


REPORT



# A five-month full-time eco-traineeship in pre-service primary school training

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## ABSTRACT

Belgian primary schools very rarely adopt an outdoor learning approach. Yet most geography and science teacher trainers involved in pre-service teacher training see the environment around schools as a resource on which to develop learning in all disciplines, and a place to develop environmental and eco-citizenship education. Training teachers to follow this vision is hard, especially now with a generation of students who have a self-confined lifestyle, lack interest in walking and have almost no connection with nature. In the Haute École Libre mosane (Liège, Belgium), an alternative strategy based on a service-learning approach was tested for two years during a whole term: volunteer students followed an eco-traineeship in a non-formal organization, for which they had to design and complete an environmental education project. The main results of this action research are presented here.

## ARTICLE HISTORY

Received 1 November  
2021  
Accepted 6 September  
2022

## KEYWORDS

Pre-service teacher  
training; service-learning;  
extramural school;  
environmental education;  
eco-citizenship education

## 1. Background and problem

In Belgium, the pre-service training of primary school teachers is provided by University Colleges ('hautes écoles'). The curriculum is spread over three years and the students obtain a bachelor's degree. Pre-service teachers are trained under the concurrent model: the pedagogical and didactic conceptual framework are taught/learned at the same time and linked with disciplinary components, so they are 'all together'. Over the three years, the students are in charge of teaching internships in primary school classes of longer and longer duration (two weeks in Bac1 through to 10 in Bac3), under the supervision of the class teachers. The programme includes courses in 'early learning disciplines' – geography, history, and science. This is an ideal time to introduce students to environmental education, but it depends on the teacher trainers' goodwill – because the official framework for teacher training does not prescribe the acquisition of environmental education competences.

The Haute École Libre mosane (HELMo) geography teacher trainers built their courses with place-based learning as a backbone. Frequent contact with the real environment outside the classroom is considered essential: it ensures that environmental and eco-citizenship education have a lasting impact on children and have meaning in their lives. The training strategy is based

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on field trip experience with learning activities that are transferable to primary school. Three different environments are exploited: urban environment, rural environment and the sea coast. The training focus for the students is to understand the meaning of place-based learning, to ensure they want to go often into the field, and to acquire the skills required to use living environments for the overall development of schoolchildren.

Unfortunately, current practices in primary education are disappointing: place-based learning and field trips are very rare, as confirmed by contacts with approximately 1,000 HELMo traineeship supervisors. Moreover, a survey carried out in June 2014 with HELMo 76 students at the curriculum's end revealed that 93% of them believe that the school should promote regular learning outside to acquire environmental skills or theoretical content and social abilities, but only 30% of them plan to do this.

This finding matches educational research that highlights a decline in learning activities outside the classroom in many countries, even though the validity of outdoor learning has long been attested (Dillon et al. 2006; Maynard and Waters 2007). However, we note deteriorating health in a growing number of children (among others: Louv 2008; Cardinal 2010; Espinassous 2014): forced into unnatural immobility at school, they become depressed, eat too much, develop aggressive behaviour and drop out academically. At home, self-isolation takes over, with tablets, video games, etc.

The HELMo geography teacher trainers wanted to analyse in detail what they consider to be a training failure, in order to inspire an alternative strategy. They managed to get resources from the University College, the Public Service of Wallonia and the Wallonia-Brussels Federation to carry out research on this subject for four years (2014-2018),<sup>1</sup> in partnership with the Institut d'Eco-Pédagogie<sup>2</sup> (2014-2015).

This research was called *Extramuros*. 'Extramuros' is the space outside the classroom walls within walking distance or accessible by public transport, both outdoors (school grounds, neighbourhood, countryside, forest, or nearest villages and towns) and indoors (public buildings, museums and exhibitions, shops and business companies).

*Extramuros* aims to feed the reflection on the changes to be made in the training curriculum for pre-service primary school teachers. The goal is for students to become professionals more rooted in the area around their school, and to become more aware of the importance of developing children's deep connection to their environment.

In this article, we present the research's general methodology and the corpus of references on which we based ourselves to build an alternative training module. We conclude with a discussion and recommendations for alternative initial teacher education.

## **2. General methodology: systemic and comprehensive action research**

Under the typology of research in education proposed by Jean-Louis Van der Maren, this research's main issue is political: it is a question of 'designing and legitimizing a new project to transform training practices' (Van Der Maren 2004, 61). *Extramuros* is a comprehensive and systemic action research (Morin 2010), where the action to be undertaken by the trainer-researchers is experimentation with an alternative training module, intended for future primary school teachers during their curriculum's last year.

### **2.1. Systemic action research**

Why do teachers resist the idea of teaching outside, when they are trained to do so? The situation is no doubt very complex and calls for an analysis of the overall functioning of the socio-cultural system in which the trend being criticised is deployed. In other words, we need to apply a panoramic vision to the unsatisfactory situation (Maingain and Dufour 2002). The search for solutions must also be considered globally.

Our research took place in three phases (Table 1).

### 2.1.1. Phase 1: Overview of assumptions

The first phase of the research was inductive (or exploratory), leading to the development of hypotheses following the observation of several unsatisfactory situations. The didactic pyramid proposed by Buffet (Figure 1) served as a starting point to structure our first assumptions and determine our first research objectives (phase 2):

*Assumptions about the 'Institution' pole and the 'Societal context'*

- Lack of official legitimization of environmental education, and particularly of extramural learning.
- Fragile status of the awakening course (1.5 h/week).
- Cultural hazards related to parents.
- Attractiveness of NICTs in school life and in daily life.

*Assumptions about the 'Primary school teachers' pole*

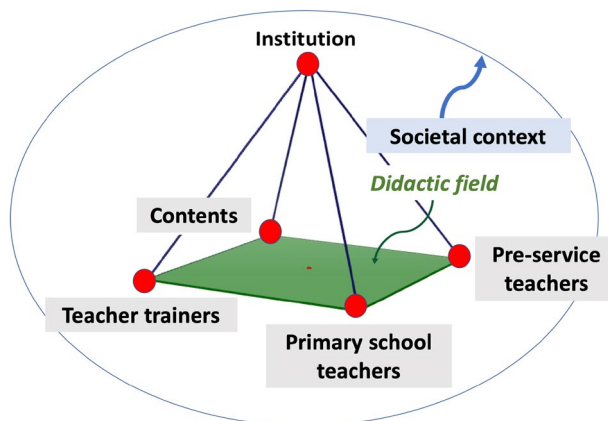
- Vision of school and learning.
- Vision of the student outside.
- Upset of usual posture.
- Fear of risks.
- Lack of knowledge of the environment surrounding the school.

