [...] are allocated comparatively and integrated into previously developed experience and imaginative contexts” thus they are “condensed into experiences” (Dohmen, 2001, p. 28). “Experiential knowledge” is acquired which “makes it easier to deal with the environments where these experiences are made” (Dohmen, 2001). For experiential learning the following features are characteristic (Kolb, 1984, p. 38):

- the involvement of the whole person (intellectual and sensory faculties as well as emotional responses);
- an active use of all previous relevant life and learning experiences; and
- reflection upon earlier experiences so as to allow an evolution of thought and hence a deeper understanding.

Informal learning in all its forms, but particularly experiential learning, contributes to developing competencies, because it is integrated in activities (Dohmen, 2001, p. 42ff.). Experiential learning especially facilitates the development of action competencies (Dohmen, 2001, p. 33), e.g. in the context of volunteering (Düx and Sass, 2005). According to Lipski (2004), informal learning has a special importance for developing “life competency” which means the capacity to plan and implement projects that serve for realising individual and/or common life goals; here the capacity for self-organisation plays an important role. With respect to higher education institutions, this means that students learn by means of self-organisation processes, e.g. in the context of projects and student participation, and in doing so they develop “life competency”.

Learning environments should be designed in a way that they also enable informal, partly also unconscious learning processes (Overwien, 2005, p. 343f). Marsick *et al.* (in Overwien, 2005, p. 344) state that important arrangements for facilitating informal learning are first and foremost providing time and places for learning, examining the environment with regard to learning opportunities, directing the attention to learning processes, strengthening the capacity for reflection and creating an atmosphere of cooperation and confidence.

Research question

Both threads presented establish the starting position for answering, the question how acquiring key competencies for sustainable development can be realised at universities. The theoretical considerations are supplemented by empirical data obtained via two specific fields of examination:

- RQ1. Examining an interdisciplinary study programme from the perspective of what contribution reoriented interdisciplinary study programmes can make to the realm of formal learning.

RQ2. Analysing the “lifeworld university” with the question of how student participation on campus, understood as a field of informal learning at universities, contributes to developing key competencies.

Methodological approach

Acquiring competencies is not only based on individual processes, but is always achieved in social contexts and, at least in part, collaboratively. In order to reproduce such group processes parallel to individual ones, it is necessary to use an approach which is suitable for adequately reproducing cross-individual opinions. Analyzing focus group discussions considers that subjective meaning structures are frequently integrated in social contexts, which can only be surveyed in group situations (Denzin and Lincoln, 1998). For the study programme “Sustainability” three focus group discussions were carried out with each of the three project groups of the programme in August and September 2005 which worked together on producing a final report. The analysis of the acquisition of competencies within the framework of student on-campus volunteer engagement is based on three focus group discussions with a total of 13 students[4] which took place in April 2007.

The focus group discussions were realised using Morgan’s (1997) process model. The presentation was carried out by two scientists involved in the project “Sustainable University” using a rough thematic guideline (topic guide). The guideline to be used and the research situation were successfully tested in a pre-test. The focus group discussions, taking an average of 60-90 minutes, were recorded digitally, transcribed and anonymised. The data were analysed using the qualitative data analysis software MAXqda. The results of this analysis are presented in extracts in this paper.

Sample

For the focus group discussions, two samples representing formal and informal learning settings were chosen.

Study programme “Sustainability”

Within the framework of the three year research and development project “Sustainable University” at the University of Lüneburg, a study programme was developed and tested which aims to constructively take up the described challenges for the university with respect to curriculum development. Based on the concept of sustainable development, the programme encourages the ability to solve problems in an interdisciplinary way. The developed approach can be distinguished by two main criteria:

- (1) complex problem areas are dealt with in an interdisciplinary manner, whereby interdisciplinarity relates to both the group of learners and to the group of teaching staff; and
- (2) the learning process is supported by the development of an alternative learning environment (blended learning).

Within the one-year interdisciplinary study programme “Sustainability” 32 students from educational, cultural, environmental and business sciences work together on a specific problem area. They identify societal problems and global trends from a political, economic, cultural and social point of view in an interdisciplinary dialogue and also work on developing solutions. From the winter semester 2004/2005 to the summer

semester 2005, the subject “nutrition, agriculture and consumption” were dealt with under the motto “Eating better – only a question of production and consumption?” The course was taught by faculty from various disciplines as well as external practice experts. This allowed for various approaches to the problem; discipline-specific methods and states of knowledge were able to be integrated and reflected upon.

