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Abstract. *Teaching and assessment in Environmental Education (EE) is rather complex because it needs to address the learners' ability to ask questions, solve problems, and develop positive values. Portfolio assessment is a holistic way to evaluate the growth and development of skills and values in EE by providing a cumulative record of work carried out by students in a variety of contexts and allowing students to reflect on the process of how their views and values change. The main aim of this paper was to discuss the process of the development and implementation of a European Portfolio for Environmental Education by TEPEE (Towards a European Portfolio for Environmental Education) Network, within seven European countries. The paper narrates the development and implementation of EPEE through the eyes of the TEPEE scientific committee coming from the seven partner countries. Their views about the advantages and disadvantages of the use of portfolios within the context of EE were collected by means of questionnaires using open-ended questions. The results of the study suggest that the main advantage of using portfolio assessment is that it provides a holistic picture of the learning and growth of students in different contexts and situations. The major asset was the enthusiasm and motivation it raised among the teachers using it. The major difficulty was trying to change the assessment culture of teachers who were used to more traditional forms of assessment.*

Key words: *environmental education, education for sustainable development, portfolio assessment, learning and assessment in environmental education.*

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PORTFOLIOS IN ENVIRONMENTAL EDUCATION: THE TEPEE PROJECT

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Introduction

Environmental education provides a basis for living on this Earth in less destructive, more peaceful, equitable, and sustainable ways. Environmental education needs to empower people, irrespective of age, gender, race, social role and responsibility, to think for themselves, develop standards for ethical and moral life choices, be better citizens, create more caring families and communities, preserve our natural habitat, and live more emotionally and spiritually satisfying lives (Filho, 2003). In order to encourage the development of environmentally literate citizens, various countries across Europe have introduced Environmental Education in schools. For Boullier (2003), "environmental education is at the heart of the educational process. It is essential for providing all pupils with skills and competencies, for giving them a sense of responsibility, for concretely promoting education in democratic citizenship" (p. 7).

The problem with environmental education is that, in various countries across Europe, it has a different status in school curricula. While some countries such as Denmark, Spain and Scotland, treat environmental education as a multidisciplinary approach and is built into a number of different topics; in other countries such as Finland, environmental education is a separate topic in the curriculum and its role is to promote sustainable development along with the protection of biodiversity (Battelli, 2003). Another problem identified by Scaluni (2003b) is that it is



very difficult to develop an assessment tool that encompasses all the competencies and skills gained by students following an environmental education program. Furthermore, since environmental education is so diverse in the different countries of the European Union, there is no way of comparing the competencies and skills developed by students involved in environmental education across different European countries.

One of the major objectives of environmental education is “encouraging the learners to be involved in their environment by posing questions, looking for relevant information, critiquing decision making processes and participating in such processes” (Tal, 2005, p. 576). To reach these objectives, environmental education cannot rely on traditional methods of teaching learning and assessment. Since environmental education also requires “the accommodation of the personal, social, and economic with the scientific as an integral whole, it constitutes a challenge to conventional subject based curriculum and pedagogy” (Jenkins and Pell, 2006, p. 777). A study by Hungerford and Volk (1990) has shown that the link between students’ environmental awareness and their environmental behaviour is at best only weakly positive. This points to the need for various methods of learning and teaching and assessment taking into consideration “both cognition and affect” (Pooley and O’Connor, 2000, p. 719).

The need for new methods of learning, teaching and assessment in Environmental Education led to the development of the TEPEE (Towards a European Portfolio for Environmental Education) network. The network was co-financed by the European Commission in the framework of the Socrates Program, under the leadership of Italy’s Legambiente who was the network co-ordinator. The participating countries were Germany, Italy, Malta, Portugal, Romania and Sweden. The partners were secondary or primary education institutions, Universities, a school inspectorate and environmental organisations. This gave a good mix of diverse institutions which could offer different areas of expertise and experiences to develop joint reflection and innovation in the area of environmental education. The main objective of the network was the design and development of a European Portfolio for Environmental Education (EPEE) which would be “a tool for learners of any age and of all levels, to record their competencies and experiences in the field, in a clear and internationally comparable way” (Scaluni, 2003b, p. 28).