*Assumptions about the 'Pre-service Teachers' pole*

- Tenuous relationship with the environment, and with nature in particular.
- Increasingly sedentary lifestyle.
- Lack of extramural learning experience in their school career.

**Table 1.** The different phases of the research.

	Expected results	Methodology
Phase 1 2014	Hypothesis Overview	Inductive
Phase 2 2014-2016	Corpos of references to feed the exploratory phase	Descriptive, evaluative, interpretive
Phase 3 2016-2018	Alternative module training	Exploratory



**Figure 1.** The didactic pyramid (Partoune C., modified from Buffet 1986).

### *Assumptions about the 'Teacher Trainers' pole*

- Lack of human resources to properly supervise students.
- Internship supervisors with little experience in extramural practices.
- Poorly identified weaknesses in the training strategy.

### **2.1.2. Phase 2: Corpus of references to feed the exploratory phase**

Based on these assumptions, three general objectives were targeted:

1. Build a robust argument intended to legitimize extramural practices, by identifying the obstacles to them and the proven or expected benefits.
2. Describe the profile of our students in terms of their relationship to the environment and to nature in particular.
3. Inventory, describe and analyse the pre-service teacher extramural training practices in the Wallonia-Brussels Federation and elsewhere in the world.

The methodology of the research's second phase was variable: descriptive, evaluative or interpretative, depending on the needs; state of the art; qualitative surveys; choice of reading grids; description, evaluation and interpretation of training practices.

### **2.1.3. Phase 3: Alternative training module**

The methodology of the research's third phase, aimed at designing an alternative training project, was exploratory. We modelled it by drawing inspiration from service-learning system that seemed convincing in terms of in-depth transformation of students' attitudes and behaviour. The modelling of this innovative intervention led to an action planning and then to the action itself: the experimentation on a training module with volunteer students, a phase when they had the status of student-researchers.

## **2.2. Comprehensive action research**

Our research is comprehensive, because some of the principal researchers are trainers directly involved in supporting students who voluntarily participate in an experimental project. The principal researchers assume a subjective posture. First, they are part of the training system that they observe and wish to improve; second, they intervene in the implementation and the adjustments of the innovative action; finally, they participate in the assessment of voluntary students.

Our research team's members share strong convictions about the meaning and importance of the direct relationship to the environment in the development of a child's personality. We believe that experiential learning in, through, for and about the environment as a living environment is essential: it allows children to meet their deep needs. Which are to move, have fun, learn while playing, have a space of freedom and action, have a multisensory, emotional and intellectual relationship with the environment, develop their own natural curiosity, and to invent their own solutions. In particular, regular and direct contact with living beings other than humans is very important. However, not all children are lucky enough to have a family environment that offers them this possibility, and their daily world mainly offers them mediated and/or virtual relationships.

We also believe that, for the primary teacher, being outside the classroom changes many things in the relationship to the child, to learning and its content. The extramuros is a living and dynamic place, where uncertainty is present alongside opportunities. It's a place where

one starts from what one observes, where the child can show curiosity for something other than what was expected, where social interactions are different, and where the body can express itself differently, with potential dangers inherent to any living space.

Because of the researchers' commitment, there are obvious risks of bias when analysing the practices studied and the action implemented. We therefore had to be careful not to positively overestimate the results obtained. Moreover, the very significant investment made by teacher-researchers was linked to their motivation created by the purpose of the research, as well as engaging their students on a risky path, the results of which were uncertain.

A critical distance was ensured by the other stakeholders in the research (Figure 2): colleagues, pilot internship tutors, members of a support committee, internship supervisors at the primary school, students and their parents. They were asked for their perspective on the process of student transformation at different steps. These moments formed an essential critical space for this action research.

In particular, students regularly provided data on the action's effect on themselves, helping to generate new knowledge about learning processes. They were involved in finding appropriate adjustment solutions to the context and their personal evolution project, which led to a positive conclusion on the new training practices implemented. Admittedly, their strong personal motivation to engage in an innovative experience is *de facto* another bias to be taken into account when assessing results. However, the risks they took, their commitment to the project and the very personal data they agreed to share along the way are all of great value. The students deserve many thanks for that.

### 3. Corpus of references

Here, we present the reference bases that fed the exploratory phase:

- Argument to legitimize extramural learning in primary school (benefits and obstacles);
- Analysis of failures in our extramural training practices;
- Our students' profile.

#### 3.1. Argument to legitimize extramural learning in primary school

##### 3.1.1. Methodology

To legitimize extramural practices, Anne-Catherine Grodos produced an inventory of the relevant English, German and French-speaking literature, from scientific journals and the non-formal environmental education field. A survey and inquiry of 174 elementary school teachers and their 10 principals completed the inventory.

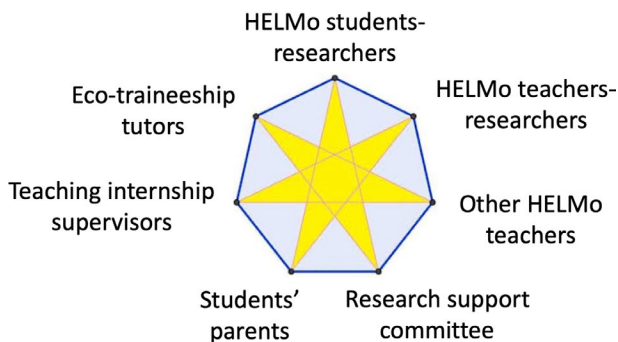


Figure 2. The different stakeholders in Extramuros research.

The inventory revealed that only a few English-language longitudinal studies (United States, Canada, and Australia) provide tangible proof of extramural pedagogy, which has various names: outdoor learning, place-based learning, community-based learning, nature/environmental education.