Student initiatives and groups

Student volunteering on campus can be seen as one important setting for informal learning at universities. For this empirical study, students participating in student groups or the student government at the University of Lüneburg were chosen as a sample. The student groups are organised in an umbrella organisation called “Dachverband der Studierendeninitiativen Lüneburg” (DSi, www.uni-lueneburg.de/dsi/). For instance AIESEC, 25 initiatives are members of the DSi, Amnesty International and the Market Team. Each semester the initiatives present their work in a fair on campus; furthermore, once per year the DSi organises a symposium which deals with questions of sustainable development. The bodies of student self-administration, the student government and the student parliament, represent the interests of the students in the university. The student government consists of three spokespersons and the representatives of ten task forces, such as the task force for public relations or the task force for ecology.

Results

Acquisition of competencies

The analysis of the group discussions focuses on the question which of the key competencies considered to be fundamental can be identified in the formal and informal learning settings.

Data show that with regard to the study programme the competence for interdisciplinary cooperation appears to be central. In this case, the development of various sub-competencies becomes clear, which is also reflected by the students. Thus, the problem of the ability to take over different perspectives, combined with tolerance and acceptance with regard to other disciplines as a central personal competence, is initially expounded. The necessary observations from a metaperspective lead to a debate about how representatives of other disciplines deal with their own and other technical terms and how the own application of terms, methods and strategies with regard to problem-solving takes place. Personal specialised knowledge is applied to new questions and problems in different combinations of disciplines and placed in an integrative perspective, so that “there is an expert on every subject, who can be asked detailed questions and who, for example, also knows where something can be read or followed up on quickly” (Spn_20).

As interdisciplinarity takes place in social groups, socio-communicative competencies are a further crucial criterion. Important in this case is particularly the ability to understand the other person’s perspective, to communicate one’s own specialised knowledge comprehensively to persons from other disciplines in order to eventually be able to develop a shared knowledge base.

Voluntary commitment, which the students participating in the focus group discussions themselves perceive to be a learning setting, also promotes communication skills: “Yes, it is definitely possible to learn a lot, especially in the field

of communication with people you are involved with – how to approach them [...]” (INT 2, TN 3). Organisational skills are also fundamental: “[...] I, as a person have been able to profit somewhat in the framework of methodical competencies, from the fact that events, etc. have to be organised ” (INT 2, TN 2).

Apart from these, skills with regard to team-leading, taking on responsibility, self-motivation and motivating others, time management, group work and presentation are also developed; new knowledge which is important for voluntary work is also acquired. It becomes clear that in both learning settings various sub-competencies, dispositions and skills are touched on.

In addition to cognitive dispositions, emotional and motivational dispositions which appear to be of special significance for competencies are mentioned by the interviewees participating in the study programme: the various viewpoints and approaches are explicitly seen as an enrichment; the close cooperation also offers a basis for trust, which is seen as being critical for high quality discussions and leads to a more trusting cooperation than in “normal” seminars.

Process of competence acquisition

If competence acquisition is seen as the development of a “mental complexity” then attention should be turned to the development of mental models, which are necessary to attain, to structure and to organise new knowledge. For the study programme, contact with complexity is stated as an important pre-requisite, which is reflected when dealing with different bodies of knowledge: “With Wiki complicated questions can be far better structured and one can retain an overview, without losing sight of the contexts” (Spn_18).

Data show that working on a mutual knowledge base which can simultaneously reproduce the multilateral interactions and influences supports the development of mental models; it equally allows for a comparison with the models of others. Such an “explication of a mental model” is a definite added value for the collaborative work and therefore favours the acquisition of competencies.

Competencies are acquired not least by the restructuring of knowledge and new formulation of personal understanding based on experience, viewpoints and contexts. This process of de- and re-construction becomes obvious and comprehensive and can be mutually negotiated and assessed. The process orientation in the work leads to scrutiny of the connected values and norms, which are discussed and (re)produced.

Successfully dealing with decision-making processes full of conflicts as a critical incentive for value interiorisation necessitates methods of work which include an affective component, which break with established action patterns and which lead to new assessments of ways of taking action. This happens in two ways: on the one hand via an explicit value discussion, especially between the various disciplines, on the other hand in developing the mutual knowledge base.