The main aim of the paper is to discuss the development and implementation of this European Portfolio for Environmental Education, based on new ideas of learning and the principles of assessment for learning, within seven European countries. The paper explores the advantages and disadvantages of the use of portfolio assessment within the context of environmental education and tries to outline a way forward for portfolio assessment in environmental education. This paper was co-authored by the project’s external evaluator and by one of the members of the project’s scientific committee.

Learning and Assessment in Environmental Education

In order to be effective, environmental education needs to bring about a change in behaviour and students need to undergo a shift from knowing about environmental issues to acting on environmental issues. If such behaviour is to be maintained it needs to be sustained by a strong value base. This is the notion of environmental education for empowerment and that which “requires not only interest in, engagement with, and motivation for environmental action ... but a degree of confidence that an individual can contribute to effecting change...” (Jenkins and Pell, 2006, p. 767). Reflection confronts learned values with the learners’ own day-to-day choices and lifestyles leading learners to clarify, challenge, consolidate or replace their learned values. This process internalises values so that action is backed up by conscious and responsible decisions (the process is summarised in Figure 1). Vanhear and Pace (2008), while stressing that “what matters is not *what* knowledge is delivered but *how* it is delivered and experienced” (p. 42) warn against the transmission of inert environmental information that never gets sifted into action. They contend that to better the chances of bridging the knowledge – action gap, knowledge needs to be meaningful for the learner and sensitive to the learner’s personalised learning process.



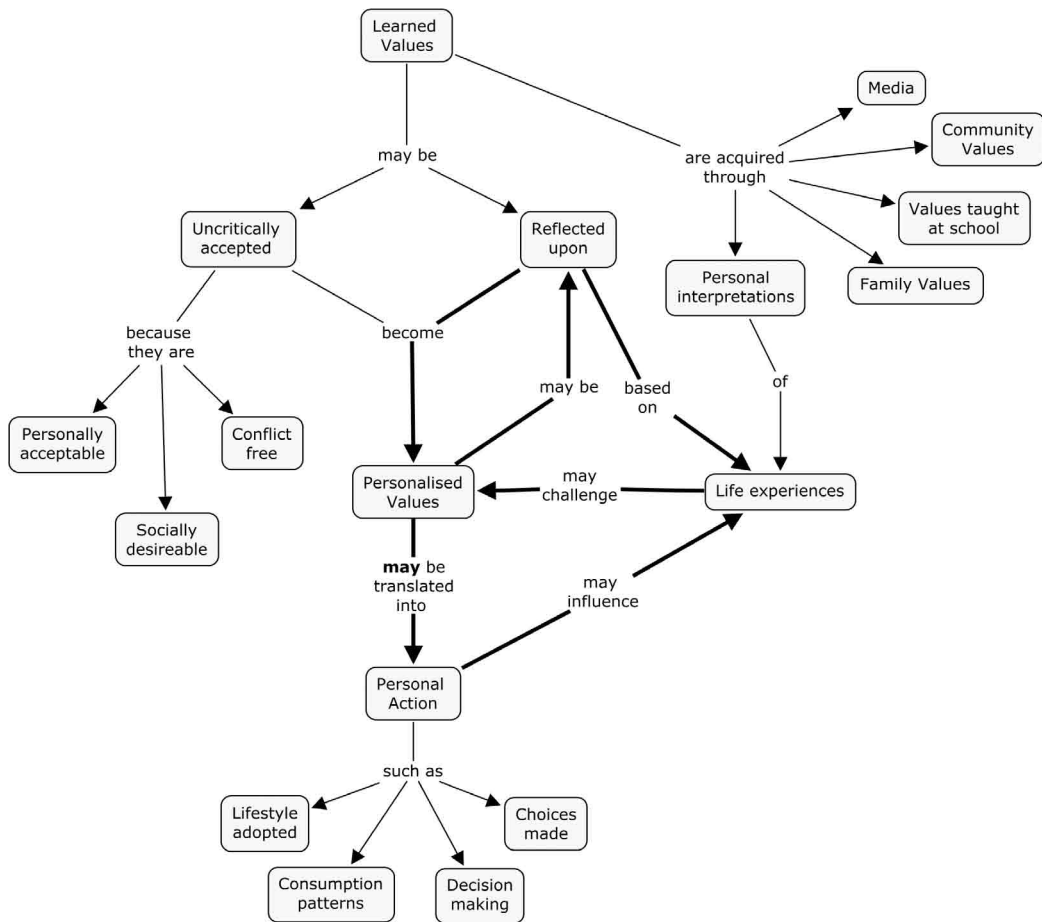


Figure 1: Concept map outlining how values are processed. (Bold lines highlight the processes that are facilitated through environmental education methodologies).

