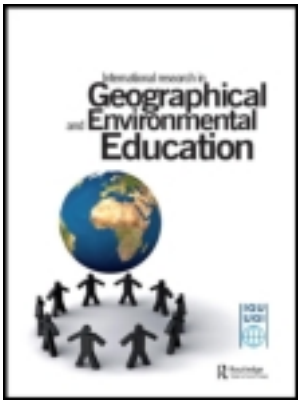

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Katie Oost [a] , Bregje De Vries [a] & Joop A. Van der Schee [b]

[a] Faculty of Education, HAN University of Applied Sciences, Nijmegen, The Netherlands

[b] Centre for Educational Training, Assessment and Research, VU University, Amsterdam, The Netherlands

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Enquiry-driven fieldwork as a rich and powerful teaching strategy – school practices in secondary geography education in the Netherlands

Katie Oost[a]*, Bregje De Vries[a] and Joop A. Van der Schee[b]

[a]*Faculty of Education, HAN University of Applied Sciences, Nijmegen, The Netherlands;* [b]*Centre for Educational Training, Assessment and Research, VU University, Amsterdam, The Netherlands*

Given its active and enquiry-driven character, fieldwork is seen as an important way to develop geographical understanding of the world, during which cognitive and affective learning reinforce each other. The present study aims to give insight into whether and how secondary school geography teachers in the Netherlands succeed in using fieldwork as a rich and powerful teaching strategy. Do they perform fieldwork that is enquiry driven, structurally integrated in the curriculum and stimulates both cognitive and affective development? The results of a questionnaire show that although 71% of the geography teachers do fieldwork, they generally do not succeed in meeting the conditions mentioned above.

Keywords: fieldwork; geography education; improving fieldwork; enquiry learning; teaching strategy

Introduction

In a review of research on outdoor learning, Rickinson et al. (2004) describe the impact of fieldwork done at primary, secondary and undergraduate levels. In this review, fieldwork is defined as undertaking learning activities in outdoor settings, linked with particular curriculum subjects. According to Rickinson et al. (2004), substantial evidence indicates that well-conceived, planned, taught and followed up fieldwork offers students the opportunity to develop their knowledge and skills supplementary to experiences in the classroom. On the basis of this evidence, they suggest that "fieldwork should be employed more widely and more frequently than is now the case because of potential learning, attitudinal, interpersonal and social outcomes" (p. 24). Because of the memorable nature of the fieldwork setting, it can have a positive impact on long-term memory (Falk & Balling, 1982; Mackenzie & White, 1982; Pace & Tesi, 2004). Effective fieldwork can also lead to individual growth and improvements in social skills. More importantly, the possible reinforcement between the affective and the cognitive, each influencing the other, provides a bridge to higher-order learning (Nundy, 2001). Over the years, the findings of the impact of fieldwork on learning in general have been supported by research on fieldwork in geography education specifically (e.g. Boyle et al., 2007; Cook, 2008; Fisher & Norman, 2000; Kwan & So, 2008; Lai, 1999; Mackenzie & White, 1982; Nundy, 1999; Scott, Fuller, & Gaskin, 2006).

In geography education, fieldwork is considered to be an important way to develop geographical understanding of the world (e.g. Foskett, 1997, 1999; Gerber & Chuan, 2000; Hope, 2009; Job, 1999; Job, Day, & Smith, 1999; Kwan, 2000; Lidstone, 1988). It is

*Corresponding author. Email: katie.oost@han.nl

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promoted as an active and inquiring way of working, which can lead to a deep approach to the learning of geography. For the teacher, it can be a rich and powerful teaching strategy.

Since the advantages of fieldwork in education in general and in geography education in particular are widely acknowledged, it is surprising that in many countries, fieldwork still seems to form an incidental part of the geography curriculum. For instance, in the US, fieldwork is not a part of the curriculum and it is performed less and less (Witham Bednarz, 1999). In the UK, fieldwork seems to be done less at Key Stage 3, although it is obligatory in the curriculum (Fisher & Norman, 2000). In Victoria, in Australia, teachers go on fieldtrips once or twice per class per year (Munday, 2008). A survey in Taiwan shows that 86% of the teachers say they do not, or almost never, do fieldwork (Han & Foskett, 2007). In China, fieldwork is largely absent from the mainstream secondary geography curriculum and teachers do very little fieldwork (Zhang, 1999).

What are possible constraints that prevent teachers from doing fieldwork? Munday (2008) found that teachers in Australia find the planning of fieldwork difficult. Other constraints are the costs of fieldwork, the transportation that is needed and student behaviour. Zhang (1999) recognises time demands of the Chinese curriculum, the inexperience of teachers with fieldwork and financial constraint as barriers to perform fieldwork. In Taiwan, Han and Foskett (2007) identify safety, the impact of lessons missed by teachers supervising fieldwork and large classes as constraints to do fieldwork. Comparable barriers are found by Rickinson et al. (2004), in their review of outdoor learning in the UK: (1) fear and concern for health and safety of students; (2) teacher's confidence and expertise in teaching and learning outdoors; (3) requirements of school curricula and timetables; (4) shortages of time, resources and support; and (5) wider changes within the education sector and beyond (e.g. class size).