### 3.1.2. *Benefits of extramural learning*

The main benefits mentioned are (Grodos 2014):

- Cognition
- Improved results, especially those of children from disadvantaged backgrounds, in written and oral expression, reading, mathematics, science and humanities (Eaton 1998; Lieberman and Hoody 1998; Emekauwa 2004; Place-Based Education Evaluation Collaborative 2010), and environmental study (Parrish et al. 2005).
- Better understanding of certain mechanisms and concepts through genuine contact and 3D input, rather than diagrams, and better detection of misconceptions (Tretinjak and Riggs 2008);
- Guaranteeing the authenticity of the observations collected and revealing realities that escape other investigative strategies (Claval 2013).
- Health
- Improved psychomotor development of the child: mobility, balance, coordination of movements, perception and management of risks, dexterity (Lieberman and Hoddy, idem; Fjørtoft 2004; Fucks 2004; Athman and Monroe 2004; Braida and Vidal 2013).
- Improved physical health (diabetes, heart problems, musculoskeletal disorders) and mental health (anxiety, depression, stress, attention disturbance) (Maas et al. 2009).
- Strengthening of the emotional balance of children diagnosed as hyperactive and/or with attention disorders (Taylor, Kuo, and Sullivan 2001; Kuo and Taylor 2004, 2009).
- Personal development
- Development of personal and relational skills: curiosity, capacity for initiative resourcefulness, creativity, problem solving, cooperation and solidarity (Lieberman and Hoody, ibidem; Parrish et al., idem; Neill 2008; Beams and al., 2012). Greater motivation of children, especially those in difficulty.
- Building a positive relationship with the child's environment and, more generally, with nature and the world. On this fundamental basis, learning to become engaged and active citizens, having better understood their missions and responsibilities as members of a democratic mushroom society (Parrish et al., ibidem).
- Valorization of other types of intelligence than those which are mainly worked on in the classroom.
- Socialization
- Strengthening of group life through mutual discoveries.
- Impact on local development when field trips engage children in concrete actions to take care of their environment (Smith 2002; Sobel 2005; Semken 2005; Pitzel et al. 2007; Place-based Education Evaluation Collaborative, idem).

### 3.1.3. *Obstacles to extramural learning*

The mentioned obstacles to outdoor activities are presented by order of frequency, in the literature and in our surveys conducted in 2014-2015.

- Fear of risks and parents' fears

The issue of risks and safety was strongly highlighted in the teachers' responses, plus the lack of dedicated staff for these activities. Increasing road traffic creates an understandable feeling of insecurity. Some parents are very concerned about the risks of falls, injuries, or colds:

they would like to see zero risk for their child. The fear of paedophiles has also become a societal marker since the 1990s (Rivière 2016).

- Institutional and parental pressure

Pressure to meet curriculum goals (Waite 2010; Dillon et al. 2006), lack of time, and lack of parent and managerial support, real or not (Southcott and Pyle 2009), are often mentioned. The extramural space is first perceived as a playground by all stakeholders, but rarely as a potential learning ground.

- Gaps in skills and knowledge

Lack of knowledge of their school surroundings makes teachers uncomfortable. This is often because they do not live nearby and can only address the problem by making a significant effort to feel concerned. There is also insufficient knowledge of school surroundings in early learning disciplines, as well as the specificities of field didactics. Teachers also worry about managing children's behaviour and fear that the outings would not be taken seriously (Stuart, Dillon, and Dowd 2009).

- Lack of adherence

Learning from the field does not fit well with the common professional identity built around the old-fashioned idea that 'the teacher knows best'. So, adopting the posture of a researcher alongside children raises questions about the visions of the child and of learning, of the relationship to knowledge and to power. For the teachers, the places available for outdoor activities are incompatible for both playing and learning (Malone and Tranter 2003; Waite, idem). Many of the teachers believe that children's nature education is the responsibility of parents.

- More challenging students

The profile of the students also plays a role: some never go out into the natural world, are afraid of it, are clumsy and at more risk of injury, while others are used to it (Dillon et al. 2004); physical disabilities or the specific needs of certain pupils also make teachers more cautious.

- No fun being outside

Lack of desire for field trips is common. Being outside for a long time, with physical exertion, is even sometimes considered 'unnatural' (Maynard and Waters 2007). Weather is a reason often mentioned, but considered as an 'excuse' by the school principals interviewed (Grodos, idem), since an elementary school teacher can easily postpone an outing.

- Virtual field trips are very easy

Finally, the attractiveness of the interactive whiteboard, offering virtual access to any place without leaving the classroom, is a truly competitive alternative, legitimized through the funding of numerous research projects in this area.

### **3.1.4. Conclusion**

Many authors recommend the practice of extramural learning, to build learning in different disciplines, and as a means to develop transversal emotional, psychosocial and social skills

(among others: Athman and Monroe, idem; Braida and Vidal, idem; Palmer 1998; Fucks, idem). It is also recommended the school be opened to its neighbourhood and that links be strengthened with the local community, in order to give meaning to learning. The aim is for children to become committed and active eco-citizens in environmental protection, having better understood their missions and responsibilities as members of a democratic society.

Yet before that, extramural pedagogy is likely to arouse children's desire to be in a close and sensitive relation with their environment. Indeed, 'a positive strategy for teaching about and in nature must be considered' (Fucks, *ibidem*, 58) for establishing greater connectivity with nature and a bond of attachment (Rosenthal 2008), then a participating consciousness (Winter and al., 2010). Nature could also have a major impact on children's mental and physical health (Louv 2016; Cardinal 2010; Espinassous 2015).

Training teachers on extramural pedagogy requires considering cultural changes of several kinds: changes in the way people perceive the environment, perceive oneself, perceive the importance for the child of being in contact with the environment; changes in the vision of the child, of learning, of pedagogy, and even of life; and changes in values and beliefs, most certainly.

Indeed, even if extramural pedagogy was included in the pre-service training curriculum, the compliance pressure exerted by teaching staff on young teachers would likely slow down innovations and risk-taking, especially for place-based learning. They lose their motivation, as they feel it is too hard to make things happen (Kennelly, Taylor and Serow 2012).

This is why we believe that to support change, and taking into account the socio-cultural inequalities in environmental education within the family, the role of schools in environmental education based on extramural pedagogy must be legitimized (McDonald and Dominguez 2010), as in New Zealand, Scotland, and Norway. Partnerships with NGOs could provide a traineeship context to learn to manage children differently and to acquire the basics of environmental education, both in pre-service and in-service teacher training (see several successful experiences reported by the Belgian network 'Tous Dehors' – tousdehors.be, or by the French movement 'Dynamique Sortir!', driven by the association 'Frene' – frene.fr).