These views of learning in Environmental Education have been conceptualised within a social constructivist theoretical framework. Within this theoretical perspective, students are seen as actively making sense of new knowledge and deciding how to integrate it with previously held concepts (Klenowski, 2002). Mental representations are continually being confirmed, rejected, adapted, reformed or developed in response to experiences both inside and outside school. Learning also depends on what the students bring with them into the classroom (Bruner, 2004) and takes place within a social context (Bransford, Brown, and Cocking, 1999). As argued by Murphy and Ivinson (2003), the “social norms and values encountered in communities such as family, peer group and friendship groups, are taken up by students, and influence their negotiation and management of their participation, and hence, their learning in classroom settings” (p. 6). The presentation of learning as both socially constructed and context specific (Lave & Wenger, 1991) is important in the development of environmental education programmes that take into consideration students’ life situations and new influences that are able to change dispositions. Tal (2005) describes the principles of learning in Environmental Education in the following way:

It is widely accepted that learning in EE and science depends on previous knowledge and perceptions of the learner, and that learning occurs mainly in a social context, when learners interact and share ideas, thoughts and actions. All these are in accord with the constructivist view of learning that focuses on the

learners and recognises that they have to be active in the process of learning. Social constructivism emphasises social interaction among learners that enable asking questions, sharing ideas, debating, arguing, concluding and collaborating while creating products and artefacts (p. 577).

Within the school context, this is translated into methods of learning and teaching which include: classroom based and outdoor learning, project-based learning, using multiple resources, learning about socio-scientific controversies and involving the broader community (Tal, 2004). The complex and cross-curricular nature of environmental education and its emphasis on higher order thinking skills, informal experiences in school as well as out of school, its focus on the acquisition of values and on changing behaviour, also necessitates an assessment model which goes beyond testing student understanding of environmental issues. For Tal (2005):

Complex learning environments as often provided by environmental education engage students in project-based learning, field trips and enhance higher-order thinking skills by encouraging students to ask questions, critique information and suggest alternatives. The traditional instruments for measuring scientific literacy do not fully convey the essence of student performance in such settings. These learning environments require the implementation of multifaceted, complex assessment frameworks as well (p. 578).

Portfolio Assessment

One form of assessment that ties in very well with sociocultural views of learning and the principles of environmental education is Portfolio Assessment. Portfolio assessment is based on the principles of assessment for learning which are described by Black, Harrison, Lee, Marshall and Wiliam (2003) as “a process, one in which information about learning is evoked and then used to modify the teaching and learning activities in which teachers are involved” (p. 22). Assessment for learning is based on the view that assessment, is an integral part of teaching and learning; that every learner can improve and develop new understandings, that feedback and questioning play an important role in the development and improvement of students and that students are actively involved in their own learning and assessment process (Weeden, Winter and Broadfoot, 2002).

These principles of assessment for learning, can all be developed through the use of portfolios as an assessment tool. Jervis (1996) describes a portfolio as, “a careful and conscious collection of a student’s work which provides a multidimensional picture of a student’s learning over time, accounts for both process and products, and includes the active participation of students in their own learning” (p. 1). However, the portfolio is more than a mere scrapbook with a collection of student work. The portfolio involves thought and reflection, firstly about what will actually go into the portfolio, and secondly, reflection about progress and development through self-assessment or dialogue with the teacher or peers. As described by Seely (1994) portfolios “... are dynamic, interactive and multidimensional ... they are evidence of students’ construction of knowledge structures that will carry them on to future paths of learning” (p. 70). The portfolio provides a picture into the process of learning which the student undergoes. Klenowski (2002) states:

In developing a portfolio of work, students are engaged in learning as an interactive process. The portfolio connects process and product. Student learning is documented and the expectation is that they will actively explore and evaluate that learning through engaging with their teachers, other students or peers. Collaboration, dialogue and reflection become essential processes in the construction of the portfolio of work (p. 109).

The use of portfolio assessment therefore shifts the focus from the products of learning and assessment to the processes. Learning and assessment thus become person-oriented rather than task-oriented and hence more relevant to the learners’ experiences and needs. The processes involved in this kind of assessment encourage learners to take responsibility for their own learning,



to be reflective and in the process change and develop their views and ideas, which is a key goal of environmental education.

