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journal homepage: [www.elsevier.de/ufug](http://www.elsevier.de/ufug)The extent and dissemination of *udeskole* in Danish schoolsPeter Bentsen <sup>a,\*</sup>, Frank Søndergaard Jensen <sup>a</sup>, Erik Mygind <sup>b</sup>, Thomas Barfoed Randrup <sup>c</sup><sup>a</sup> Danish Centre for Forest, Landscape and Planning, University of Copenhagen, DK-1958 Copenhagen, Denmark.<sup>b</sup> Department of Exercise and Sport Sciences, University of Copenhagen, DK-2200 Copenhagen, Denmark<sup>c</sup> NIRAS Consultants, DK-3450 Allerød, Denmark

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## ABSTRACT

Studies have shown that outdoor environments lend themselves to particular types of learning at the same time promoting physical activity and well-being of children. In the past decade, Danish public and private schools have introduced curriculum-based outdoor learning as a weekly or bi-weekly 'outdoor school' day for children aged 7–16 – called *udeskole* in Danish. Based on a national population survey of Danish schools ( $N=2082$ ), information on the extent of *udeskole* activities, dissemination of *udeskole*, and barriers to teaching out-of-doors are presented. Findings show that 28% of the responding schools practice *udeskole* across the country. Furthermore, another 15% are planning to start *udeskole* within the next three years. It is argued that *udeskole* plays an increasing and important role in the Danish school system and constitutes a potential for green space management. As potentially key actors, we suggest that green space planners and managers regard *udeskole* as an important concept in the future development of public green space, and consider school teachers and pupils as an important contemporary and future user group.

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## Introduction

*Children in the outdoors*

Increasingly attention is being paid to the role of nature as an important aspect of childhood. This can be seen most clearly in industrial and post-industrial societies (e.g. Dahlgren and Szczepanski, 1998; Bentsen et al., 2009a). In an increasingly urbanised society, however, children's contact with the natural world and outdoor environments has changed, due to growing cities, living situations, safety concerns, video games, etc. Therefore, there is an awareness of a reduction in the amount of time children spend in the outdoors (e.g. Breivik, 2001; Rickinson et al., 2004). As a response, children and the outdoors have attracted political focus and children have been identified as one of the key groups in relation to use and promotion of use of the outdoors (Nilsson et al., 2007; Muñoz, 2009).

Since children spend a large amount of their childhood in school – approximately 14,000 h in kindergarten to year 12 (Arbogast et al., 2009) – initiatives to take children outside and embed outdoor learning within the school system have been put

forward. Therefore, outdoor learning as a part of the planned curriculum in schools has received greater attention in industrialised countries in recent decades, and has attracted interest from practitioners, policy makers and researchers. Scandinavian countries are often perceived as 'countries of reference' concerning outdoor learning in school and pre-school systems, i.e. kindergarten to year 16 (Rea and Waite, 2009), and there is a strong anecdotal evidence about a widespread provision. The Scandinavian concept *udeskole* (meaning 'outdoor school'; see Box 1) is a particular type of approach to outdoor learning, which has emerged as a way to engage children with nature through educational contexts. There is evidence that Scandinavian models and approaches to outdoor education and learning are found in other countries (Henderson and Vikander, 2007; Muñoz, 2009; Rea and Waite, 2009), e.g. O'Brien and Murray (2007) state that the development of Forest Schools in Britain began in the 1990s with inspiration from Scandinavia (see Box 1).

*Benefits of outdoor learning and 'udeskole'*

The interest in links between nature, schools, and learning has resulted in research exploring the potential for and benefits of engaging children with 'the outdoor classroom' within an educational setting. Research highlights that children can benefit from outdoor learning in several ways (Rickinson et al., 2004; Muñoz, 2009), e.g. improvements in concentration, increased motivation, and higher levels of physical activity. It is also argued

\* Correspondence to: Danish Centre for Forest, Landscape and Planning, University of Copenhagen, Rolighedsvej 23, DK-1956 Frederiksberg C, Denmark. Tel.: +45 35 33 17 73; fax: +45 35 33 15 08.

E-mail addresses: pbe@life.ku.dk (P. Bentsen), fsj@life.ku.dk (F. Søndergaard Jensen), emygind@ifi.ku.dk (E. Mygind), tra@niraskon.dk (T. Barfoed Randrup).

**Box 1:** What is 'udeskole'?

School-based outdoor teaching in the local outdoor environment as an integrated part of the school system is a relatively new form of teaching and learning activity in Scandinavia (i.e. *udeskole* in Danish; *uteskole* in Norwegian; *utomhuspedagogik* in Swedish). The concept was described in a Norwegian context by Jordet (1998), in a Swedish context by Dahlgren and Szczepanski (1998), and recently Bentsen et al. (2009b) described and defined *udeskole* situated in the socio-cultural context of Danish education and Scandinavian society. *Udeskole* targets children aged 7–16, and is characterised by compulsory educational activities outside of school on a regularly basis, e.g. one day weekly or fortnightly. *Udeskole* can take place in both natural and cultural settings, i.e. forests, parks, local communities, factories, farms, etc. (Jordet, 1998, 2007). However, in Denmark *udeskole* has mainly been practised in natural settings to date, and the term *nature classes* has been used and could be understood as a subset of the term *udeskole* (Mygind, 2005). *Udeskole* activities are characterised by making use of the local environment when teaching specific subjects and curriculum areas by, for example, measuring and calculating the volume of trees in mathematics, writing poems in and about nature when teaching languages, or visiting historical significant places in history education – teaching and learning activities are however often inter-disciplinary. Thus, the approach is often to deal with an academic subject matter or concept in its real concrete form to facilitate learning, motivation, and understanding.

that 'the outdoor classroom' can support pupils' learning by offering a real life context for learning (Jordet, 2007).