### **3.2. Analysis of failures in our extramural training practices**

#### **3.2.1. Methodology**

The methodology applied for this part of the research (2015-2016) is descriptive, evaluative and interpretative. The description of about 10 current training practices in the Wallonia-Brussels Federation is followed by a cross-evaluation of their efficiency. This was done by owners of these practices gathered in focus groups, from seven University Colleges of education and six trainers from the non-formal sector of environmental education. This critical analysis is completed by a review of the latest relevant literature.

#### **3.2.2. Ambitious learning outcomes**

Training practices based on field trips identified in the Wallonia-Brussels Federation used private school grounds or the surrounding ordinary environment, as well as extraordinary environments during outings or short stays out of school. Sometimes a partnership was established with educational NGOs. More often, the set-ups were multidisciplinary (i.e. geo-history, geo-sciences) and sometimes included general pedagogy lecturers, but each discipline also conducted specific activities (e.g. see in Partoune 2020).

The training targets were ambitious:

- Boost interest in outside environments and take pleasure in surveying them.
- Investigate an unknown environment in full autonomy and acquire specific knowledge about it.



- Adopt awakening research approaches, the bases of extramural didactics, the foundations of environmental education.
- Identify the educational potential of a place, design coherent learning activities for it plus original teaching tools.
- Lead activities in the field.
- Acquire reflective analysis skills and adopt the arguments to legitimize extramural pedagogy.

### ***3.2.3. Active and participatory teaching methods***

All training practices listed in the literature and described during the focus groups were based on active and participatory pedagogy, holistic and integrated, as advocated by Marcum-Dietrich et al. (2011) and Mattox, Llerandi-Roman, and Fegel (2008): the acquisition of scientific content was coupled with that of educational and didactic content to learn how to use a school's surroundings as a classroom space.

Another essential principle is isomorphism: if adapted, the learning activities offered to students are transferable to primary school. They are part of an investigative process aimed at understanding the environment explored. Some of these activities also aim to develop a deeper relationship with nature, by favouring a sensitive approach to the environment (Winter and al., 2010; Pineau, Bachelard, and Cottreau 2005).

The trainers tried to offer learning situations likely to motivate the students: environmental problem-based learning, geomystery, inquiry, roleplay, travelogue, sketch of a landscape, enigma, environmental mission, free wandering, guided visit, construction site, local planning project, unexpected event. (Partoune, idem).

### ***3.2.4. Interpreting the weaknesses in extramural training practices***

The trainers were disappointed with the results. First, student motivation waned very quickly, once the surprise effect of discovering the place and the originality of the activities to be experienced had passed. Second, students mainly struggled to adopt the scientific approach and an understanding of the concepts seen. Finally, the transfer of extramural pedagogy into professional life was extremely rare.

We interpret this training failure as being due to this training being:

- A very small part of the curriculum

We recognize that the curriculum ambitions are excessive, given the means available. The students' initial lively interest, called 'situational interest' by Hidi (1990), cannot be maintained long enough to generate a deep and long-lasting interest – one that would become a characteristic of a person, leading them to make professional choices to 'feed' this interest (Hidi and Harackiewicz 2000).

- An illusory impact

Analysis of the trainers' beliefs about the field trips also highlighted some biases that are likely to feed their disappointment: the trainers believe that going outside should immediately motivate the students, especially when they offer them exceptional sites to discover, therefore relying on the seductive effect of the place. For Catherine Meyor (2002), their disillusion is a form of naivety based on two beliefs:

- Belief that the objects of the world are inherently endowed with sensitive, 'transcendent' qualities (goodness, beauty, ugliness, warmth);
- 'Consider[ing] the human being as an object, which results in a combination of conditioned reactions or behaviors selected by the environment' (p. 76).

It would be wrong to ignore the subjective dimension of emotions, just like the attribution of a value to an environment and to an experience in that environment. However, the students are people with desires above all, and their desires, projects, dreams and the way to realize them, do not necessarily match the trainers' project.

- Too distant from the students' comfort zone

Trainers rely on the surprise effect of extraordinary environments, but that can be counterproductive: if the environment is too 'new', the student will be distracted by too many things and will have difficulty concentrating on useful tasks (Orion and Hofstein 1994; Orion 2003; Orion and Ault 2007). Furthermore, doing science from investigative fieldwork is inherently difficult for students, especially if they have moved too far from their comfort zone (Lieberman and Hoody, *ibidem*; Nelson Aron, and Francek 1992; Akerson, Abd-El-Khalick, and Lederman 2000; Donovan and Bransford 2005).

Failure to take into account the 'strange' nature of a site for students can lead to a learning situation outside their proximal zone of development (Vygotski [1934] 1997). Students who have limited field experience would be unable to fully appreciate the place's exceptional character and would quickly feel overwhelmed by the ambition to interpret its physiognomy. Moreover the observed reality never exactly matches the theoretical patterns (Partoune, *ibidem*). Some students therefore adopt an avoidance posture: they are afraid of 'losing face' and await the teacher's explanations.

Willing to take this parameter into account, Winter, Sadler, and Saunders (2010) recommend that investigative steps should be taken in an extraordinary environment – but only when students are sufficiently familiar with their living environment and identify the problems that affect them. Other researchers stress the importance of substantial preparation before conducting an investigation in an extraordinary environment (Orion and Hofstein, *idem*; Kempa and Orion 1996; Tretinjak 2001; Schwimmer and Hester 2008; Rebar and Enochs 2010). They suggest preparing students at three levels: psychological (knowing what to expect), geographic (information about places), and cognitive (preliminary exercises, clarification of preconceptions). We suggest adding physical preparation (as some students may lack endurance).

- Lack of human resources

Furthermore, in order to identify and transform students' misconceptions, trainers believe that they should have the means to work in small groups, or even to provide individual support at certain times. The greater privacy of face-to-face discussions would facilitate the creation of an emotional expression space for the student, as it would for the trainer (Meyor, *idem*).

- A problematic transfer

If we want 'indoor' students to become 'outdoor' teachers in order to experiment with children, we must do it with them in their training and show them how to do the same with the children. It is needed to ensure the transfer by practising isomorphism until the end of the process (Barstow and Geary 2002). However, the vast majority of in-service teachers are not able to support students in this pedagogy, since they do not practise it themselves.

### **3.3. HELMo students profile**

#### **3.3.1. Methodology**

In 2015, a profile of the students registered at HELMo as pre-service primary school teachers was drawn up, to determine their training needs. A questionnaire survey, on their relationship

to their living environment and to nature, complemented the observations of the trainer-researchers during the extramural training sessions. The profile drawn up was validated and completed during two focus groups, which brought together around 15 trainers from seven University Colleges in the Wallonia-Brussels Federation.