Portfolio assessment has been introduced in a number of countries. In the U.S. Koretz (1998) analysed the use of large-scale portfolio programmes such as those used in Vermont and Kentucky. He concludes that while teachers reported that portfolios had a powerful influence on instruction, the use of portfolios for large-scale assessment was problematic. Stecher (2010) also argues that portfolios should not be used for high-stakes large-scale testing. However, within the classroom context Stecher (2010) states that portfolios play a valuable role in the learning process, they allow students to reflect upon and improve their work and they allow the teacher to gain a better understanding of the context in which learning is taking place. They can also provide a cumulative record to show a student's growth over time. In the UK, portfolios form a part of the National Vocational Qualifications and the General National Vocational Qualifications programmes. The evidence collected by students over time is then used for a place in higher education or for employment. However, due to their selective purposes the role of portfolios has now been reduced (Klenowski, 2002). In fact, the practical difficulties associated with portfolio assessment are not the philosophical and pedagogic principles which underpin its development. A number of studies (Fernsten & Fernsten, 2005; Hamp-Lyons & Condon, 2000; Stecher, 2010) have shown that the benefits of portfolios are numerous and enhance the evaluation of higher-order thinking skills, cross-curricular skills and personal development. The problems are related to what is described by Klenowski (2002) as being the procedures and processes of portfolio assessment. Tasks presented in portfolios are highly individualistic and cannot be standardised; the work is accumulated across time and in a variety of different contexts and conditions; and teachers need to be trained in the use of assessment. Simon & Forgett-Giroux (2010) state that in a number of case-studies carried out with teachers from eastern Ontario Canada, they found that the effective integration of the portfolio into teaching and assessment practices depended largely on the flexibility of the context in which it was being implemented as well as on the type of training or support provided to the teachers.

All in all, however, the benefits of portfolios outweigh the burdens. Davies & Le Mahieu (2003), describe case-studies from a number of North American schools which suggest that the use of portfolios provide at least four potential "value-added" reasons to more traditional means of generating evidence of learning. They state that portfolios: (1) show growth and development over time; (2) they allow more in-depth learning to occur; (3) they allow student choice which results in more engagement by the student; and (4) they allow students to reflect on their own work and to also engage in dialogue about their work with teachers, peers or parents. In a study carried out with classroom teachers in Cambridge, MA, Stefanakis (2002, p.143) offers a window into the implementation of portfolio assessment in the classroom. She states:

...portfolios help teachers, at different grade levels, adapt their teaching to meet individual needs, customizing their practices to respond to the developmental level of their students. Simply there is no one way to "do portfolios". The beauty of portfolios is that they adapt to the context of the community, the school, the classroom, and the child.

In another case study, Johnson (2006) used portfolios in her science classroom and she argues that portfolios empower students to relate what they learnt in their science lessons and through their portfolios apply pieces of their own lives, their own cultural interests and backgrounds to their work. This allowed the students to develop a better and more detailed understanding of science. For Klenowski (2002, p. 136) the processes involved in portfolio assessment have great potential since they "encourage the learner to take responsibility for their own learning and to be reflective, a key tool for transformation and development". This however, needs to be accompanied by changes to the way teachers conceptualise teaching and learning and students need to be given the skills and support required to allow them to develop their portfolio in a meaningful way.



The Design and Implementation of EPEE

The need for new methods of learning and assessment led to the development of EPEE (European Portfolio for Environmental Education), by the Scientific Committee of the TEPEE Network. The EPEE (2005) is designed in such a way that it can be developed by learners individually or else as part of the school curriculum. The EPEE is designed as a handbook for teachers, but it can be very easily developed by the learners on their own. The EPEE includes an introductory section giving a basic understanding of the portfolio and how it can be set up; followed by a set of guidelines and student sheets which can be used for the compilation of the portfolio. Usually the portfolio could include:

- Information about the student who owns the portfolio.
- A record of qualifications evidencing the learner's proficiency in specific significant learning experiences, including a resume of learning experiences and a record of certificates and diplomas.
- An updateable record of how, why and where the learner learned what s/he knows. This enables the student to reflect on needs and objectives, learning experiences and current level of competence.
- Samples of the owner's work that evidence his/her competence. This section includes a number of artefacts which show the various skills and competencies of the owner of the portfolio. A variety of different artefacts can be included so that students can show their different talents through different media.
- The teacher's evaluation of the student's competencies.