In the Netherlands, as well as in many other countries, fieldwork has never been obligatory in the geography curriculum (Swaan & Wijnsteekers, 1999). This raises the question whether and how fieldwork is being performed. Considering the positive effects fieldwork is supposed to have on learning geography, there is a growing need to gain more insight into how secondary geography teachers think about, design and implement fieldwork in their curriculum. For this purpose, a questionnaire was conducted amongst a large group of secondary geography teachers in the Netherlands. The main research question of this study is *to what extent do secondary geography teachers succeed in using fieldwork as a rich and powerful teaching strategy?*

In the next section, the supposed power of fieldwork as a teaching strategy is outlined in more detail. Next, the method and the results of the survey are presented. On the basis of the results, in the conclusion, suggestions are given to improve the integration of fieldwork in secondary geography education.

Theoretical background

Fieldwork in geography can be considered as an activity taking place outside the classroom and mostly of the school premises, in which students actively engage in experiencing and studying geographical phenomena in the real world (e.g. Foskett, 1997; Hill & Woodland, 2002; Scott et al., 2006). During the past 50 years, teaching strategies in fieldwork have developed from the traditional field excursion to field research based on hypothesis testing and geographical enquiry to sensory and discovery fieldwork, reflecting different perspectives on teaching and learning (see Figure 1). With these fieldwork strategies, it is thought that teacher and student play out different roles: the role of the teacher undulating from an omniscient provider of knowledge to a coach and the role of the student undulating from a

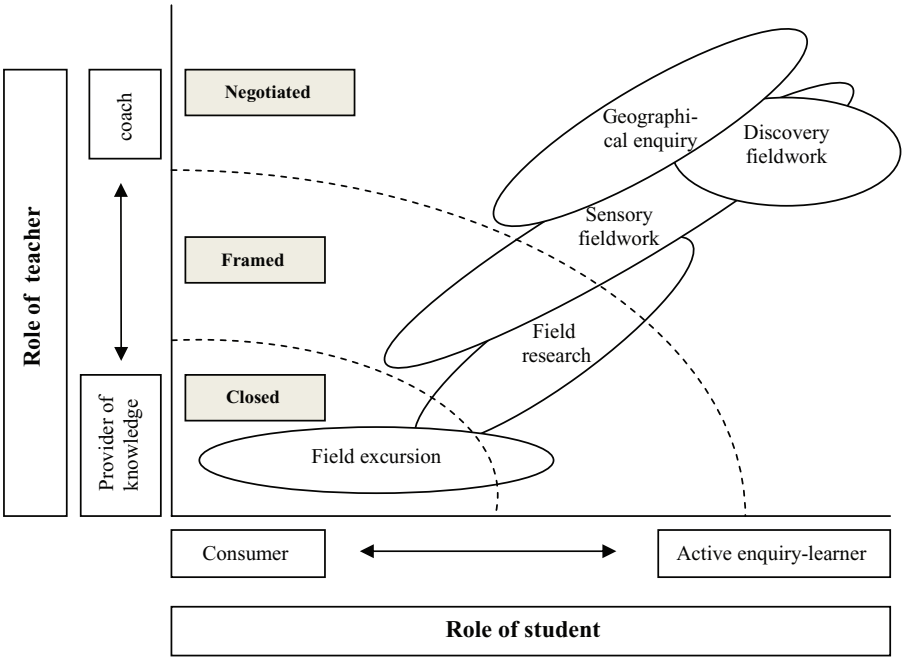

Figure 1. Tentative view on roles of teacher and student in different fieldwork strategies (adapted from Caton, 2006; Foskett, 1997; Job et al., 1999; Roberts, 2003).

consumer to an active enquiry-learner. Both the roles of the teacher and the student balance each other, creating either a more teacher-led or a more student-centred way of working (Caton, 2006; Foskett, 1997; Job et al., 1999; Kent, Gilbertson, & Hunt, 1997).

Recently, in education in general as well as in geography education specifically, there is a growing interest in making the learning process more enquiry driven. In that sense, *geographical enquiry* has been defined as follows:

> An active process through which learners construct knowledge about the world. In order to learn, students need to make connections between what they already know and new information and new ways of seeing things. I think they do this through the process of enquiry. [. . .] Geographical enquiry should be focused on real issues, on places and spaces that mean something to students and on real data of the kind that students are likely to encounter in the world outside the classroom. (Roberts, 2003, p. 6)

Roberts (2003) developed a framework to place an enquiry way of working on a scale from "closed", through "framed", to "negotiated" to find out to which extent students or teachers control the learning. "Closed" means that the learning process is controlled by the teacher (teacher-led way). "Framed" means that students are active participants within conditions set and controlled by the teacher. "Negotiated" means that students control almost every aspect of the learning process (student-centred way). In Figure 1, the fieldwork strategies are placed in a similar framework.

Although all fieldwork strategies can be more or less successful in activating student learning, especially negotiated learning environments leading to enquiry-driven fieldwork and both cognitive and affective learning are expected to be the most fruitful to develop deep geographical understanding. More attention for the affective component of learning

and for enquiry-driven, student-centred activities seems to have many benefits. Firstly, the enquiry-driven, student-centred, "in the real world" nature of fieldwork is thought to motivate students because it appeals to their personal thoughts, experiences and interests (e.g. Boekaerts, Pintrich, & Zeidner, 2000). Students actively engage in activities such as measuring, observing and counting, using the field as a learning resource (Witham Bednarz, 1999). Secondly, during fieldwork, students are involved as a whole person: interaction takes place between physical, mental and emotional experiences (Foskett, 1999; Stoddart, 1986). Since fieldwork is often done collaboratively, it also leads to social experiences. These physical, mental, emotional and social experiences can motivate students to actively engage in the learning process. Thirdly, fieldwork leads to cognitive, affective as well as social learning outcomes, which mutually reinforce each other (Nundy, 2001; Rickinson et al., 2004). The cognitive is directly linked to learning outcomes through processing of information and construction of meaning. The affective deals with emotions, feelings and values, leading to perceptions of learning tasks, and is indirectly linked to learning outcomes. The way students perceive a learning situation is what determines their learning approach. Affective outcomes that foster deep approaches to learning lead to better student performance due to higher levels of understanding. In this way, it is thought that a positive outcome in the affective domain must be an important antecedent to success in the cognitive domain (Boyle et al., 2007; Entwistle & Smith, 2002; Marton, Hounsell, & Entwistle, 2005).