The results of emerging Scandinavian research into outdoor learning in school contexts have generally been positive (Bentsen et al., 2009b, Muñoz, 2009). Research in Norway has documented learning potentials of *udeskole* (Jordet, 2007) and a Danish case study showed a significantly higher level of physical activity among pupils during outdoor learning in natural settings compared to a 'normal' school day (Mygind, 2007). In the latter study, the pupils expressed a significantly higher level of well-being, improved social relations, and joy while being taught in a forest setting compared to classroom teaching (Mygind, 2009). A Swedish study documented a stress-reducing effect on teachers teaching in the outdoor environment (Szczepanski et al., 2006). In a review of *udeskole*, it was concluded that *udeskole* can contribute to the realisation of the overall aims of the Danish school system, especially its impact on health, well-being, and social competencies was emphasised (Bentsen et al., 2009b). This review pointed towards an increased focus on the potential of *udeskole* to add value and variation to daily school life, so that outdoor learning and classroom teaching can work together and complement each other.

Summing up, international and Scandinavian studies of outdoor learning and *udeskole* have tentatively shown that urban and peri-urban green space can play a role in children's learning and development as well as physical activity and well-being.

*Rationale for the current study*

This paper provides a study of a specific form of outdoor learning in a particular context: *udeskole* in Danish schools. The point of departure for this paper is the relevance of outdoor education and learning in the context of landscapes for teachers, schools, local governments, non-governmental organisations (NGOs), and green space planners and managers. The Danish situation and 'model' may provide inspiration to the international fields of outdoor education and green space management, i.e. providing and facilitating outdoor learning.

Traditionally, the classroom has been the central place for formalised teaching of children and adolescents. However, outdoor education and learning is a growing focus for organisations within policy, planning, and management of green space, e.g. forests, woodland, and urban parks. This includes, e.g., public organisations such as the Danish Forest and Nature Agency (2002a, b), private organisations such as the Danish Forest Association (The Forest in the School, 2008), and NGOs, such as the Danish Outdoor Council (1997, 2006) and The Danish Society for Nature Conservation (2009). The focus on education outside the classroom seems to have become increasingly popular, and

has even increased during the last decade in Denmark (Christensen, 2004; The Forest in the School, 2008). Thus, outdoor education and learning have received more political and administrative attention in Denmark. This in turn has increased the demand for valid information on the educational use of urban and peri-urban green space as well as information on barriers and facilitators in relation to the educational use of these areas.

Internationally, several studies have investigated the extent, nature, and scope of different forms of school-based outdoor education and learning. Studies in Australia (Lugg and Martin, 2001; Polley and Pickett, 2003), New Zealand (Zink and Boyes, 2006), England and Wales (Davis et al., 2006; O'Brien and Murray, 2007), Scotland (Higgins et al., 2006), and Norway (Bjelland and Klepp, 2000; Limstrand, 2001) have illustrated that educational contexts differ from country to country. Therefore, it is important to be aware of local, regional, and national contexts, and of how curriculum and outdoor educational practices are framed and shaped by cultural, social, political, and geographical factors (e.g. Turčová et al., 2003; Bentsen et al., 2009b).

In order to make the most of green space in relation to educational and recreational opportunities, green space managers need updated, relevant, and accurate information on both user demand and green space supply (e.g. Kajala et al., 2007; Davies et al., 2008). Therefore, the overall aim of this study is to describe and understand the concept of *udeskole* and the related potential use of green space for educational purposes. This will increase the understanding of how facilitation and policies can promote the use of the outdoors. In particular, three research questions are investigated.

*Research question 1: What is the precise extent of 'udeskole' in Danish schools?*

When it comes to the extent of provision of *udeskole*, very little is known. In a review examining existing research on children, health, and the outdoors, Muñoz (2009) argued that future research could use 'quantitative indicators' in the monitoring of projects intended to connect children and the outdoors. Without this, it can be difficult to argue for the importance of outdoor learning, and in extension green space, in the context of policy and resources allocation. Increasing provision of outdoor learning in schools would also suppose that there exist indications of the current and an idea of the desired extent of provision (Cousineau, 1989). In addition, Lynch (2002) argued that it is important to quantify the extent of the described benefits, i.e. the more children who participate, the greater benefit overall. Furthermore, it seems important to create baseline data in order to compare with other countries and earlier time periods (Rickinson et al., 2004). Anecdotal evidence shows increase in numbers of schools

practising *udeskole* throughout Denmark: from a few classes and teachers in the 1990s, Christensen (2004) in a student paper found 35 schools practising *udeskole*, and recently 'Skoven i Skolen' ('The Forest in the School') estimated that 50–60 teachers and classes practice *udeskole* once a week all year round ([www.skoven-i-skolen.dk](http://www.skoven-i-skolen.dk)). Based on this, our hypothesis is that the number of schools practising *udeskole* today is more than 60.