The student's reflection about the learning outcomes (Pace, 2005, p. 5).

Artefacts which can be included in an environmental education portfolio include evidence of problem solving tasks such as stories written about environmental issues; photographs or written reports of project work carried out; written reports and teachers' assessments of co-operative group work; evidence of involvement in community projects; and evidence of involvement in co-operative projects such as students' exchanges (Chetcuti, 2003). The choice of artefacts allows students to be creative and to include evidence of work carried out both in school as well as out of school. They reflect "the various aspects, modes and settings in which learning occurs" (Tal, 2005, p. 576). Portfolio documentation also makes learning visible by capturing descriptions of students' learning experiences, digital photos of their explorations, and concept webs and daily work samples tell a cohesive story of the learning experience that can be shared with students, parents and administrators (McNair, 2004). The EPEE shows ability and achievement in different contexts and students can use their "multiple intelligences" (Gardner, 1993) to demonstrate problem solving, higher order thinking skills and deep understanding of environmental issues.

The portfolio is also a means whereby teachers can give feedback to students regarding the progress of their work, either through written comments or through rubrics including criteria for success. "The evolving picture of the student's development is captured in the portfolio and can be used as the focus for regular review between tutor and student or to enable the student to self-evaluate for the improvement of learning" (Klenowski, 2002, p. 23). Black and Wiliam (1998) suggest that feedback is one of the key factors in promoting learning. It helps to close the gap between current ideas and desired learning outcomes. It "gives students the opportunities to examine and to carry out analyses of their ideas, beliefs, constructions and values" (Klenowski, 2002, p. 111). This provides an insight to both students and teachers about the processes involved in choosing a particular course of action. It shows students what they have managed to achieve and as shown by Filho (2003) this building of competence in environmental education, helps to empower individuals to think for themselves, integrates cognitive and experiential learning, gets the theoretical and the practical and, though the metacognitive ability of being able to assess all of these individuals, can lead to more healthy, fulfilling and satisfying lives

Portfolios also have a reflective component (Chetcuti and Grima, 2001). Reflection allows the students to take charge and assume ownership over their own learning (Paulson, Paulson and Meyer, 1991). This constructivist approach involves "creating opportunities for students to make their own ideas explicit, share them with others, subject them to critical scrutiny and test their robustness by observation and/or experiment" (Hodson, 1998, p. 35). The reflections are important because they give students a voice



in defining their work. In the reflective writings included in the portfolios students can show how they solved and tackled problems related to the environment and how their views changed and developed over time. Through its design to incorporate both evidence of competence as well as reflection on learning, the EPEE also focuses on the process of learning. As stated by Klenowski (2002), "the portfolio is not in itself the end. The associated assessment and pedagogical practices and processes help to develop successful learning. Learning occurs, as a consequence of these processes, beyond the submission of a portfolio of work" (p. 4). The EPEE as described in the handbook (Pace, 2005):

...can become an essential tool in the assessment of environmental education programmes. They (the portfolios) can be used to provide snapshots of the learning journey of a student grappling with environmental issues. They are windows not only into the knowledge gained by the students, but also into the processes, the dilemmas and debates that make students aware of environmental issues. Furthermore, they make the students more aware of themselves both as learners as well as responsible citizens who are sensitive to the environment and show greater responsibility, motivation and commitment towards sustainable development (p. 8).