Taken together, the three characteristics of fieldwork mentioned above are expected to lead to a so-called deep approach to learning, in contrast to a surface approach to learning. Using a deep approach to learning, the student searches actively for meaning and tries to relate it to prior knowledge, experience and learning, in this way transforming the knowledge gained. A surface approach to learning, however, renders the student more passive. He or she attempts to memorise material, to reproduce it accurately in a later stage. There is little attempt to relate it to prior knowledge, experience or learning and to transform the knowledge (Bradbeer & Livingstone, 1996; Entwistle & Smith, 2002; Marton et al., 2005). A deep approach to learning is thought to lead to deep understanding, long-term knowledge and skills retention and transferability of knowledge and skills.

Motivation also is an important factor to achieve a deep approach to learning. There are indications for the link between student self-regulation, motivation, interest and self-confidence, and a deep approach to learning (Entwistle & Smith, 2002; Fuller, Rawlinson, & Bevan, 2000; Healey, 2005; Higgitt, 1996; Marton et al., 2005; Scott et al., 2006). Motivation of students can be diminished by the overstructuring of learning activities and by a heavy workload and fact-based assessment procedures (Boyle et al., 2007; Entwistle & Smith, 2002). Ballantyne and Packer (2002) found that "the use of worksheets, note-taking and reports were all unpopular with students, and did not appear to contribute greatly to [their] environmental learning" (p. 228). This indicates that using only teacher-led activities may lead to declining student motivation and a surface approach to learning, whereas a certain "freedom in learning" leads to an increase of student motivation and a deep approach to learning (Entwistle & Smith, 2002; Marton et al., 2005). This is in line with the notion that the enquiry-driven, student-centred nature of fieldwork is important.

On the basis of the literature, in the context of this study, geography fieldwork is defined as follows:

> An enquiry-driven, more or less student-centred way of experiencing and studying the environment outside the classroom, by way of purposeful instruction in geography, fostering a deep approach to the learning of geography and leading to deep understanding in the cognitive as well as the affective domain.[1]

Fieldwork is thought to consist of three necessary phases: (1) preparation, (2) work outside the classroom and (3) debriefing (Foskett, 1997; Job et al., 1999; Kent et al., 1997; Kisiel, 2009; McLoughlin, 2004). These phases highly depend on each other for their quality and success. Inadequate preparation of students for fieldwork has led to poor-quality learning in the field (Bradbeer & Livingstone, 1996). Students who are prepared for a field visit learn more from their experience (Cox-Petersen & Melber, 2001; Falk & Balling, 1982; Falk & Dierking, 1992; Knapp, 2000). Traditional forms of preparation, such as strongly teacher-led activities, have encouraged a passive and surface approach to learning. Similarly, work outside the classroom involving mainly teacher-led activities gives students little opportunity for active enquiry learning and leads to more or less passive students (e.g. Job, 1996; Job et al., 1999). The debriefing, in the form of a dialogue on the field findings and the learning process, is important to find out whether or not and how the students have gained the correct geographical knowledge and skills and a deeper understanding. In this way, a teacher can check for misconceptions and omissions. The dialogue can be provided through whole-class as well as individual discussion (Roberts, 2003). Also, during the debriefing, the teacher can clarify links between the world outside the classroom and the "world of the school" (Foskett, 1997; Uzzell, Rutland, & Whistance, 1995).

To improve the learning outcomes of fieldwork and to achieve a long-lasting effect in memory, fieldwork should be structurally integrated in the curriculum (Foskett, 1997). This means that it has to be done with a certain frequency and duration. Rickinson et al. state that "there is considerable evidence indicating that longer programmes are more effective than shorter ones" (2004, p. 46). In addition, Orion and Hofstein suggest that "the fieldtrip should be an integral part of the curriculum rather than an isolated activity" (1994, p. 1117). Furthermore, and not unimportantly, structural integration of fieldwork in the curriculum only occurs if fieldwork is a mandatory part of national programmes, syllabi or school curricula. It should be central to geography education.

In summary, geography teachers who want to integrate fieldwork as a rich and powerful teaching strategy, leading to a deep approach to learning of geography and a deep geographical understanding of the world, should at least satisfy a number of conditions. Firstly, fieldwork should be enquiry driven and more or less student centred. Secondly, it is important that the structural integration of fieldwork at classroom level is complete and thorough. This means that the preparation of students should be profound and thorough and that teachers should have a profound dialogue about the fieldwork findings and the learning process with the students during the debriefing, to let students construct an overall view of the subject at hand and check possible misconceptions and omissions. Thirdly, fieldwork should be structurally integrated at curriculum level with a link between the goals of the regularly occurring fieldwork and national and school programmes. Fourthly, there should be attention for affective learning as well as for cognitive learning and the interaction between the two.