### *3.3.2. Result: a majority of students disconnected from reality*

The profile of our students who are uncomfortable with an extramural pedagogy matches the profile depicted in the literature. The first characteristic is a growing disconnection with their living environment, and with nature in particular: 53% of our students go out for a walk less than once a month, 49% of them never do any gardening, and only 13% say they have contact with nature several times a week; 18% say that nature is not important to their family circle, and 71% say they have never participated in nature discovery or protection activities.

The following characteristics can be linked to this disconnection with the real environment:

- A very poor scientific culture, confirmed by the results of the PISA tests in 2015 (Lafontaine, Crepin, and Quitte 2017).
- Generalised misconceptions of Earth sciences (Petcovic and Ruhf 2008; Johnson and Tymms 2011; Gunckel et al. 2012; Adadan and Savasci 2012).
- A system of misconceptions very resistant to change (Nelson, Aron, and Francek 1992; McDonald and Dominguez 2010).
- A spontaneous way of thinking that is far from scientific reasoning: only 2% of students demonstrate an understanding at a systemic level (Gunckel et al. 2012).
- A lack of presence of mind, due to disconnection from human experience (Partoune, ibidem).
- Great ignorance and a lack of curiosity about the surrounding environment, which has become an unreadable 'setting' (Partoune, ibidem).
- A deep lack of interest in science in general and a lack of self-confidence to teach it (Palmer 2004).
- Lack of motivation for teaching outside the classroom (Marcum-Dietrich et al. ibidem).

In line with the idea of 'habitus' (Bourdieu 1972), we presume that students are inclined to act and think in a certain way because they are not used to going outside often. Or they are unused to practising a certain type of activity there as a 'consumer' of environment, so they are unable to establish any substantial relation with the environment. In short, we as trainers are faced with a way of living and functioning, and not just specific gaps that could be filled.

### **3.3.3. Conclusion**

We assume, in line with sociologist Pierre Bourdieu's idea of habitus, that not being used to going outside often, or being unfamiliar with practising a certain type of activity there as a 'consumer' environment and not creating an essential relationship with the environment, leads students to act and think in a certain way. We are therefore faced with a way of living and functioning, and not only specific gaps that could be filled.

## **4. Development of an alternative training scheme**

The ultimate phase of the research focussed on the design, testing and evaluation of an alternative training strategy, building on the results of the previous phases. We concluded that transforming students into extramural teachers requires a major change.

#### **4.1. Service-learning as inspiration**

We identified several inspiring sources in the literature (Cooper 2007; England and Marcinkowski 2007; Swick and Rowls 2000; Hart and King 2007; Schneller 2008; Wade 1995). This is how we discovered service-learning, still unknown in Belgian formal education, although this learning method has been present at all levels of education since the 1990s in other countries (United States, Canada, Australia, United Kingdom, France).

The basic principle of service-learning is to anchor learnings, through the design and implementation of a public-interest project, into the real world. Missions can be in all fields of society. Experience-based learning and self-management of learning underpin an entire programme, leading learners to build their own approach to fully participate in social life and to build new knowledge linked to the chosen projects.

The training methodology for service-learning is a competency-based approach, which combines learning by doing with reflective thinking and guided analysis. Autonomous acquisition of specific knowledge and the development of transversal skills are grafted onto the projects to be done, plus a reflective analysis of the lived experience. One big challenge is the risk of a change of perspective: moving from an individual vision of the problems experienced to a systemic and collective vision. It is about moving from 'For me' to 'For us', then to 'For all of us' (Hansotte 2005).

In the United States, Canada and Australia, programmes for integrating service-learning into student training are being implemented in universities in various fields. However, according to the literature we consulted in 2016, service-learning was rarely integrated systematically into the teacher training curriculum. Furthermore, we found there was little extensive research on evaluating this type of approach (Phillipson-Mower and Adams 2010). One exception was Nipissing University (Ontario), where a 120-hour pilot module was tested in 2009 under two formulas, before being made compulsory in 2010. This module was the subject of detailed qualitative evaluations by Nancy Maynes, Hatt, and Wideman (2013, Maynes, Cantalini-Williams, and Tedesco 2014). However, this research was limited to comparing the profiles of students before and after the training module; the authors did not investigate the transformation process.

The results of existing research are encouraging on the transformation of students: motivation to train themselves, cognitive commitment, personal development, involvement and empowerment (Phillipson-Mower and Adams, *idem*); development of critical thinking and a more open professional identity (Maynes and al., 2014); and empathy towards marginalized people (Chambers and Lavery 2012). In projects with an environmental dimension, we also note positive results for awareness and development of a deep and positive relationship with nature (Phillipson-Mower and Adams, *ibidem*).

These results inspired us to define an alternative module. The youth volunteering program implemented in Canada (Katimavik program) and the citizen service in Belgium ([www.service-citoyen.be](http://www.service-citoyen.be)) also provided useful resources.

#### **4.2. The ecostage course unit**

In 2016, we obtained the agreement of the HELMo academic authorities to test a pilot service-learning module and to study its impact on the students' personal and professional development. The formula adopted was that of a full-time internship, lasting several months in a non-profit organization.

The environmental education sector was chosen, to look for partners who could host internship students, hence the name of the course unit: 'Ecostage', leading to the term 'Eco-traineeship'. Given the transformative purpose for the students, Ecostage has been given very significant resources: 30 credits/60, i.e. 430h spread over a whole term (from 15 September to 31 January).

The definition of the training module (aims, objectives, programme, methodology, evaluation) became a genuine research issue, as well as its adjustment during the experimental phase. The relevance assessment was not to simply compare the profile of the students before and after the pilot module, but to produce qualitative data on the student transformation process.

The Ecostage Course Unit transformation goals were formulated from the preliminary analysis of our students' profile:

- Territorial anchoring: generate a deep curiosity, acquire expertise and local knowledge, and the desire to learn more about the environment.
- Eco-responsibility: stimulate the desire for a tangible personal commitment for a more fair, equitable and peaceful world, with respect for the environment and people as fundamental values.
- Empowerment: promote autonomy in learning and self-management to complete a project.
- 'Extramural' professional identity: adopt the foundations of environmental education and eco-citizenship; and feel able to regularly use the environment surrounding the school to carry out various learning activities.