Collaboratively acquiring competencies can be described as learning in communities of practice. By “growing into” a community, not only knowledge but also values guiding actions are acquired. This is supported by a focus on action-relevant practice contexts, by highlighting individual and collaborative learning as well as by reflecting social constructions. The various contexts of the study programme offer a space where gradually increasing participation and a “catching-up” type of learning is made possible. Simultaneously, students as “experts” and “laypersons” can be involved in a subject and in this way learn from each other:

I actually think it's good, because I myself, when sitting opposite my fellow-students, do not like to get involved in discussions, because I always need a little longer to organise my points of discussion in my head [...] with regard to "my" subject in Wiki I was, however, able to discuss and argue competently; in that situation I was an "expert" (SPN_18).

Acquiring competencies and skills happens in volunteer work as experiential learning or rather incidental learning: persons start to commit themselves and then encounter initial hurdles. They have to come to terms with tasks where they are not certain if they can cope, because they have absolutely no relevant experience and they try to develop problem-solving strategies themselves:

... the first question that came up was how to make contact, how can I address the people, that is what I thought of, [...] That was difficult to overcome [...] that is a genuine responsibility (INT 1, TN 1).

With regard to the success of the strategies put into practice there is an uncertainty and the anxiety of not being able to accomplish the task.

When the challenges are met, however, all the existing anxieties can be thrown off and one is calmer: "throwing off anxieties, [...] that you learn because you realise that, in the end, what you do is not at all so bad" (INT 1, TN 5). One is proud of the success achieved, gains confidence and, in turn, looks for new challenges.

In the sense of learning-by-doing, students can try things out, gather experiences; they not only start to relax more but also acquire new skills: "[...] but then, that is easy, you can try it out and experience it, I think that you become much calmer that way [...]" (INT 1, TN 1).

Special aspects in the learning process

With regard to the acquisition of key competencies in the study programme, data show that three aspects of the learning process are significant criteria:

- *Reflection processes.* For acquiring key competencies, a critical distance to one's own actions as well as the ability to reflect on one's actions is seen to be a crucial pre-requisite (Rychen, 2003). Through explicating the learning process, this is supported on different levels. Individually because one's personal method of learning has to be questioned and tried and tested routines have to be examined. In group contexts, reflecting on the collaboration leads to identifying possible solutions which could take new, as yet, untried directions. Interdisciplinary collaboration gets to be a key role.
- *Self-reliance and self-direction.* Within the study programme the principle of self-direction enters into the learning process in two ways: Firstly, the gradual opening of more guided to self-directed learning during the phases of attendance is seen to be a testing of real-life situations in which the students can apply existing competencies and acquire new ones. Apart from that, the applied learning platform plays an important role; it strengthens the individual's responsibility for the learning processes as well as her/his chance to independently direct the learning processes. The reflection on the perceived advantages and disadvantages of this type of learning and the testing and accomplishment of various demand contexts leads to a deeper reflection and to an actively designed approach which encourages the acquisition of corresponding key competencies.

- *Multiple contexts.* A fundamental condition which supports acquiring competencies has turned out to be the perceived demand context, where certain strategies are implemented. The demand framework defines learning situations in which acquiring competencies can be realised. Simultaneously providing different demand contexts in which different actions are called for opens the possibility of testing and consolidating interdisciplinary competencies in various contexts: “In my opinion, I have not yet acquired any new competencies [...] or skills. [Such skills] I have also practiced more or less intensively in other seminars, so that it is not new to me. Through the intensive application in the study programme, however, these ‘techniques’ are improved, bit by bit” (Spn_19). Through the close interlocking with changing problem situations, different stocks of knowledge are activated. Thus, inactive knowledge – as it often arises in higher education – is avoided.

According to the gathered data, the non-organised and non-structured learning process in the framework of voluntary commitment, which is primarily to be seen as experiential learning, can be especially characterised by the following elements:

- *Voluntariness and individual responsibility.* The students commit themselves voluntarily and organise their work processes themselves. There is no supporting or directing third party. This means that the learning processes also take place without guidance; possible reflection processes take place on an individual basis or rather in exchange between learners but without the support of a teacher.
- *Learning with an ethical orientation in meaningful real-life situations.* Students act with a certain objective in mind, they want to achieve something with their actions, want to effect changes. For this reason they take part in student initiatives, groups or bodies which have to be managed and organised. The students act “as in real life” and in this way prepare themselves for their professional life. At the same time, they can do this in a protected context. They support each other and rely on the group, they can try and test different strategies in a somewhat protected framework.
- *Unintentional, but conscious learning.* The students have a basic intention to learn something through their volunteer commitment. The concrete actions are, however, not motivated by the desire to learn, but to carry out a project or to organise an event, etc. Actions are not taken because of a specific intention to learn; the students are also not aware of learning while taking this action. With hindsight, they become aware of having gained experience and thus also skills. The committed students learn incidentally, by experience.
- *Interdisciplinary collaboration.* The students, who are committed, are from different study programmes. During their voluntary work they experience interdisciplinary collaboration and get to know different disciplinary perspectives.