*Research question 2: How has 'udeskole' spread in the Danish school system?*

*Udeskole* is presently not written into the Danish national curriculum. Mygind (2005) characterised *udeskole* as a bottom-up phenomenon started by devoted teachers originating from 'the reality in the Danish school system'. Bentsen et al. (2009b) described the Danish *udeskole* movement as a grassroots movement of practitioners. Therefore, our hypothesis is that *udeskole* has spread in Danish schools by local initiatives, i.e. teachers and schools, in contrast to central/top-down initiatives, e.g. ministerial and municipal programmes.

*Research question 3: What are the major barriers to practising 'udeskole'?*

Until now, most research has focused on the impacts of *udeskole* on children's learning and development; however, it is also important to increase the understanding of factors that influence the provision of outdoor learning in different contexts (Rickinson et al., 2004; Muñoz, 2009). Based on previous research (Limstrand, 2001; Lugg and Martin, 2001; Zink and Boyes, 2006), our hypothesis is that cost, transport, and safety are major barriers to practising *udeskole*. Tentatively, we also want to explore the so-called 'place' factors, e.g. presence and distance to 'good' green space.

## Methods

### Population

The Danish schools as a whole form the study population and this is very well-defined as each school has a unique number. According to the Danish Ministry of Education (2009a), several institutions offer basic school education in Denmark: public schools and private/independent schools, continuation schools, boarding schools, schools for children with special needs, children's homes, residential school homes, and independent residential schools for students between 14 and 18 years old. In this case, we chose to only include public and private/independent schools because we wanted to focus on mainstream schools, 'normal' teaching, the formal curriculum, and compulsory teaching. Hence, our study population consisted of a total of 2082 schools in Denmark by January 2007 (1603 public schools and 479 private and independent schools) (Danish Ministry of Education, 2009a, 2009b). The size of the schools varied between 9 and 961 pupils (mean=331, median=295) (Statistics Denmark, 2007). It is difficult to grasp the precise extent of *udeskole* programmes in Denmark, e.g. because of different definitions, practices, and understandings. We therefore defined and delimited *udeskole* as all educational activities which

- take place outside the walls of the school (buildings);
- take place on a regular basis (every or every other week);
- are structured (integrated in the teaching plan for the school year);
- have a specific duration over a certain period (minimum a half day and minimum half-year round); and

- are a part of the formal curricula integrated with indoor teaching (within specific subjects and curriculum areas, e.g. Danish, mathematics, art, English, or developed as inter disciplinary activities).

### Survey technique

An electronic questionnaire-based national survey was carried out in 2007 involving all 2082 schools. The questionnaire was e-mailed to the school office using the computer-based programme SurveyXact that enables construction, mailing, management, and exportation of questionnaires and responses. In order to increase the response rate, (1) we designed the questions carefully. Areas of enquiry were restricted to the schools' (i.e. principals' and vice principals') current provision, practice, knowledge and barriers in relation to *udeskole*. Additional comments were also invited; (2) we made the questionnaire short and simple, i.e. maximum 13 questions; and (3) we sent a reminder after two weeks.

Survey questions were constructed, and a draft survey piloted among selected teachers, experts, and researchers. The final survey instrument was developed in four parts: (1) objective information on size and the type of school, (2) the extent of *udeskole* activities, names, and e-mails of teachers practising *udeskole*, (3) the respondents' acquaintance with *udeskole*, and (4) barriers in relation to practice and the establishment of *udeskole*. Nineteen potential barriers to *udeskole* were presented in the questionnaire. These were formulated based on the literature (Limstrand, 2001; Lugg and Martin, 2001; Zink and Boyes, 2006) and pilot studies with Danish teachers, experts, and researchers. The respondents were asked to rank each of the barriers on a four-point scale indicating very limiting, limiting, slightly limiting, and not limiting (and in addition, do not know).

We considered an electronic survey as relevant and adequate in this situation because all Danish schools have an official e-mail address (Cobanoglu et al., 2001; Jepsen, 2004), being frequently used by the Danish Ministry of Education, from which we obtained the official e-mail list. We perceived it as an advantage that the survey was designed to a narrow and relatively homogeneous target group (i.e. school managers in Danish schools), and we expected the respondents to be motivated to participate in the survey because of the potential relevance to them (Kruuse, 2005).

### Response rate

The response rate was 52% (1073 answers/2082 schools). Similar surveys in Norway (Bjelland and Klepp, 2000; Limstrand, 2001), Australia (Lugg and Martin, 2001), New Zealand (Zink and Boyes, 2006), and Scotland (Higgins et al., 2006) have obtained response rates between 14% and 89%. The non-responses were evenly distributed among public and private schools and among small, medium, and large schools and the most common reasons given for non-response were lack of time or lack of interest.

### Data processing and background variables

The processing and analysis of data were done using the software programme Predictive Analytics Software (PASW 17.0). Selected data were analysed for (i.e. cross-tabulated):

- School type (public or private).
- School size (the schools were divided in three equal-sized groups: small=9–173 pupils, medium=174–429 pupils, and large=430–961 pupils).