Method

A questionnaire was developed in several steps. Preliminary to the development of the questionnaire, eight geography teachers were interviewed about their perception of fieldwork and the way they performed it. The results of these interviews and a literature review on fieldwork were used as input for the development of the questionnaire. The questionnaire was then validated in two steps. A first version was pre-tested by a panel of six experts consisting of teachers and scientists in the field of geography education. The test focused

on completeness and its internal and external validity. On the basis of this pre-test, a second version was constructed and tested with a panel of five secondary school geography teachers now focussing on its usability and clearness.

The questionnaire consisted of three main parts. The first part focused on personal information and school situation. The second part consisted of items on the characteristics of the fieldwork performed and on the external conditions to perform it. The third part consisted of items addressing the attitude of the respondents. In total, the questionnaire consisted of 45 questions. Most questions were multiple choice and closed scale items (five-point Likert-scale). Two open questions were included to collect fieldwork experiences which the respondents considered typical or special in their teaching history. Filling in the questionnaire took approximately 20 minutes.

Procedure

A non-personalised email was distributed amongst approximately 2000 geography teachers working in secondary education, by way of the Royal Dutch Geographical Society (KNAG). Also, a digital announcement was sent to the members of an online community of geography teachers (approximately 1000). There is an overlap between both groups of geography teachers, but the size of this overlap is not known. In the email, an open link to the online questionnaire was provided which the respondents were invited to follow. After several weeks and again after two months, they received a reminder. The incoming data were automatically stored in a database and recoded for further statistical analyses. The data were summarised into descriptive results, means and standard deviations were calculated and tests (chi-square, *t*-test) were performed to explore correlations between variables.

Participants

In the survey, 205 respondents participated (see Table 1). In secondary education, in the Netherlands, three different, parallel school types are distinguished: pre-vocational education, senior general secondary education and pre-university education. For this study, the school types the respondents work in are clustered in four categories: "lower pre-voc" (consisting of two grades), "upper pre-voc" (consisting of two grades), "lower sec-ed/pre-uni" (consisting of three grades) and "upper sec-ed/pre-uni" (consisting of two or three grades). Most respondents work in the school type "sec-ed/pre-uni". Because respondents often work in more than one school type, the total in the first row in Table 1 exceeds 205.

Table 1. Characteristics of the respondents.

	Age (year)		School type			
	M	*SD*	Lower pre-voc* (*n*)	Upper pre-voc (*n*)	Lower sec-ed**/pre-uni*** (*n*)	Upper sec-ed/pre-uni (*n*)
Respondents ($N = 205$)	42.7	11.9	79	56	151	131
Female ($n = 70$)	38.1	12.4	25	17	45	43
Male ($n = 135$)	45.1	10.9	54	39	106	88

*Pre-vocational education.
**Senior general secondary education.
***Pre-university education.

Table 2. Frequency of fieldwork per school type per year ($N = 145$).

Frequency (per year)	Lower pre-voc (%) ($n = 54$)	Upper pre-voc (%) ($n = 38$)	Lower sec-ed/pre-uni (%) ($n = 113$)	Upper sec-ed/pre-uni (%) ($n = 99$)
0	13.0	31.6	8.0	19.2
1	53.7	44.7	51.3	41.4
2	24.1	13.2	24.8	23.2
3	1.9	10.5	12.4	6.1
4	3.7	0	1.8	5.1
5	0	0	0.9	1.0
>5	3.7	0	0.9	4.0

Results

Whether or not and in what way do the respondents realise fieldwork?

Of the 205 respondents, 145 (71%) perform fieldwork and 60 (29%) do not. In the school types "lower" and "upper sec-ed/pre-uni", fieldwork is significantly done by more respondents than in the other school types ($\alpha < 0.05$). The frequency of the fieldwork performed is mainly once or twice a year per school type (see Table 2). For all school types, fieldwork is mostly done in a day or less (see Table 3).

For the respondents who do fieldwork, November to January is the least popular period to perform fieldwork and May to July the most popular. Reasons for choosing a specific period most mentioned are *weather* (54%), *geography books used in the classroom* (49%) and *school planning for "project-weeks"* (48%). On this question multiple answers could be given.

Multiple answers could also be given on the questions with which goals the respondents apply fieldwork in their educational practice and which learning goals they distinguish for the students. One goal for applying fieldwork stands out: 94% state they do fieldwork with the goal of interlinking theory with the real world. The goals to develop geographical skills and research skills follow (72% and 71%, respectively). The development of general skills is mentioned by 52% and the development of knowledge by 43%. The introduction of a new theory, the activation of prior knowledge, the testing of geographical knowledge and skills and the testing of research and general skills all score less than 28%.

The most important learning goals for students mentioned by the respondents are the development of geographical skills and knowledge, together with the development of research skills (76%, 61% and 66%, respectively). The development of general skills is chosen by 48% as a learning goal, whilst 12% do not work with learning goals.

Table 3. Duration of the fieldwork ($N = 145$).

Duration	Lower pre-voc (%) ($n = 54$)	Upper pre-voc (%) ($n = 38$)	Lower sec-ed/pre-uni (%) ($n = 113$)	Upper sec-ed/pre-uni (%) ($n = 99$)
1 hour	7.4	10.5	9.7	5.1
2 hours	20.4	18.4	17.7	10.1
Half a day	35.2	18.4	37.2	19.2
Day	24.1	26.3	38.9	43.4
2–5 days	9.3	5.3	14.2	19.2
>5 days	0	2.6	0.9	4.0

Table 4. Fieldwork categories performed by the respondents in the last 5 years and the student activities developed during this fieldwork ($N = 145$).