The Ecostage Course Unit includes six training modalities (see Table 2):

- Initiation on Ecostage programme (20h with teacher trainers).
- Introduction to eco-pedagogy (30h, with trainers from Institut d'Éco-Pédagogie).
- The ecostage (300h, with on-site support on demand).
- Reflective analysis seminars (30h with teacher trainers).
- Portfolio: recording actions taken, successes, difficulties encountered and solutions proposed, moods, reflective thoughts (30h in autonomy).
- Mid-term and final assessment (15h).

The Ecostage Course Unit is built around the design of an educational product for a given audience, which calls for mastery of scientific, didactic and educational content, as well as proficiency in new information and communication technologies. Some benchmarks are specific to environmental education. Several skills could be acquired, depending on the project (field

**Table 2.** Ecostage Course Unit programme and responsibilities.

Before the start of the Ecostage	September	October	November	December	January
Presentation of the Ecostage programme to all students	Contractual meeting at the host structure	Discovery of the territory (80h)	Fulfillment of the mandate (200h)		Finalization (20h)
		Planning, retro-planning, adjustments, keeping a portfolio (autonomy - 30h)			
Instructions for students and for traineeship tutors	Initiation to Ecostage program (20h)	On-site support on demand			
		Weekly reflective analysis seminars (30h)			
Contract between the University College and the host structure	Introduction to ecopedagogy (30h)	Internship mandate (5h)	Mid-term formative assessment (5h)		Final assessment (10h)
<b>Responsibilities:</b>	Students	HELMo supervisors	Traineeship tutors	Institut d'Éco-Pédagogie	

investigation and bibliographic research methods, methods to represent an environment, descriptive and narrative methods, computer graphics, webography).

The students are supervised by two HELMo trainer-researchers and by a tutor in the workplace, whom they can call outside of scheduled working periods. The trainers guide students in their professional development process and help them define their learning needs; they provide tools to support self-management learning (as a reverse-schedule or competences map); they are the contacts of the internship tutor. These tutors are a precious interface, opening the doors to the territory and giving meaning to the mission to be carried out; they facilitate contacts and provide logistical support.

The certification assessment of the Ecostage Course Unit is based on four exercises:

- Presentation and discussion of a portfolio on professional development;
- Oral presentation with visual support demonstrating the progression of the territorial anchoring;
- Demonstration of the acquisition of knowledge in the form of a conference (as chosen by the student);
- Presentation of the outputs produced under the internship mandate.

In 2016-2017, after the Ecostage Course Unit, students had to assign their second term teaching traineeships and their Bachelor's dissertation in the field of service-learning. So their follow-up by several trainers could assess to what extent the Ecostage influenced their professional practices.

### **4.3. Experimentation and methodology**

Ecostage was initiated in 2016-2017 with four students, on a voluntary basis, and was renewed in 2017-2018, with a single student. Here is an overview of their mission:

- Students A and B designed, for the rural village of Olne, pedestrian routes with geocaches<sup>3</sup> with the aim of introducing young people to the territory's natural and cultural heritage, starting from the landscape.
- Students C and E chose the Ourthe River Contract,<sup>4</sup> with the goal of using an educational tool to raise awareness of cohabitation with beavers.<sup>5</sup>
- Student D designed an educational tool for a museum on the stone trades; she also had to establish a link between the objects on display and the surrounding environment features.

Analysis of the results was based on these elements:

- Student profile outlined prior to the Ecostage (questionnaire).
- Weekly seminars with students and trainers (notes taken by everyone).
- Talks with tutors (notes taken by the trainers-researchers).
- Mid-time formative assessment (oral presentation; notes during free and open discussion between students, supervisors and tutors).
- Observations by the trainers-researchers during implementation of the pedagogical tools designed and produced by the students (notes and photos).
- Student portfolio produced for the certification examination (15-20 pages).
- Oral presentations for the certification examination: portfolio, territorial anchoring, pedagogical tools, scientific conference.
- Post-Ecostage survey with students and their parents (questionnaire).

- Teaching traineeships in primary schools during the 2nd term (supervision of the course preparations; reports on supervisory visits).
- Monitoring of the final dissertation (text).
- Final dissertation (text and oral defence).

The assessment of learning outcomes is based on the contribution of the stakeholders: students, teachers-supervisors-researchers, other teacher members of the examination panel, tutors, students, parents. Student testimonials are added after, taken from their portfolios, to clarify the results and show their embodiment.

#### 4.4. Transformative outcomes

During the Eco-traineeship, students experienced different emotions. Thanks to their testimonies, documented in a portfolio and the weekly reflective seminars, we have a description of their progress step by step (Table 3).

##### 4.4.1. Discovery of the territory

Not all students had the same experience of the first step in autonomy. For three of them, this step was immediately full of enthusiasm and a feeling of freedom, which encouraged them to discover the whole territory, in full autonomy. However, this enthusiasm grew weaker and even wobbled unsteadily.

*I started this new adventure with euphoria! Discovering the territory was splendid. What excitement! But in just three weeks, I had consumed all my energy. (Student D)*

Students B and C struggled to set themselves benchmarks from the start, despite their enthusiasm about escaping the restrictions of school, whose structural framework they missed.

*The beginning of this adventure often left me perplexed and confused about my decision. The first weeks, although stimulating in terms of discovery, were difficult and my nervousness continued to grow. I was accustomed to the teachers' guidance, so autonomy was an uncomfortable novelty for me. (Student C)*

In these moments of hesitation and doubt, supervisors and tutors psychologically supported the process of student empowerment, through constant positive reinforcement. Frequent seminars made it possible to identify any signs of demotivation and to assure the students that this was inevitable. Indeed they faced an obstacle to overcome and learned to put their emotions into words.

**Table 3.** Students' transformation process and role of the supervisors and tutors.

Results	September	October		November	December	January	February-June	
	Initiation to Ecostage programme	Discovery of the territory		Fulfillment of the mandate		Finalization	Assessment	Q2 (school internship)
Student transformation process	Posture change	Exaltation, empowerment	Destabilisation, doubt, questioning	Project implementation, self-management, self-confidence, work together, commitment, overcoming		Achievement, appreciation	Formalize, reflective analysis	Loneliness, culture shock, transfer
Role of the teacher trainers	Formalize, organize	Encourage, enhance	Reassure, advise, encourage	Propose management and self-assessment tools, encourage reflective analysis and adjustments, reassure		Support, celebrate	Encourage, testify	Legitimize, encourage, enhance
Role of the eco-traineeship tutors		Guide, advise, provide material aid, encourage	Value, validate	Set requirements, deadlines, commitments		Celebrate, congratulate	Testify	

*The weekly follow-ups allowed us to refocus on our mission. They gave us dynamism and helped us to develop the project. (Student A)*

Students' meetings with the host partner's team and with passionate resource people played a central role in their territorial anchoring. They also boosted their motivation to become a full stakeholder themselves. Students' combined contributions seem to have driven the shift from a situational interest in the territory to a deep interest.