## Results and discussion

### The extent of 'udeskole'

Twenty-eight percent of the respondents indicated that teachers at their school practised *udeskole*. Schools practising *udeskole* were spread all around the country, in all regions, and in the majority of municipalities (87% of 98 municipalities) (see Fig. 1). Twelve percent of the responding schools had previously practised *udeskole* but had ceased. Hence, more than one third of the Danish schools have experience with the *udeskole* concept through their teachers (whether the school practises *udeskole* does not mean that all classes and teachers at the school practice *udeskole*). There was no significant difference between public and private schools ( $p=0.888$ ) nor small, medium, and large schools ( $p=0.406$ ) regarding *udeskole* practice.

So, although *udeskole* is not written into the Danish national curriculum, as much as 28% of the responding schools practice this type of regular and compulsory outdoor teaching. Compared to other countries (e.g. Lugg and Martin, 2001; Zink and Boyes, 2006; O'Brien and Murray, 2007), the Danish provision of school- and curriculum-based outdoor learning in general and *udeskole* in particular seems large. However, the provision is probably not as widespread as in Norway: a national survey showed that the extent of *udeskole* (half a day or more per week) was 37% of school time in 1–4th class (6–10 years old), 6% in 5–7th class (11–13 years old) and 1% in 8–10th class (14–16 years old) (Bjelland and Klepp, 2000). This is possibly due to the fact that *udeskole* (i.e. learning in the local community) has been written into the Norwegian national curriculum (Jordet, 2007) and the Norwegians 'close connection to nature' (Henderson and Vikander, 2007).

Approximately 15% stated that their school planned to initiate *udeskole* and/or *nature class* activities within three years. On the other hand, 35% declared that they had no intention of initiating such activities. It seems that there is a current upward trend in provision, and it looks like school-based outdoor learning activities for children are likely to increase further in the future. We expect this trend towards more outdoor teaching to continue as it addresses key societal concerns about child health, the environment, and the need for natural science teaching.

### The dissemination of 'udeskole'

Respondents were asked if they were acquainted with the concept of *udeskole* (cf. our methodological definition and delimitation), and how and where they became acquainted with it. Seventy-five percent were familiar with the *udeskole* concept, which suggests that *udeskole* is a well-known concept among Danish school managers. This acquaintance was driven from a number of sources: professional journals (52%), the website [www.skoven-i-skolen.dk](http://www.skoven-i-skolen.dk) ('The Forest in the School') (51%), teachers within the school (47%), and the press (46%) (see Table 1). Interestingly, half of the respondents had previously met the concept of *udeskole* through the website, [www.skoven-i-skolen.dk](http://www.skoven-i-skolen.dk), which is run by a cross-disciplinary group of public, private, and non-governmental organisations, all of which work within policy, planning, and management of green space, except for the Ministry of Education.

Twenty-five percent of schools had experienced enquiries about starting *udeskole* activities. These enquiries came primarily from school teachers (86%) and social educators/nursery teachers (34%), while 23% mentioned that nature interpreters had made such enquiries. It seems as though the Danish Nature Interpretation

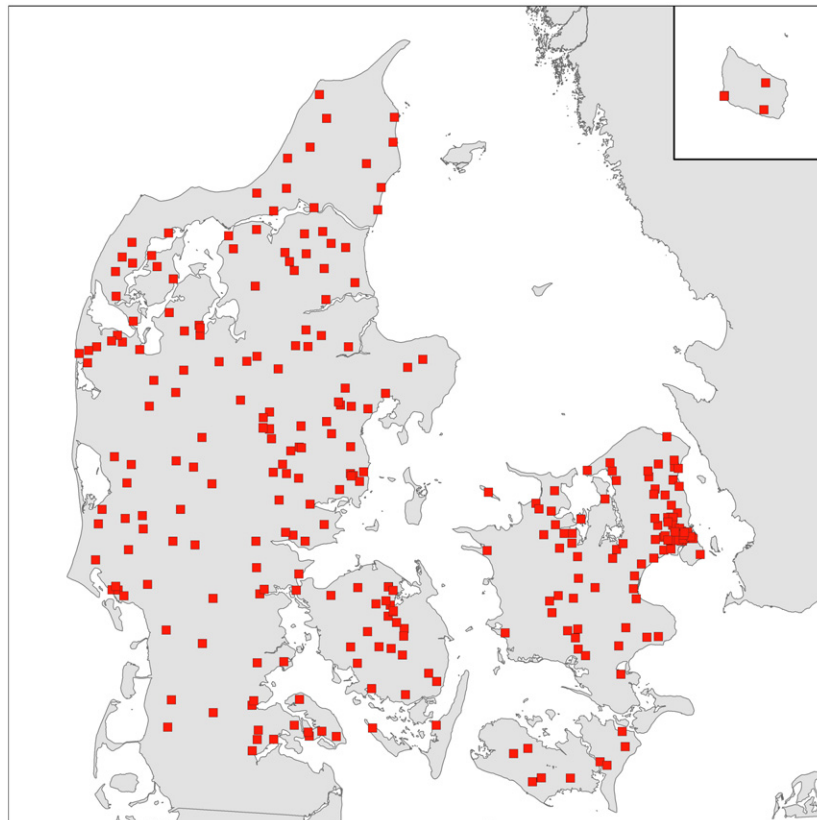
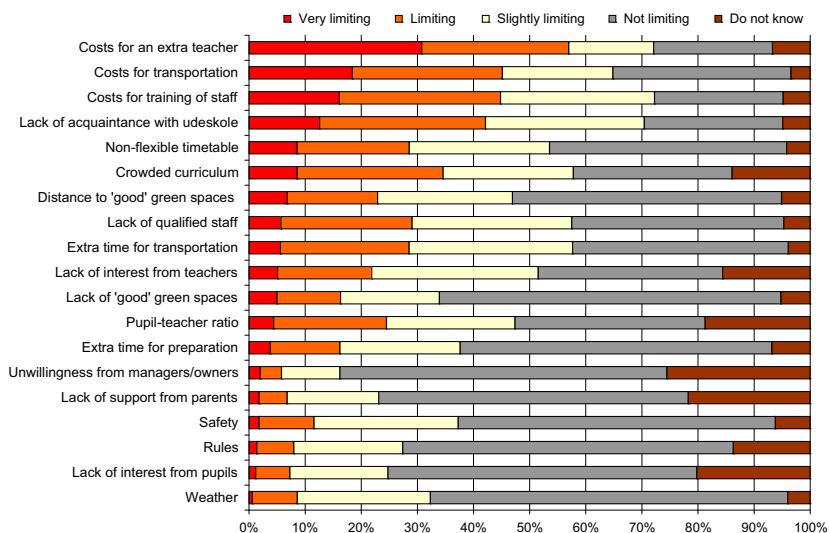