Evaluation of EPEE

One of the aims of the scientific committee of the TEPEE Network was to evaluate whether EPEE could actually be used and implemented by teachers in the various partner countries. Each member of the scientific committee from each partner country contacted a number of schools and trialled EPEE. The schools then sent in their feedback to the member of the TEPEE scientific committee who had contacted them. This trialling was carried out in each of the partner countries of the TEPEE network. However, the purpose of this paper was not to evaluate the individual feedback sent in by the schools but rather give voice to the views of the members of the scientific committee who were involved in both the design and implementation of EPEE. The aim of this research paper was therefore to narrate the experiences of the members of the scientific committee of the TEPEE Network in order to evaluate the validity of EPEE as an assessment tool used to foster the development of environmental responsibility in learners. The experiences of the members of the scientific committee were evaluated through questionnaires. The choice was based on the fact that as stated by Cohen, Manion & Morrison (2011) questionnaires can be administered without the presence of the researcher. They are easy to administer and generate a considerable amount of data (Brod, Tesler & Christensen, 2009). They therefore provided better access to the partner members who all came from different European countries. Two questionnaires were prepared and then distributed by email to the members of the scientific committee. One questionnaire was sent half way through the project and the second questionnaire was sent at the end of the project in February 2006. The questionnaires were sent by electronic mail to the members of the scientific committee of the TEPEE Network. The first questionnaire was sent to 10 members of the scientific committee and 8 partners completed the questionnaire. The second questionnaire was again sent to 10 members of the scientific committee and only 5 responded to the questionnaire. The questionnaires included open-ended questions which focused mainly on the experience of the partner members with the introduction of EPEE, the benefits of the portfolios and any difficulties they had come across in its implementation. Open ended questions were chosen because they "can catch the authenticity, richness, depth of response, honesty and candour" (Cohen et. al., 2011). A disadvantage of open-ended questions may be that they are more difficult to analyse but in the case of the present study they were thought to be more suitable to provide deeper insights by the participants of the study. The dangers of electronically generated text as pointed out by Marcus (1994) is that text-mediated communication is faceless and the writer is embedded within a virtual reality. However, the external evaluator had met all the members of the scientific committee during a TEPEE conference held in Malta and in Italy during which the importance of their honesty and transparency in the answering of the questionnaires was stressed.

Following Punch (1994) all the members of the scientific committee were assured that their names would be kept confidential and that anything that they would like to disclose would be presented in a general evaluation. The external evaluator established a relationship of trust with the participants and



like Griffiths (1998) tried to work on the principles of equal respect and appreciation of every individual and of the work carried out by the whole team. She did not place herself in a position of power but rather worked together with the team as a colleague.

EPEE: The Way Forward in Environmental Education

The members of the scientific committee who responded to the questionnaires all indicated that the development of EPEE as an assessment tool which could be used across different European countries was one of the major achievements of the TEPEE network. As stated by one member of the scientific committee:

I personally think that the portfolio is a very good tool that would help educators to evaluate the level of environmental education that a particular learner has reached. In fact the idea was gladly accepted by a large number of teachers...

The major success of the EPEE is attributed to the fact that individuals from different countries could come together and develop an assessment tool for the evaluation of competence in environmental education which could be used transnationally. All members who responded to the questionnaire were in agreement about this. In the words of one member:

The competence based model for evaluation proposed in the TEPEE is in fact a reference book in which environmental concepts are shared by everyone involved. It provides not only a reference system but a common language and a mutual understanding of concepts.

This was also expressed by another member of the scientific committee who states:

...Even if the schools which teach environmental education are all different and are found in different countries...we managed to produce something which is common and can be used in all the different schools...

Major Difficulties Encountered in the Implementation of EPEE

One of the major difficulties encountered in the implementation of the EPEE was the acceptance of a new model of educational assessment within a traditional assessment framework. Portfolio assessment places new demands on teachers and schools. "These demands relate to teacher and student time – professional development time to create new materials and lessons, classroom time to produce and refine portfolio pieces, and scoring time to assess the quality of student work" (Chetcuti & Grima, 2001, p. 34). As stated by one respondent:

...when teachers tried to implement the portfolio in the narrow context of their educational system...they couldn't and hence they failed to continue with the evaluation exercise. The portfolio needs to be backed up by an educational system that values this kind of evaluation tool...

The major factor determining the successful implementation of EPEE is the enthusiasm and motivation of individual teachers. Similar resistance to portfolio assessment was also observed in the introduction of a Professional Development Portfolio in the Faculty of Education, University of Malta (Chetcuti, Murphy & Grima, 2006). As observed by the authors of this study the successful implementation of portfolios (even if in a different context) "depends for its success on individual's feelings about the value and need for the proposed change, their feelings about their position in relation to it, and their evaluation of the effectiveness of the innovation in meeting the needs" (Chetcuti, Murphy & Grima, 2006, p. 106). The schools which were successful in implementing EPEE managed to engage the teachers in their schools and convinced them of the value of EPEE. As stated by one member of the scientific committee:



Some schools have succeeded in engaging a whole team of teachers while others are dependent on driving spirits that are not discouraged by the complementary amount of work it represents to adapt the portfolio to the work environment and the age group they work with.