*Territorial anchoring increased when we started to meet local actors linked to our problem. A naturalist allowed us to familiarize ourselves with the search for traces of beavers. Although I do not live in this territory, participating in the construction of a common project with the help of passionate and fascinating people made me take this mission more and more to heart. (Student C)*

Gradually, the process of anchoring in a territory – by roaming through it and meeting local inhabitants – opened the students' minds, stimulated their curiosity about the environment and generated a real feeling of attachment.

*My curiosity has become an engine for learning. (Student D)*

*We often returned to the field to answer our questions. In some cases, the answers directed us to new quests for information. Thus, our circle of knowledge of the local heritage has grown little by little. (Student A)*

#### **4.4.2. Fulfilment of the mandate**

The realization phase revived the students' enthusiasm. They took initiatives, developed their creativity, organized themselves, and collaborated with the project's various stakeholders. They felt more comfortable in the field and were proud they could decode the landscapes for themselves. They were able to build on the friendly relationships with the community and thus could ask for help to produce original and high-quality pedagogical tools. The friendly 'adult-adult' relationship with the tutors also helped the students to become empowered thus breaking with the posture of passive students who do what they are asked and worry about the assessment.

*Students' empowerment in setting goals, in decision-making, in scheduling their work, in taking initiatives and in solving problems evolved throughout the traineeship. (Cécile, tutor)*

*Usually, I am someone who is afraid of making mistakes and I generally wait for someone to tell me what to do. I'd rather do nothing than be wrong. However, for our project to succeed, we had to take initiatives. Now, I am no longer afraid of the evaluation, I ask for it! We created an evaluation grid for our animation for teachers and children, in order to improve our product. (Student C)*

Project planning and self-management were made easier, with students taking ownership of a planning tool. A competences map enabled students to assess their learning and to be confident about their 'non-standard' programme.

This phase was also marked by moments of questioning and learning about eco-responsibility. The students changed some of their daily behaviours, e.g. waste sorting, water and electricity consumption, or choice of eco-responsible clothing. In each project, they looked carefully at the materials they used, so as to minimize the environmental impact.

*We first built a plastic and polystyrene model to model the beaver's living environment. After a review, we made another one with materials taken from nature or recycled materials. (Student C)*

By communicating in a whole series of situations, the students learned to improve their language proficiency in different registers. Moreover, this helped them to become committed eco-citizens. They also developed a work ethic.

*I feel responsible, not only for myself, but also for the image of the inhabitants of the commune who trusted us. It's very motivating. (Student E)*



Learning to be tolerant was an unexpected result, such as when the students found themselves struggling with people who were very aggressive towards beaver supporters.

*I was appalled to learn that some people were in favour of killing beavers. I thought it was unfair and barbaric. The first meetings with these people were difficult and tested my composure. I thought in principle that I could never consider this subject in context. However, the meeting with people who shared more nuanced opinions led me to take a more moderate viewpoint and to take into account the viewpoints of the territory's various actors. (Student C)*

The students also learned a lot from the partnership with environmental education associations.

*Cooperating with other education professionals has enriched my professional skills. It opened my eyes to ways of dealing with children that are very different from the classic school model. (Student D)*

#### **4.4.3. Finalization**

The finalization phase was an important moment for the students, particularly when their work was recognized by the host teams, who had sometimes even contacted the press to highlight it. The students were very proud to present what they had achieved and they were warmly congratulated by the tutors.

*Their commitment as eco-responsible citizens to produce a quality product on time made remarkable progress, and they can be proud of that! (Cécile, tutor)*

*It has been very rewarding for me to make my work known to the media. It was then that I realized the importance of my project. It was becoming "official" and was going to be at the service of society. (Student B)*

These moments of celebration 'outside of school' were however overshadowed by the next step, the certification assessment; this was very stressful for the students.

#### **4.4.4. Summative assessment**

The summative assessment took place at school, according to a traditional convention. The students' achievements were judged to be original and of high quality. Their significant progress in the four learning areas set out in the curriculum (territorial anchoring, eco-responsibility, empowerment, extramural professional identity) was unanimously recognized. However, some presentations were a bit disappointing in terms of communication, and the quality of reflective analysis varied greatly from student to student. Despite this, the examination panel awarded a 'very good' grade to all the students: these grades (very good or excellent) were generally much better than what the students had achieved before.

#### **4.4.5. Second term (Q2)**

All the students noted that the return to school was tough. They suffered a kind of culture shock when they 'fell back' into the traditional learning system. Student B even experienced a 'feeling of suffocation'; Student C had great difficulty returning to the usual learning routine. The students felt they had experienced something extraordinary, but this did not ultimately interest many people.

The transfer phase could be further documented, during the supervision of the teaching traineeships that the students had to complete in the second term, as well as during the supervision and reading of their Bachelor's dissertation. This phase confirmed the cautious reception by some of the school community. However, three students were able to propose an environmental education project that involved an outing close to the school (to discover a protected environment/an organic vegetable garden/or beaver tracks); the fourth student carried out two projects based on service-learning (producing a brochure to discover a neighbourhood/

the landscapes of a village). These successful experiments strengthened the students' new eco-citizen convictions and skills.

#### 4.5. Conclusion

The final results of this experiment are encouraging. The benefits initially expected from the Ecostage are fairly well demonstrated, although they have yet to be confirmed in the medium to long term.

All the students testified to feeling happy when outside often, during long walks in nature, and their resulting sense of well-being. It was a unique experience.

*I rediscovered this pleasure of getting in touch with nature to discover new things or simply to recharge my batteries. Now, I spontaneously go for a walk and involve those around me in my adventures. And I no longer have any reluctance to go out, whatever the weather! (Student D)*

*What has changed a lot thanks to Ecostage is that I now dare to go further. Before, I stayed in my village. I became more curious 'about everything'. (Student E)*

Ecostage Course Unit allowed students to give more meaning to learning content. They also acquired skills to carry out their project, to build a deeper relationship with nature, and to feel more responsible for the environment. Ecostage enabled them to acquire the basics of environmental education and extramural pedagogy, thus underlining their existing beliefs about the overall value of extramural activities for children.