General conditions and learning pre-requisites

Acquiring the competencies described above is dependent on an appropriate learning setting. Working on certain issues in interdisciplinary contexts encourages developing

those competencies. However, organising an entire course of studies in an interdisciplinary manner cannot be the aim, because interdisciplinary collaboration is based on the combination of disciplinary viewpoints, which, above all, can be developed in a disciplinary course of studies.

In order to enable students to take up volunteer activities at the university and to facilitate the shown learning processes, certain general conditions have to be given. Especially, time for participating in volunteer activities has to be available outside and beyond formal study. Even students who have only little time during their studies become active nonetheless, because voluntary work has a high priority for them.

Against this background, it is of particular importance that students get an insight into the actual value of their voluntary work for their environment but also for themselves; that they get sufficient recognition; that they have the freedom to organise their voluntary work themselves; and that they have the support of, for example, teaching staff with regard to their voluntary work.

Ultimately, it is about a university culture which supports and recognizes students' voluntary commitment as a condition for the informal acquisition of competencies in the framework of students' self dependent action.

Discussion

The results obtained regarding the acquisition of competencies in formal and informal settings at universities make clear the following:

- Within the study programme “Sustainability” as well as the students' volunteer work, developing competencies or rather particular dispositions is encouraged. Important aspects of “Gestaltungskompetenz” such as interdisciplinary collaboration, planning and implementation skills or the ability to motivate oneself and others are addressed.
- To acquire and implement competencies, the existence of various and manifold contexts is important. In formal settings multifaceted contexts have to be created; informal learning offers these *per se*. It is, however, dependent on the fact that universities create spaces for informal learning and appreciate and support informal learning processes. The present results illustrate which factors play an important role in this context.
- Developing competencies is only controllable up to a certain degree. Learners' individual responsibility is of great importance: it leads to a maximum of possibilities for learning and acquiring competencies. Learners can be supported by making spaces for informal learning processes available to them.
- Interdisciplinarity is important for promoting reflection processes, developing a key competency for interdisciplinary collaboration and developing motivational dispositions. In formal settings, the possibility for interdisciplinary collaboration must be made available; in informal settings it is more likely already existent as subjects are not differentiated.

The results of the present analysis indicate that formal as well as informal learning settings at universities are relevant for developing competencies for sustainable development.

Thus, it can be stated that a culture of teaching should be superseded by a culture of learning that combines the learning processes in academic formal and informal settings and that includes competencies developed in extra-curricular settings. Establishing such a learning culture enlarges the learning space and facilitates better learning opportunities for developing future-oriented competencies across different contexts. In addition to professional-vocational education it aims at a personal development that enables individuals to cope with complex situations, to be able to act and to decide reflectively, to take responsibility, to consider ethical criteria while acting and to be able to envision consequences.

The question remains how formal and informal learning can be systematically related to each other. If and in how far both forms of learning can complement one another (additive learning), how they can extend and transform what has already been learned in each respective area (transformative learning, Schugurensky, 2000, p. 6), or in other words, which interactions actually exist between them remains to be examined. Initial indications emerging from the obtained data suggest that mutual support could exist: “[. . .] and that can also be marvellously combined, and I do, yes, I really feel that studying, thus the theoretical, and the practical work are also incredibly mutually dependent” (INT 1, TN 5).

Notes

1. The activities and research findings described here are from the subprojects “Interdisciplinarity in Teaching” and “Lifeworld University”.
2. “Learning culture means the cognitive, communicative and socio-structural implementation programme for all socialisation concerned with learning processes. The focus is on the therefore necessary professional-methodical, social-communicative, personal and action-oriented competencies that are developed in action learning (Lernhandeln) (Erpenbeck and Rosenstiel, 2003, p. 8f).
3. About the shaping of a new learning culture see for instance: Arnold and Schüßler (2001) and Arnold and Siebert (1995).
4. All student groups and initiatives active at the University of Lüneburg were informed about the planned group discussions. A number of 13 students volunteering in student initiatives or the student government (see section “sample”) responded to the request to participate in the focus group discussions.

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