Fig. 1. Geographical distribution of the 290 Danish schools practising *udeskole* in 2007 ( $n=1025$ ).

**Table 1**  
Knowledge sources of the *udeskole* and *nature class* concepts in Denmark ( $n=788$ , possible to give multiple answers).

Knowledge sources of the <i>udeskole</i> and <i>nature class</i> concepts (counts/percent)	School size				Significance	School type		
	Small schools $n=270$ (%)	Medium schools $n=255$ (%)	Large schools $n=261$ (%)			Public schools $n=619$ (%)	Private schools $n=169$ (%)	Significance
From journals	409 (51.9%)	48.9	53.7	53.3	NS	51.7	52.7	NS
From www.skoven-i-skolen.dk	401 (50.9%)	62.6	47.1	42.9	$X^2=22.937$ ; $df=2$ ; $p < 0.000$	49.8	55.0	NS
From teachers at the school	372 (47.2%)	44.1	47.8	49.8	NS	48.3	43.2	NS
From the press	359 (45.6%)	41.5	47.8	47.5	NS	45.1	47.3	NS
From other school managers	250 (31.7%)	31.1	31.8	32.6	NS	32.3	29.6	NS
From TV	165 (20.9%)	19.6	22.4	21.1	NS	21.2	20.1	NS
From courses	151 (19.2%)	21.1	18.8	17.6	NS	20.0	16.0	NS
From www.udeskole.dk	79 (10.0%)	12.6	9.0	8.4	NS	10.3	8.9	NS
From the Internet	56 (7.1%)	8.9	5.9	6.5	NS	6.8	8.3	NS
From parents	23 (6.9%)	8.5	7.5	4.6	NS	5.7	11.2	$X^2=6.495$ ; $df=1$ ; $p=0.011$
Other	110 (14%)	13.0	12.2	16.9	NS	14.4	12.4	NS



**Fig. 2.** Distribution of Danish schools according to what year their managers first became acquainted with the concept of *udeskole* and *nature class* ( $n=779$ ).

Service and the Danish Rangers Association have played a relatively important role in the spreading of *udeskole*. Fig. 2 shows which year respondents first became acquainted with the concept of *udeskole* and *nature classes*. This data suggest that the concept of *udeskole* became widespread around the year 2000, possibly due to the public interest in the 'Rødkilde Project' and the related media attention. The Rødkilde Project, the first major Danish research project in *udeskole*, was a multi-dimensional and cross-scientific case study aiming to investigate the impact on pupils, parents, and teachers based on a weekly compulsory teaching day in a natural setting (e.g. Mygind, 2005, 2007, 2009). Another possible explanation for the dissemination around 2000 could be the establishment of the website [www.skoven-i-skolen.dk](http://www.skoven-i-skolen.dk) in 1999 by the project 'The Forest in the School'.

The results indicate that the provision of *udeskole* in Denmark can be described as a 'grassroots' movement spread by teachers, schools, and nature interpreters through a bottom-up process among schools and teachers themselves, but apparently it is also highly influenced by other stakeholders from private, governmental, and non-governmental organisations (see Fig. 2). However, survey responses to open questions indicate that international inspiration

from Norway and Sweden as well as inspiration from nature schools and local governments also has had an effect. In a recent review of current literature on impacts and provision of *udeskole* Bentsen et al. (2009b) concluded that teachers' 'freedom of methods' in the Danish schools system has been a potential in relation to the development and provision of *udeskole* programmes, and that *udeskole* began as a voluntary bottom-up process by enthusiastic teachers. Findings from this survey support this conclusion. Other studies have shown and emphasised that the distribution and quality of *udeskole* depend very much on the individual teacher (e.g. Mygind, 2005; Hyllested, 2007). A study from Norway concluded that the distribution of *udeskole* is random compared to the type and size of schools (Limstrand, 2001).

The dissemination of *udeskole* by teachers themselves also implies a lack of institutionalisation and overall organisation of *udeskole*. The Danish school system has a tradition for bottom-up development with ideas spreading after being implemented locally (Jensen et al., 2005). Thus, very often laws and policy have been drawn up in the light of the development of practice and acted as an affirmation of already existing practice. Further, the *udeskole* development projects could be seen in the light of the

Danish 'free school model'; schools and teachers' interpretation of the curriculum; and their relative freedom to develop new pedagogical ideas and methods (Bentsen et al., 2009b).