Another difficulty with the implementation of EPEE was the introduction of new skills and competencies which students had to learn in order to be able to compile their portfolio. This is no easy task and students need to acquire new skills (Klenowski, 2002). Sweet (1993) suggests that students are ill-prepared to carry out work that is required of a portfolio. They need to learn how to reflect, how to self-assess, how to dialogue with teachers and peers and how to interpret levels of competence and success criteria. As described by one respondent:

Teachers were somewhat surprised by the lack of initiative of students. This was very obvious with regard to self-evaluation; a matter that students are not used to deal with in the way it is foreseen to happen in the portfolio.

As is always the case with the introduction of new methods of assessment, one factor which is always mentioned as a difficulty is the resources. One important factor for teachers is the time taken to implement portfolio assessment, the time taken to select material, reflect, give feedback and interact with students regarding their progress. As stated by one member who participated in the study:

The working circumstances of the teachers are different in European countries and therefore the main obstacle to a broad implementation of the portfolio is the substantial workload to which teachers are subjugated.

Stetcher (1998) argues that this is in fact one of the major negative aspects of portfolios, since they place additional burdens on teachers in the form of time, staff development, instructional preparation and scoring.

EPEE as a Learning Tool

The members of the scientific committee who participated in the study suggest that the major success of EPEE, when implemented in the schools, was the way in which it helped individuals to take ownership of their own learning. As stated by one member:

Those who have used the portfolio have found it quite useful and are now using it (or parts of it). The major plus of the portfolio is that it tangibly provides an opportunity for the learner to be directly involved in her/his learning and eventually it will also provide the teacher (and the learner) a clear indication of the whole journey that the learner went through...

This reflects the focus of the portfolio as a learning process. It provides individuals with the opportunity to give emphasis to personal achievement and development and enables individuals to review experiences and plan for future learning (Paczuska and Turner, 1997). The portfolio can be used in a formative way to help students reflect on their learning process, understand their strengths and weaknesses, dialogue with the teacher or with peers about their performance and set targets for themselves (Richert, 1990).

In the countries in which EPEE was trialled the portfolio was seen however as a complementary tool to learning and assessment and not as something which can stand on its own and be used solely in the evaluation of students. In the words of one member:

In some cases positive comments have been forwarded on the usefulness of the materials in given circumstances (project activities). Project work allows both students and educators to set up partial goals that are easier to evaluate by means of a portfolio methodology than curricular activities in general. It was therefore proposed that the portfolio be seen as a complementary tool to be used in particular circumstances...



The main strength of the portfolio was that it provides a holistic picture of the small bits and pieces of competence which students are engaged with in an environmental education program. The portfolio can be used to represent “the holistic and interdisciplinary nature of environmental education” (Tal, 2005, p. 595). In one of the partner countries:

By moving from specific aspects of knowledge to the building of conceptual understanding, the trial phase of the portfolio was seen as a process that should contribute to improving assessment methods and to encouraging multi-sensory approaches to evaluation.

The Way Forward

Despite the many limitations outlined above, the EPEE was seen to be successful by all the members of the scientific committee who participated in the study. In their view, it can act as a pilot project for the implementation of portfolios as an assessment tool in environmental education in conjunction with more traditional methods of assessment. The enthusiasm of individual teachers can act as a catalyst to bring about change in assessment practices in environmental education. As stated by a member of the scientific committee:

The portfolio with all its weaknesses and strong sides, speaks for itself in the educational field. The potential for broad implementation is transparent, but practitioners need to be given the right conditions for implementation, all under the assumption that there is a will to give the product a fair chance of becoming at least one of the tools for evaluation that always will be available in the toolbox.

Discussion

The main lesson learnt from EPEE is that teachers and educators can come together to develop curricular and assessment material in a process which is enriching for all those involved. The need for innovative assessment tools in environmental education is also realistic and EPEE has provided a basic model on which competence and certification can be built. However, the benefits of EPEE cannot be gained unless the teachers believe in it, unless the students believe in it and unless there is backing and provision of resources from educational authorities and governments. This can only be brought about by professional training of teachers and all those involved in the process.