Fieldwork category	Performed in last 5 years (% of respondents) ($N = 145$)	Teacher-led (% of respondents within fieldwork category)	Student activities (% of respondents within fieldwork category)
Excursion (cf. field teaching)	83.4	75	Doing research, student-centred: 35 Filling in instruction form: 56 Measuring/counting/observing: 51 Smelling/feeling/tasting: 41
Enquiry fieldwork and field teaching	82.8	18	Doing research, student-centred: 62 Filling in instruction form: 62 Measuring/counting/observing: 78 Smelling/feeling/tasting: 38

The respondents were asked what type of fieldwork they had done the past five years and which activities the students had performed during this fieldwork. Two categories of fieldwork were distinguished: *excursion* (cf. field teaching) and *enquiry fieldwork and field research.* Per fieldwork category respondents could tick boxes on working teacher-led or not and on a number of student activities. Discovery and sensory fieldwork are not well known in the Netherlands, so these two types were not included. However, one student activity the respondents could tick – *smelling, feeling and tasting* – gives a tentative idea of the application of qualitative or sensory activity. The results shown in Table 4 indicate how the respondents work during fieldwork (since respondents could give multiple answers, the counts do not total 100%). In the past five years, both fieldwork categories have been performed by 83% of the respondents. Considering the starting-points of the different fieldwork types, it is not surprising that respondents work in a more teacher-led way when doing an excursion than when doing enquiry fieldwork and field research. Also, the enquiry-driven nature of fieldwork seems to stand out less when doing an excursion than when doing enquiry fieldwork and field research. This is reflected in the student activities: during excursions less student-centred and enquiry-driven activities are done. What is surprising, though, is that 38% of the respondents who do enquiry fieldwork and field research do *not* say that they allow students to do research in a student-centred way, whilst only 18% state that they work in a teacher-led way. Combined with the fact that in this category 62% of the respondents state that they use instruction forms, this indicates that a student-centred way of working is not yet fully implemented.

The activities *measuring*, *counting* and *observing* are seen as an indication of the learning in the cognitive domain and the activities *smelling*, *feeling* and *tasting* as an indication of the learning in the affective domain (see Table 4). The results show that the cognitive domain receives more attention. This is in accordance with the findings of the interviews with geography teachers, held preliminary to the survey, that overall the affective domain is not addressed as thorough as the cognitive domain. Also, it can be seen as an indication for the predominance of a quantitative approach of fieldwork over a qualitative approach.

To gain a clearer view of the activities the respondents undertook with the students, they were asked what they had done during the preparation of fieldwork, the work outside and the debriefing (see Figure 2). On these questions, multiple answers could be given.

Looking at the activities mentioned by more than 50% of the respondents, the results show that during preparation most attention is paid to discussing the assignment, the review criteria of the assignment and the division of tasks, looking at maps of the fieldwork area