This illustrates how contextual social realities may influence pedagogy and (outdoor) teaching practice. Rea and Waite (2009) emphasised that this Scandinavian example tends to be based on greater teacher autonomy and principles of 'education for life' – particularly compared to recent developments in England and USA involving a tightly prescribed curriculum narrowly focused on learning outcomes and formal teaching methods (Gruenewald, 2003; Rea, 2008).

#### Barriers to practising 'udeskole'

The responses of schools' (i.e. managers) to barriers to practising *udeskole* are summarised in Fig. 3. The most important barriers are connected to cost issues, e.g. extra teacher, transportation, and training of teachers – what one could call 'economic barriers'. This is followed by three 'cultural' barriers related to mainstream school tradition: lack of acquaintance of *udeskole*, non-flexible timetable, and crowded curriculum. In general, the school managers perceive very few barriers of high magnitude in relation to *udeskole*. Interestingly, safety was not perceived as a major barrier to teaching outside the classroom as hypothesised – contrary to e.g. Scotland (Higgins et al., 2006).

Twenty-two percent expressed that distance to 'good' green space was limiting or very limiting for *udeskole* activities, but only 6% stated that "unwillingness from owners/managers of outdoor spaces" was a barrier. Respondents had the possibility of listing additional examples of barriers to *udeskole*. Comments indicate that external pressure of raising academic standards and book-learning are relevant additional barriers.

Based on the survey, there appears to be a potential for developing and spreading *udeskole* in Denmark. First of all, many

schools (15%) state that they are planning to start *udeskole* activities in the near future. Secondly, there seems to be potential for improvement of coordination within municipalities. Although this study did not indicate major problems between schools, teachers, and green space managers regarding *udeskole*, there is no indication of active cooperation. The barriers "unwillingness from managers/owners", "lack of support from parents", and "lack of interest from pupils" each have approximately 20% replying "do not know" (see Fig. 3). These answers demonstrate that school managers are unsure about third person involvement (i.e. parents and green space managers/owners), but also that knowledge in relation to pupil interest is lacking. Furthermore, they point towards the need for further dialogue with, e.g., the managers of green space, in order to discuss and relate green space to *udeskole*. There may be even greater potentials if a cross-disciplinary dialogue could be initiated.

In general, Danish school managers do not perceive any major barriers towards *udeskole* beyond the economic issues of an extra teacher and transportation (see Fig. 3). These results are consistent with research published recently within the field of outdoor education in, e.g., New Zealand (Zink and Boyes, 2006). As the majority of Danish schools are public, external funding is not likely. However, it is possible to remove or break down the largest (economic) barriers to practising *udeskole* by using school yards and green space close to schools. Thus, we see a great potential in using local areas in the practice of *udeskole*. Here green space management can play an important role in the further promotion of *udeskole*. Until now, most schools have used public forests (i.e. often further away from schools) for their educational activities (Mygind, 2005). If schools could use local green space, the cost of transportation and an extra teacher could be removed or at least reduced. However, this would require a more detailed analysis of, e.g., urban green space and their potential for use within an *udeskole* framework.

It seems as teacher attitudes are among the influential factors in the provision of outdoor learning. Thus, it could be interesting

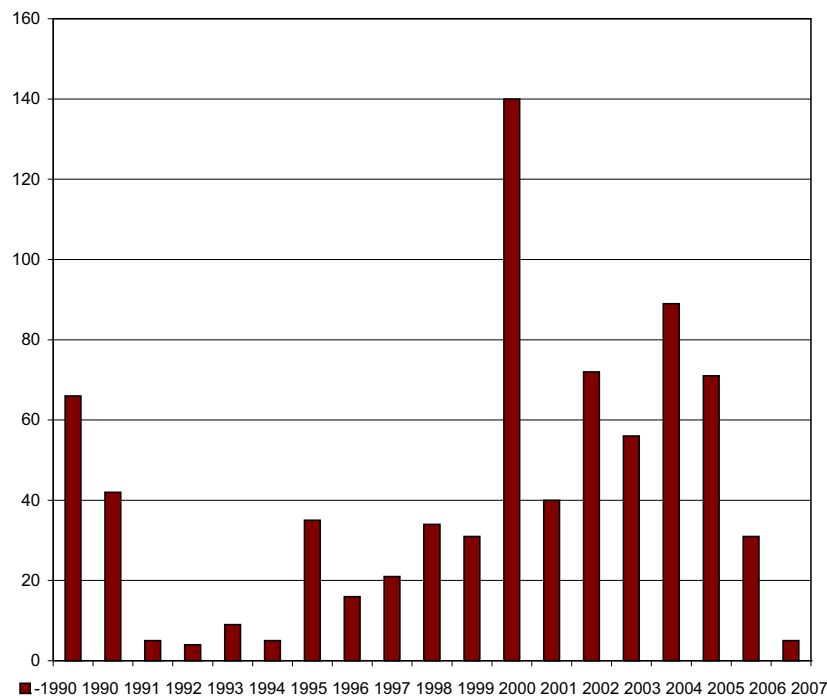


Fig. 3. Barriers in relation to *udeskole* and *nature class*, ranked by "very limiting" ( $n=697-907$ ). Translation and abbreviation of the original Danish statements in the questionnaire.

to know more about the teachers practicing *udeskole* with regards to gender, age, education, etc, and more about institutional issues, e.g. how supportive are schools and the educational sector. Another relevant question is whether teachers have sufficient competencies to actually carry out quality outdoor teaching. At present, outdoor teaching and learning is not a compulsory part of teachers training, however, incipient efforts and in-service training courses for *udeskole* teachers are today provided by private organisations, universities, etc.