The introduction of portfolio assessment in environmental education offers the possibility of providing evidence of competence in an area which is spread over different subject areas, takes place both inside as well as outside of the classroom and involves the acquisition of attitudes and values apart from knowledge. Environmental education is not learning about a subject but actually learning about a way of life. It helps to empower young people to think for themselves, develop standards for ethical and moral life choices, be better citizens, create more caring families and communities, preserve our natural habitat, and live more emotionally and spiritually satisfying lives (Pace, 2003). Environmental education is about developing a personal identity and a community identity. Within such a framework learning is bound up with identity construction (Lave and Wenger, 1991). It takes place within a social setting and involves “understanding and participation in on-going activity” (Lave, 1996, p. 9).

“Environmental educators aim at fostering in students an appreciation of the environment, and an understanding of their relationship with it and their responsibility for its future” (Tal, 2005, p. 576). Within such a context and in order to achieve such an objective we need to take into consideration the idea that classrooms and environmental education communities are also social settings and “we can no longer omit what students bring to classrooms as a consequence of their participation in a myriad of social contexts” (Iverson and Murphy, 2003, p. 91). Environmental education creates “a unique learning context” (Hodson, 1998, p.83). Building on this, it stands to reason that assessment practices in environmental education need to also take into consideration what Elwood and Murphy (2002) describe as the “social impact” of assessment. This requires a shift in our way of thinking and what Pryor and Crossouard (2008) describe as an important “discursive shift enabling a move from a notion of learning as a primary process of stor-



ing and reproducing knowledge towards its broader conceptualisation as a process of coming to know in different situations" (p. 3). This is the shift which is described by the participants of the study as being absolutely necessary for the successful implementation of portfolios in environmental education, and which has been experienced in the implementation of EPEE.

This discourse is still not very common in environmental education literature which "discusses the question of 'what to teach/assess' rather than the 'how to' question. Discussing what learning means and what exactly is the preferred type of learning is still uncommon" (Tal, 2005, p. 577). The development and implementation of EPEE suggests the need for the shift in discourse in environmental education and the need for greater focus on the way in which students come to know environmental education and how tutors can assess the path and process of this learning. This is a gap which requires further research and more in depth studies about learning and assessment in environmental education are required.

Conclusion

The development and implementation of EPEE in a number of European countries, suggests that portfolios can actually be used as a learning and assessment tool. It can trace the development of a learner's Environmental awareness and it can attest the learner's actions and involvement in putting into action what they have learnt. It is difficult to assess a student's environmental values through traditional modes of assessment but a portfolio can show through the various artefacts particular initiatives and projects in which the learner was involved, the change in attitudes and values as the learner proceeds through an environmental education program, and the involvement with community and the contribution to the community in terms of the environment. "We become who we are through participating in the communities around us in ways that are constantly negotiated and renegotiated. Learning and Identity are therefore inseparable" (Pryor and Coussard, 2008, p. 9). In environmental education this is very important and one objective is to actually change views and perceptions about the environment and providing individuals with the skills necessary to bring about changes in their individual and community life. As stated by Lave and Wenger (1991), "learning implies becoming a different person and involves the construction of identity" (p. 53). The environmental education portfolio can actually represent the "narrative text" (Pryor and Coussard, 2008, p. 9) of an individual's personal identity with regards to the environment.

The environmental education portfolio (or narrative text) can work powerfully to shape an individual's sense of self in ways that can become self-confirming (Eccleston and Pryor, 2003). These texts are constantly changing, need to be constantly reviewed and reconstructed. Positions and relations within the interactions between the learners and tutors need to be constantly negotiated and renegotiated. The reflective process encouraged within the environmental education portfolio can act as "a space where students can narrate into being new identities through their collaborative production of different texts"... the portfolio ... "might thus act as a means whereby learning activities become relevant to students' desired identities and futures" (Pryor & Coussard, 2008, p. 16). The lessons learnt from EPEE show that one of the major advantages of using portfolio assessment in environmental education is that the portfolio creates a common frame of reference which cuts across and can be used in different European countries. Yet at the same time the portfolio is a highly individualistic narrative of experience with the environment which is unique and developed within a particular learning community. The portfolio also allows learners to share views, ideas and experiences and their developing environmental points of view with peers, teachers and parents. It allows them to grow and develop an "environmentally conscious" identity within a safe and authentic context. This will hopefully lead to what Fortier, Grady, Lee & Marinac (1998) describe as an informed and involved citizens who have the creative problem solving skills, the scientific and social literacy and the ethical awareness and sensitivity which will enable them to take responsible actions which will help ensure an ecologically and economically sustainable environment.

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