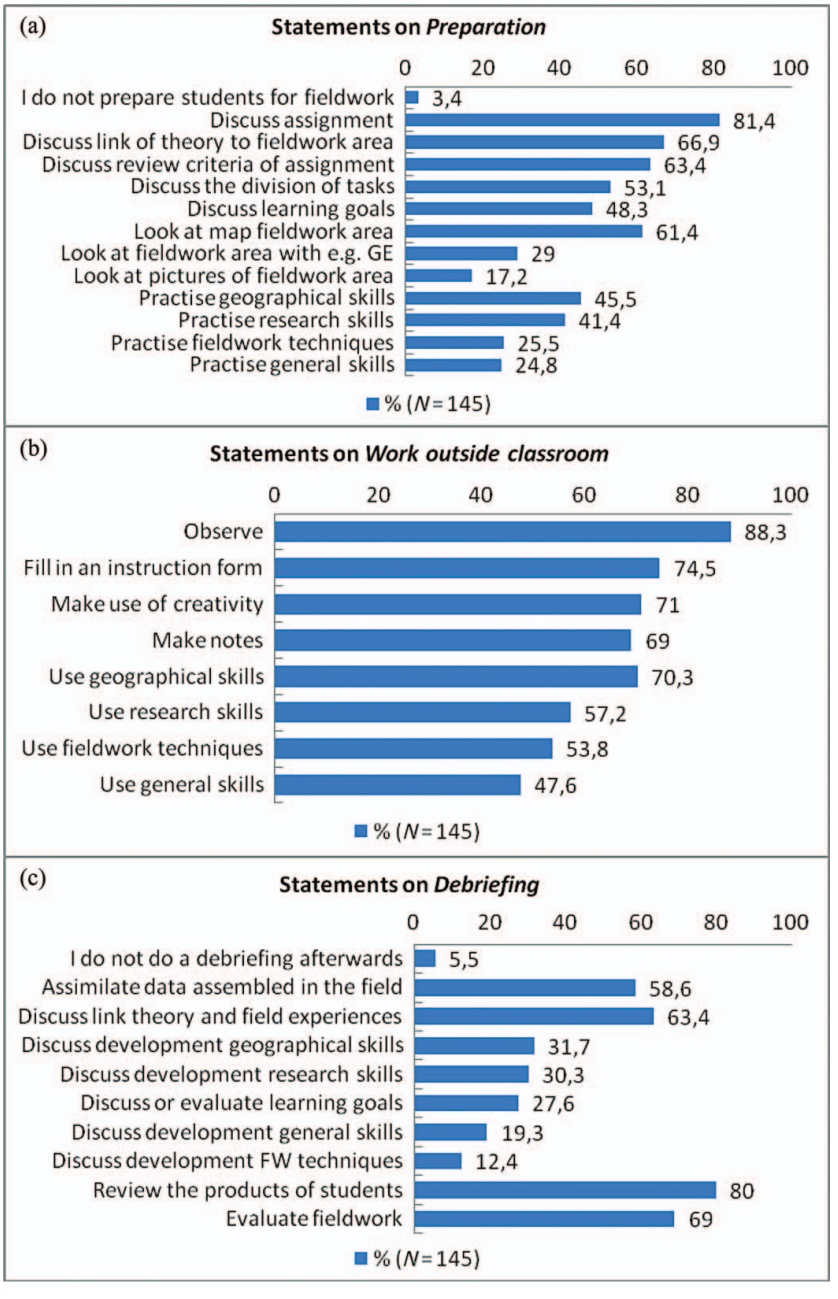

Figure 2. Activities undertaken by respondents with students (a) during preparation, (b) the work outside the classroom and (c) debriefing ($N = 145$). GE, *Google Earth*; FW, fieldwork.

and linking the theory to the context of the fieldwork area. Less attention is given to the learning goals and practising skills. Fifty-two per cent of the respondents do not discuss the learning goals. During the work outside the classroom, observing and making notes are important activities. Instruction forms are often used. The use of geographical skills seems to be very important. During the debriefing, 80% of the respondents review the products

of the students. However, 41% do not let the students assimilate the data assembled in the field and 37% do not discuss the link between theory and the field findings. There is even less attention for the development of skills and fieldwork techniques. Only 28% evaluate or discuss the learning goals. Notably, although most respondents say they do fieldwork with specific (learning) goals, only half of them discuss these goals during preparation and only one quarter of them evaluate or discuss these goals during debriefing.

From the interviews with geography teachers, held preliminary to the survey, it becomes clear that during debriefing, they do not use thinking skills or special teaching strategies. They do not seem to check misconceptions and omissions on a regular basis. They spend little time on the transfer of the knowledge gained or on the way the students have learned. As one of the teachers stated:

> It is important to go outside with students, to let them link geography concepts to what they see outside. We do discuss this link afterwards in the classroom, but students find this difficult and it does not always work. Then the outcomes do not meet our expectations. We pay no attention to learning to learn during fieldwork.

Why do respondents perform fieldwork or not?

The respondents who perform fieldwork experience positive outcomes for students as well as for themselves and overall feel competent in doing fieldwork. Eighty-six per cent or more agree or totally agree with the statements that fieldwork enhances geographical knowledge and understanding; the understanding of the connection between the "real world" and the theory in textbooks; the geographical, research and general skills of students. Also, 83% or more agree or totally agree on the statements that fieldwork enhances the motivation of students for the subject and the appreciation of and the concern for their own environment. Concerning the outcomes for themselves, they recognise that fieldwork enhances competence (57%), creativity (86%) and working together with colleagues (72%). More than 70% feel competent in developing, organising and performing fieldwork; working with colleagues and students; and motivating students. However, 12% do not feel competent on the content of fieldwork, 11% on the organisational aspects and 14% on the development of fieldwork materials.

Furthermore, the respondents who do fieldwork find it important (97%) and they like doing it (97%). They get energy from it (84%) and they like being outside and active (92%). They also get motivated through working with students (91%). They like the preparation of the content of fieldwork (77%) more than the logistics of it (50%). Eighty-two per cent find the school surroundings suitable for doing fieldwork.

It is striking that 35% of the respondents agree or completely agree on the statement that they find fieldwork difficult, and 18% agree or completely agree with the statement that they do not feel secure about doing fieldwork. For some teachers, this might be a reason not to do fieldwork very often.

In Table 5, the scores on the statements on impediments are given for the respondents who do ("fieldwork yes") and who do not do ("fieldwork no") fieldwork. For both groups, the lack of time to develop fieldwork and to do fieldwork and the lack of time in their class schedule and that of their colleagues are the most felt impediments. To see whether the answers of both groups differ significantly, a chi-square test was performed. Cramer's V is a measure for the power of this significance. The respondents who do not perform fieldwork significantly agree more with all the statements on the impediments for fieldwork, except for Statement 7 on the time to develop their own knowledge. The groups differ most

Table 5. Response percentages to statements on impediments for performing fieldwork for the group that does and the group that does not do fieldwork and results on the chi-square test on these groups ($N = 205$).