#### Implications for policy and practice

A number of practical and theoretical questions arise in response to our findings. The results can influence decisions at all levels from policy to practice, and can inform and influence guidelines and recommendations for policy makers, teachers, green space managers, and researchers. This widespread provision may have consequences for educational policy, practice, and research. At the moment, there is no national framework, no formal qualifications, and no official educational policy with regards to *udeskole*.

If 28% of all Danish public and private schools practice *udeskole*, it seems as there is a need for access to effective support from green space providers in order to offer opportunities for schools and teachers. The research outcomes illustrate the need for policy, planning, and management for outdoor learning within green space – especially in the urban fringe. To develop policy and management strategies, a more formal dialogue between green space managers and the education establishment seems crucial (Randrup and Persson, 2009). The documented widespread provision of *udeskole* can be used in strategic arguments and when negotiating for resources. As mentioned in the introduction, there are several arguments for facilitating *udeskole* and other formal outdoor educational activities, because society and its NGOs focus more and more on outdoor recreation, outdoor education, and other non-material values of green space (e.g. Jensen, 1999).

The potential of integrating *udeskole* with local government and green space management seems to offer significant benefits. First of all, teachers and pupils can be seen as some of the primary users taking into consideration the regularity, frequency, and intensity of their visits, cf. the ‘typical’ Danish person (e.g. Koch, 1984; Jensen, 1999). Second, school teachers and pupils use green space in the hours where there in general are relative few other people – *the off-hours* – minimising potential conflicts with other users (e.g. Koch, 1984; Skov-Petersen et al., 2008). This could increase the utilisation and the rationale of green space. Finally, children are the coming generation of users and some studies indicate that childhood and youth experience could be important for future interest in nature (e.g. Tanner, 1998; Ward Thompson et al., 2008) not to mention the health and well-being aspects related to outdoor recreation and education.

As mentioned, approximately 25% of the respondents answered “do not know” to the question of barriers in relation to unwillingness from managers/owners, and this suggest that in some cases there is only little communication and cooperation between schools and managers/owners. Thus, there seems to be a need to reduce the knowledge gap between green space managers and school teachers, calling for joint programmes and cooperation. For many green space managers who do not have expertise in outdoor learning, this development presents a challenge.

Although a number of issues mentioned in this study are specific to the Danish context, the questions are also relevant to an international community. During the last 30 years of natural resource management and public administration of natural areas

(e.g. public forestry), we have seen focus evolve over time. We are certain that Denmark is quite comparable with many other countries in terms of natural resource management: moving from a main focus on production to multiple-use management also focusing on recreation and education (e.g. O'Brien and Murray, 2007).

#### Methodological considerations and limitations

The strength in this study lies in the large sample size of schools, which gives a precise nationwide overview of the Danish situation. Twenty-eight percent (290 schools) of the respondents indicated that teachers at their school practised *udeskole*; however, as this study is a total population study, we lack information from about 49% of the schools who did not answer the questionnaire. Taking this into consideration, the total percentage of Danish schools practising *udeskole* is somewhere between 14 and 62%. Motivation to participate in the survey could have caused selection bias. Thus, the schools and managers that responded to the questionnaire are likely to be more interested, have more knowledge, and more experience with *udeskole* than the ones who did not answer. However, the background variables (school type and school size) are controlled with the non-respondents and showed no significant differences. Overall, there is no indication that non-response has seriously biased the results of this survey. Thus it is assumed that the responding schools constitute a good representation of the whole population.

Quantifying the provision of outdoor learning is challenging at best. Lynch (2002) discussed some of the problems and difficulties associated with quantifying participation, e.g. how outdoor education and ‘courses of study’ are defined and interpreted. We made a relatively strict definition of *udeskole* (see section ‘Population’), and it is safe to assume that many more schools and teachers are teaching outdoors in an ad hoc fashion. So the extent we have revealed is a minimum.

Another limitation could be the problem of having one person answering on behalf of a whole school. A relevant question could be how ‘good’ the principal and vice principals are at answering the questions on behalf of the whole school. By asking the teachers one might get different results due to differences in knowledge, attitude, and experience. One indicator of the knowledge of the respondents could be their length of employment at the school, and results showed that the respondents in average have been employed for 12 years (minimum=0.5 years and maximum=41 years).

It is important to be aware of an eventual bias in some of the answers, because it is non-committal to answer a hypothetical question about the intention to start a particular programme. When it comes to the validity of the survey, a relevant question is whether the questions are understood and thus measuring what we intended. As mentioned earlier, the questionnaire was constructed and tested in close relation with resource persons and selected teachers. A quantitative approach illustrates main tendencies and patterns in relation to a theme, but one should be aware of the limitations. Thus, it could be relevant to undertake a follow-up qualitative study.