*Children were proud to use new vocabulary words wisely, especially rare or specialized terms, whose meaning they now knew from their field observations and tactile experiences. (Student E)*

The students were also convinced of the importance of adopting a sensitive approach to the environment, as a prerequisite for feeling any responsibility for the environment.

*Children need to see and feel things on the ground, it's the best way to make sense of what they're learning. (Student B)*

The students emphasised not only that they want to be outdoor teachers and feel well prepared to do so, but also that they envision service-learning with children. They found many projects in the territory where they could participate with their class.

*I believe that service-learning is a pedagogy that promotes the territorial anchoring of children and offers real meaning to each of lessons learned. So describing a landscape just for the sake of description makes no sense to me. However, describing it for a specific audience, with a specific goal, for a 'sponsor' outside the school, really motivated the pupils and made them responsible. (Student E)*

The students have gained confidence in their ability to undertake something and feel that they have become more 'adults', which their parents confirmed.

The evaluation of the student support methods confirmed the relevance of the tools offered (reverse planning, skills map and trainee guide) to guide students in carrying out their mandate. The weekly visits by the trainers and the tutor's assistance were considered essential, as they strongly supported the work in its cognitive, metacognitive, practical and affective dimensions. Thanks to the formative mid-term evaluation, the portfolio and the final evaluation, the students were helped to question their professional identity. However it was concluded that the support should be extended beyond the Ecostage itself, to avoid the stress that the students said they felt when returning to 'normal' school.

#### 5. Discussion and recommendations for an innovative curriculum

Nowadays, primary school learning practices rarely include the spaces around these schools. Yet these spaces offer children many opportunities to learn from close contact with the real

world, and to become committed eco-citizens (see the argument presented in § 3 A). Pre-service teachers can be trained for this kind of teaching at University Colleges in Wallonia-Brussels Federation, through several extramural training modules, which are highly relevant and consistent from a didactic viewpoint (see § 3 B). However, Belgium's education system often restricts this kind of service-training, thus negatively affecting teachers and their school directors as well as parents (see § 3 A). The Belgian system's Achilles heel is the compliance pressure on young teachers. This typically delays innovations and risk-taking, particularly for place-based learning.

Yet overall, critical analysis of the extramural teacher training practices (see 3B) highlights how their learning outcomes are clearly too ambitious – given the profile of most of the students, who are disconnected from their living environment, and particularly from nature. This unfortunately affects students' empirical knowledge of the world, their scientific culture and their spontaneous way of reasoning, as well as their personal anchoring in their living environment (see § 3 C).

Consequently, if the attitudes and behaviour of students (who are influenced by this societal trend of disconnection from nature) are to be changed, extensive thought will have to be given to making major changes in teacher training, alongside the provision of significant resources. The results of extramuros research show that training based on a service-learning eco-traineeship for a whole term can profoundly transform the students. They could become teachers who are eager and able to regularly exploit the resources of the surrounding environment with their pupils (see § 4).

Research has shown that well-established beliefs about the benefits of extramural learning, plus the relative ease of implementing education on the environment and eco-citizenship at school, are not enough to foster this kind of learning. So our ambitions for extramural learning can only produce the expected effects if thought is given to systematically transforming the education system. This is why we are making recommendations at different levels, in order to inspire the reform of pre-service teacher training that is now underway in the Wallonia-Brussels Federation. Ideally, four conditions should be met for the system to 'move':

### ***5.1. Institutional support***

Explicitly include environmental and eco-citizenship education in official documents establishing the aims of education and defining the teacher competence profile. Impose frequent extramural trips, so students can build and facilitate learning across disciplines.

### ***5.2. Extramural teacher training***

- Pre-service teacher training for all students on the foundations of environmental education and the didactics of outdoor learning.
- Optional module of specialized skills in Environmental and Eco-citizenship Education.
- Service-learning eco-traineeship for five months full-time, in a non-academic structure; at least one school internship based on a place-based service-learning strategy.

### ***5.3. Environmental education awareness for all educational stakeholders***

Raising the environmental education awareness of school directors, practising teachers, teacher trainers and parents about the basics of environmental education.

### ***5.4. Interesting and exciting environment near the school***

There should be a reflection about the intrinsic qualities of the surroundings of each school, as well as the school's proximity to a public natural environment. Public authorities should seize existing urban opportunities to reduce any inequalities linked to the location of schools.

## Notes

1. Research team in 2014-2016: A.-C. Grodos, G. Meunier and C. Partoune (coordinator); in 2016-2018: H. Bernard and C. Partoune.
2. The Institut d'Eco-Pédagogie is a NGO specialised in training and research in environmental education – renamed Ecotopie-laboratoire d'écopédagogie, asbl, since August 2020. [www.ecotopie.be](http://www.ecotopie.be)
3. Geocaching is an outdoor recreational activity, in which participants use a GPS receiver or mobile device and other navigational techniques to hide and seek containers, called 'geocaches' or 'caches', at specific locations marked by coordinates all over the world. A typical cache is a small waterproof container containing a logbook.
4. A River Contract involves bringing all the stakeholders in a valley around the same table, with a view to defining by consensus a programme of actions to restore the rivers, their surroundings and the water resources of the basin: [environnement.wallonie.be/contrat\\_riviere/contrats.htm](http://environnement.wallonie.be/contrat_riviere/contrats.htm)
5. The European beaver was part of the native fauna in Belgium. Exploited then considered harmful, it disappeared in the 19th century. It was reintroduced in the early 90s. It has now benefited from full protection since European directive Habitat (92/43). The animal's cohabitation with humans is controversial.

## Acknowledgements

We would like to thank the academic pool of the HELMo University College, the members of the research support committee and our colleagues, which allowed us to experiment with a very innovative training module. We are grateful to the students involved in the action research and to their parents, who trusted us and took on the risk of the Ecostage adventure with us. Our thanks also go to the eco-traineeship tutors.

## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by the Wallonie-Bruxelles Federation, Wallonia Public Service and the Centre de Recherche des Instituts Groupés de la Haute École Libre mosane. This work was supported by the Wallonie-Bruxelles Federation, Wallonia Public Service and the Centre de Recherche des Instituts Groupés de la Haute École Libre mosane.

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