Impediment	Responses	Fieldwork Yes (%)	Fieldwork No (%)	χ^2	Cramer's V
1. *Lack of knowledge and experience are an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	29.7	35.0	14.94*	0.270*
	Neutral	14.5	15.0		
	Somewhat disagree + completely disagree	55.9	45.0		
2. *Lack of motivation is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	10.4	13.3	12.63*	0.248*
	Neutral	11.0	25.0		
	Somewhat disagree + completely disagree	78.6	60.0		
3. *The expectation of a low outcome is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	10.3	23.4	15.98*	0.279*
	Neutral	15.2	15.0		
	Somewhat disagree + completely disagree	74.5	60.0		
4. *The unsuitability of the school environment is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	15.9	35.0	22.32*	0.330*
	Neutral	12.4	25.0		
	Somewhat disagree + completely disagree	71.0	38.4		
5. *The lack of time to develop fieldwork is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	71.1	78.3	11.30*	0.235*
	Neutral	10.3	13.3		
	Somewhat disagree + completely disagree	18.0	6.6		
6. *The lack of time to do fieldwork is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	73.1	85.0	22.57*	0.332*
	Neutral	9.0	6.7		
	Somewhat disagree + completely disagree	17.2	6.6		
7. *The lack of time to develop my knowledge is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	41.4	45.0	6.96	0.184
	Neutral	20.0	28.3		
	Somewhat disagree + completely disagree	34.5	20.0		
8. *The lack of time in my own class schedule is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	65.5	81.7	17.62*	0.293*
	Neutral	15.9	6.7		
	Somewhat disagree + completely disagree	17.2	6.6		
9. *The lack of time in the class schedule of colleagues is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	57.3	66.7	23.40*	0.338*
	Neutral	20.7	21.7		
	Somewhat disagree + completely disagree	20.0	1.7		
10. *The lack of financial means is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	46.9	66.7	9.47*	0.215*
	Neutral	18.6	16.7		
	Somewhat disagree + completely disagree	32.4	15.0		
11. *The lack of support from school management is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	27.6	50.0	23.30*	0.337*
	Neutral	28.3	35.0		
	Somewhat disagree + completely disagree	42.7	10.0		
12. *The lack of administrative support is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	20.6	35.0	20.61*	0.317*
	Neutral	27.6	43.3		
	Somewhat disagree + completely disagree	43.5	13.3		
13. *The lack of motivation of geography colleagues is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	17.2	23.3	11.16*	0.233*
	Neutral	19.3	20.0		
	Somewhat disagree + completely disagree	61.4	45.0		

(Continued on next page)

Table 5. Response percentages to statements on impediments for performing fieldwork for the group that does and the group that does not do fieldwork and results on the chi-square test on these groups ($N = 205$). *(Continued)*

Impediment	Responses	Fieldwork Yes (%)	Fieldwork No (%)	χ^2	Cramer's V
14. *The lack of motivation of colleagues of other subjects is an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	24.9	25.0	10.70*	0.228*
	Neutral	26.2	36.7		
	Somewhat disagree + completely disagree	46.2	28.3		
15. *The possible dangers of fieldwork are an impediment for myself doing fieldwork*					
	Somewhat agree + completely agree	8.2	23.3	10.40*	0.225*
	Neutral	25.5	23.3		
	Somewhat disagree + completely disagree	64.2	51.6		

*$p = .10$ (two-sided).

on the statements on the unsuitability of the school environment, the lack of time to do fieldwork, the lack of time in the class schedule of colleagues, the lack of support from school management and the lack of administrative support (Cramer's V > 0.300).

Conclusion and discussion

The main research question of this study is *to what extend do secondary geography teachers succeed in using fieldwork as a rich and powerful teaching strategy?* Four conditions for fieldwork to be a rich and powerful teaching strategy arose from the literature: (1) it has to be enquiry driven and student centred; (2) it needs to be structurally integrated on classroom level; (3) it needs to be structurally integrated on curriculum level; and (4) there needs to be a balance between the cognitive and the affective.

In this study, the data-set used has its limits. The population from which the respondents are drawn is likely to contain the most active part of the teacher community. In this way, the findings might be overestimating the willingness to do fieldwork. However, this study provides a clear picture of the state of development of geographical fieldwork in secondary education in the Netherlands and contributes to the emerging body of knowledge on geographical fieldwork.

In the Netherlands, 71% of secondary geography teachers across all school types do perform fieldwork, but the conditions for it to be a rich and powerful teaching strategy, leading to a deep approach to learning of geography and the development of geographical understanding, are not all met. Firstly, the findings indicate that the enquiry-driven and student-centred nature of fieldwork can be improved. The fieldwork types performed are excursions, during which students work in a pre-structured teacher-led way, and enquiry fieldwork and field research, during which students work in a more enquiry-driven and student-centred way. However, only 62% allow students to do research in a student-centred way and 62% say they use instruction forms. Also, the quantitative approach to fieldwork seems to predominate the qualitative approach.

Secondly, the structural integration of fieldwork at classroom level is not complete and thorough. Most teachers do prepare their students for fieldwork, mainly by discussing the assignment, the map of the fieldwork area and the theoretical background. Less attention is paid to discussing the learning goals and the skills to use. Afterwards, teachers do discuss the link between theory and the field findings, but many of them do not use the learning

goals as a lead. Most teachers do not discuss geographical skills, and they pay little attention to the development of skills. So, the preparation and the debriefing are not as profound as they can be.

Thirdly, fieldwork is only done once or twice a year within all school types and it is mainly done in a day or less. The place of the fieldwork in the curriculum is mainly connected to the planning of "project-weeks" or influenced by the weather. There does not seem to be a conscious planning of fieldwork during the year, and over the different grades. It generally has no proper place in the curriculum. Teachers state that they apply fieldwork in their educational practice with a specific goal, especially linking theory to the world outside the classroom. This is in accordance with the attention paid to the link between theory and the field findings during the discussion afterwards. In this respect, there seems to be a clear link between the goal(s) and the structure and format of the fieldwork. Also, teachers do formulate learning goals for the students. But these are given little or no attention during fieldwork. It seems that the (learning) goals are present in the minds of the teachers, but for the students, they remain implicit. These findings indicate that fieldwork is not structurally integrated at curriculum level.