A study by Cobanoglu et al. (2001), indicated that web surveys have significant advantages over mail and fax surveys in relation to response rate and costs – especially if the population accesses the Internet daily. In this case, the choice of a web survey was relevant because Danish schools are very familiar with the Internet, the Danish Ministry of Education and the schools communicate via e-mail on a weekly basis, and the response rate is relative high compared to comparable international surveys.

### Future research

There are still areas and themes regarding the relatively new concept of *udeskole* that need more investigation. Because of the growing interest in provision of *udeskole* from public, private and non-governmental organisations, it seems crucial to obtain more knowledge from both (outdoor) educational and green management perspective. In the light of the extent of provision of *udeskole*, very little is known about how *udeskole* is conducted. Which classes, subjects, and activities are taken outside in green space? What characterises teachers who have started these local pedagogical development projects? What characterises their pedagogical foundations and practices in this form of curriculum-based outdoor learning? Further exploration of schools' and teachers' practice is needed as well as examination of trends over time.

There is also a potential for further research within *udeskole* and the use of green space for educational purposes. Outdoor teaching has existed in the Danish school system for more than 100 years (Hyllested, 2007), but not with the regularity, intensity, frequency, and extent as this survey indicates. The results show that a relatively high number of schools are practising curriculum- and subject-based outdoor teaching on a regular basis. Thus, teachers and pupils can be regarded as an overlooked group of users of green space. Jensen (1993) showed that forest planners and managers can have a relatively misplaced perception or lack of detailed understanding of forest preferences of different groups of users, which makes it important to explore preferences of the actual and potential users (i.e. teachers and pupils) and not only rely on experts (i.e. planners and managers) opinion. What demands do the *udeskole* teachers and pupils place on green space through *udeskole*? How is green space going to be planned, designed, and managed to take the wishes and demands for a 'good' outdoor classroom into consideration without conflicts with other use/users of the area? Informed decision making in the planning and management of green space in relation to *udeskole* requires a greater information base.

Survey results suggest that teachers with their freedom of methods can be seen as a very – if not the most – important stakeholder in practising *udeskole*. Limstrand (2001), Mygind (2005), and Bentsen et al. (2009b) also stressed teachers' central role in the provision and quality of *udeskole*. Thus, we see merit in a survey of teachers practising *udeskole* and follow-up case studies with selected schools, teachers, and the green space being used. In this connection, it will be interesting to compare the answers from the school managers with those of the teachers: Are they seeing and experiencing the same barriers and potentials?

Another relevant area of research is spatial analyses of schools and their surroundings. From studies of outdoor recreational patterns, it is known that distance, accessibility, and other spatial concepts play an important role in the use of green space (e.g. Grahn and Stigsdotter, 2003; Nielsen and Hansen, 2006). However, when it comes to distance, transport, physical barriers, and perceived accessibility, little is known in relation to the educational use of the landscape. A further area of study in this context could be schools and teachers who do not use the concept of *udeskole* and schools that have ceased practising *udeskole*.

The development of school-based outdoor teaching and learning is not unique for Denmark and the rest of Scandinavia. A similar trend can be seen in non-Scandinavian countries where the outdoors is increasingly a part of pre-school and school teaching showing the international nature of this interest, e.g. the emergence of forest schools around Europe. It is evident that an increased understanding of outdoor teaching and learning in different countries and contexts could be another future research focus as socio-cultural perspectives on pedagogy and learning are almost absent from the literature.

### Conclusion

The overall aim of this study was to describe and understand *udeskole* and the related use of green space for educational purposes in Denmark by investigating the extent and dissemination of this new outdoor teaching concept and tentatively explore barriers to its provision.

*Udeskole* is practised by 28% of the responding Danish schools and is distributed across the country in all regions and most municipalities. Our initial hypothesis that there were more than 60 schools practising *udeskole* proved to be very low and we identified at least 290 though the number could be even higher. In addition, 15% are planning to start *udeskole* activities within 1–3 years. It can be concluded that the number of schools practising *udeskole* is relatively high, and that *udeskole* plays an increasing role in the Danish school system. Especially, seen in the light of the fact that *udeskole* is not written in the national curriculum.

The *udeskole* movement has spread as a grass roots movement, with strong support and promotion from private and non-governmental organisations, and the survey results paint a picture of the concept becoming widespread around 2000; thereby confirming our hypothesis, which stated that *udeskole* has been spread by local initiatives.

The major barriers to practising *udeskole* are 'economic', i.e. cost for transportation, salary for an extra teacher, and cost for training of staff. This result confirms partly our third hypothesis; however, our anticipation of safety concerns being a major barrier was not confirmed.

Based on these results, the need for planning and management of green space in relation to curriculum-based outdoor teaching is becoming increasingly evident. Thus, *udeskole* plays an important role in the Danish school system and Danish green space management. First of all, the interest in and extent of *udeskole* seem to be growing. Second, because green space managers can play an important role in removing barriers in relation to *udeskole* by facilitating outdoor learning in the local environment. Therefore, green space planners and managers have to take *udeskole* seriously and plan and manage for outdoor learning – realising that school teachers and pupils use green space more (in regularity, frequency, and intensity) compared to the 'typical' Danish person (in the off-hours with fewer potential conflicts). Future recommendations for research include an increased understanding of teachers' and pupils' use of and preferences for green space.

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