Fourthly, it seems to be that little attention is given to affective learning. Cognitive learning gets more or all attention during all phases of fieldwork. This is reflected in the (learning) goals mentioned by teachers and the predominant use of the quantitative approach of fieldwork over the qualitative approach. This implies that the mutual reinforcement between cognitive and affective learning is not as strong as could be.

The frequency with which geography teachers in the Netherlands do fieldwork seems comparable to that in other countries. For instance, in Victoria, Australia, geography teachers perform fieldwork once or twice a year per level they teach (Munday, 2008). In China, schools do not do geography fieldwork or only once a year (Zhang, 1999). In Taiwan, a small survey shows that 86% of the geography teachers do not or almost never do fieldwork (Han & Foskett, 2007). The types of fieldwork performed in the Netherlands are reflected in other countries. For example, Munday (2008) mentions excursions as well as field trips as fieldwork types done in Australia. Geographical fieldwork in senior high schools in Taiwan is characterised "as of limited development, with an emphasis on enhancing knowledge from the classroom and with limited focus on skills development" (Han & Foskett, 2007, p. 18). In Singapore, the traditional field excursion is the most used fieldwork type (Chew, 2008). In Spain, research shows that teachers mainly use "traditional" ways to prepare and perform excursions, leading to passive students and superficial learning (Estepa Giménez, Ávila Ruiz, & Listán, 2008). In Germany, there are many new initiatives to do fieldwork, but there are also still many teachers who choose "traditional" ways, mainly excursions and teacher-led activities (Hennings, Kanwischer, & Rhode-Jüchtern, 2006). Even in the UK, with its long history in fieldwork, many "traditional" ways of fieldwork lead to students not being prepared well to do fieldwork (Bradbeer & Livingstone, 1996). In Hong Kong, there is a shift towards a more student-centred programme in environmental education, for example through problem-based learning (Kwan & Chan, 2004; Kwan & So, 2008).

What might explain for the fact that geography teachers in the Netherlands do not satisfy the conditions for fieldwork to be a rich and powerful teaching strategy and that 29% of them do not perform fieldwork at all? Impediments mentioned by more than 50% of all teachers are the lack of time to develop fieldwork and to do fieldwork and the lack of time in their class schedule and that of their colleagues. These impediments are in line with barriers mentioned by researchers from other countries, namely *requirements of school curricula and timetables* and *shortages of time, resources and support* (Han & Foskett, 2007; Rickinson et al., 2004; Zhang, 1999). The barrier *fear and concern for health and safety*

of students does not meet with a wide response in the Netherlands under teachers who do fieldwork: only 8% of them recognise the impediment of the possible dangers of fieldwork. However, of the teachers who do not do fieldwork, 23% do recognise this impediment. *Teacher's confidence and expertise in teaching and learning outdoors* meets a somewhat wider response: 30% of the teachers who do and 35% who do not do fieldwork recognise the impediment of a lack of knowledge and experience. The barrier *wider changes within the education sector and beyond (e.g. class size)* is not addressed in this study. Overall, the teachers who do not do fieldwork feel the impediments more strongly.

Recommendations for research and practice

How can teachers be helped performing more fieldwork and using it as a rich and powerful teaching strategy? A first step would be for school managers to recognise the importance of fieldwork, so that finances and available time are no longer a problem. Working together with other subjects, such as biology, history and economy, might be helpful in this respect. If schools would work with clustered class schedules, teachers could have a whole morning or afternoon with the same class to do fieldwork. During teacher education, more attention should be paid to the development and implementation of fieldwork. It could help novice teachers to start to think differently about the importance of fieldwork and the many ways in which it can be conducted. Furthermore, it could help them prepare fieldwork that is enquiry driven and student centred. Teachers could also learn to perform more qualitative and sensory activities with their students, thus stimulating and combining cognitive and affective involvement. And most importantly, it can help teachers find new ways to structurally integrate fieldwork in their classrooms and have an extensive dialogue with their students before, during and after the work outside the classroom. To conduct this dialogue, teachers for example could use thinking skills and teaching strategies on "learning how to learn" (Leat, 1998; Leat & Higgins, 2002; Roberts, 2003; Van der Schee, Vankan, & Leat, 2006). These ways of working can help to achieve a deep approach to learning, because they make students more conscious of their learning and help them regulate their learning process. How worthwhile geography fieldwork then can be is shown in the following experience of one respondent:

> During a fieldwork in a peat and heath landscape, the students observe and make a map. They jump together on the peat, to feel it move up and down, and they take peat in their hands to feel and smell it. They see theory in the real world: suddenly they understand more.

We suggest that further research should be aimed at supporting novice and expert teachers to set this change in motion, for example:

- Research into the use of thinking skills as a means to achieve a deep approach to learning with enquiry-driven and self-regulatory fieldwork.
- Research into the way the preparation and the debriefing should be structured and performed, to achieve a deep approach to learning.
- Research into the link between the affective domain and the cognitive domain during fieldwork and a deep approach to learning.
- Research into the effectiveness of alternating between a teacher-led approach and self-regulation.

There seems to be a chasm between what teachers want and what they do: teachers find fieldwork important, but the way they do fieldwork needs to be improved. For this to happen, not only more research is necessary but also

- the creation of a community of learners to achieve a breakthrough for fieldwork,
- the exchange of good practices within this community or within teacher networks, and
- the enhancement of the confidence and expertise of teachers in doing fieldwork by teacher education.

Note

1. The social domain and the affective domain are linked, sometimes even intertwined, and difficult to distinguish from each other. Therefore, in this study, the social domain is seen as incorporated in or a part of the affective domain.

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