

Vocational training and the environment: sustainability and employment ⁽¹⁾

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Keywords

Occupational training,
employment and
environment,
environmental
awareness,
evaluation,
sustainability,
indicators

SUMMARY

The inclusion of an Environmental Awareness Module (EAM) within Vocational Education and Training (VET) in Spain is considered a factor of overriding importance due to the current need to incorporate environmental awareness within society as a whole but also within particular occupations and professional practices involved both in jobs relating to the environment and the entire system of production.

In this study, we will tackle the changes in the educational system that are essential for sustainable development and for environmental education; we will also look at the equally essential changes that must be made to training in preparation for employment. We will analyse different dimensions of the EAM: its creation, development and evaluation, its set objectives, the function of Training Centres and the scope of students. Lastly, we shall propose a set of quality criteria.

⁽¹⁾ The research to which the article refers was carried out under the guidance of professors from the University of Granada: José Gutiérrez Pérez, Professor of educational research and diagnostic methods and F. Javier Perales-Palacios, Lecturer in educational sciences, within the inter-university doctoral programme in environmental education, co-developed with nine Spanish Universities.

Introduction

The aim of this investigation falls within the framework of Vocational Education and Training (VET) and the introduction of the Environmental Awareness Module (EAM) in 2000.

Three adult training pathways exist in Spain: initial vocational training, managed by educational administrations; VET managed by employment administrations-and lifelong worker training.

Various 'families of professions' exist within VET. The Safety and Environment family has only recently been created. In the development of such training courses, some core modules are traditionally included, such as occupational risk prevention and guidance for employment. Recently, Environmental Awareness has been included in all such courses, with the general aim of *'developing an environmental awareness in individuals by motivating and involving each and every citizen with a view to changing behaviour and consumption patterns and thereby promoting sustainable development. This refers to both individuals and the working environment'*.

In this way, the Network of Environmental Authorities proposes to make the environment an integral part of the schemes co-funded by the European Social Fund over the period 2000-2006. The responsibility of this Network is to determine the training and information needs of the various economic activity sectors and of regional and local administrations, in order to improve the use of structural funds and ensure that the community environmental policy laid down in the 5th programme is applied. In 1999, this network designed a training strategy with the following as one of its basic premises:

'All training programmes, irrespective of the main subject they cover, shall include an EAM, providing general information on the current environmental situation, current problems and future risks, with the aim of developing environmental awareness in the individual that will allow a prudent and rational use of natural resources'.

Until this investigation began, no evaluation had been carried out on the scope and efficacy of this strategy by the competent administrations. The following objectives were set:

1. To analyse the design, development and results of the inclusion and teaching of the EAM from its origin within Spain to its development to the Autonomous Communities and more specifically by means of an occupational training case study in the Province of Malaga (in the Autonomous Community of Andalusia). Four scenarios were analysed as part of this objective.
 - Design of a national strategy.

- Design of teaching material (National Level and Autonomous Community Level).
 - Design of an autonomous community strategy (Autonomous Community of Andalusia).
 - Implementation of the module within a Vocational Training Centre. Teaching staff. A Case Study was carried out on students from one of the courses.
2. To compare the evaluation proposals designed for the EAM, with those put into practice and to draft other evaluation schemes using a proposed set of environmental awareness indicators or quality criteria.

The initial proposal arose out of a quest for answers to various questions, the first of which was the possibility of raising environmental awareness within VET. The compulsory nature of this teaching Module offered an opportunity to make environmental education a tool that works across the board as a foundation to the achievement of sustainable development. What was the development path taken to achieve this pioneering educational proposal within vocational training? What teaching methods can be used to achieve environmental awareness? Can environmental awareness be achieved in 9 hours? What are the conceptual contents to be acquired? What values and changes in attitudes are desirable? How can the changes in attitudes and values be achieved? What skills must be acquired by the student? What is the most appropriate strategy? Is there a communication and development plan?

The following important questions were also posed:

- How may EAM be included in course activities?
The concept of integration implies horizontal development. How may this be achieved in view of the way such courses work in terms of teaching and bureaucracy?
- How may a Code of Good Environmental Practice (GEP) be applied and evaluated as part of Course activities?
This application requires the involvement of the subject teacher and that of the training centre managers.
- Who must be made responsible for promoting the EAM?
However good the subject teacher, lack of preparation in the environmental field and the conceptual and methodological difficulty of the topic make it advisable that courses should be delivered by specialist environmental educators.
- How and what should be evaluated in the EAM?
Conceptual, procedural and attitudinal aspects may be evaluated. Other goals are, however, set such as the achievement of GEP within course activities or within the student's role that must be examined once the educational action has been completed.

Various actors, managers and experts have been chosen to evaluate programme set-up and development. (Figure 1, see Annexes)

The method used is qualitative/interpretive, taking into account that, to date, no evaluation tool has been practically implemented for the application of this programme, that no records exist of evaluation by psychoeducational teams and that the evaluation of this module does not affect the overall evaluation of the various courses. The investigation topic formulated is descriptive in nature and aimed at the transformation of a given social reality.

The qualitative/interpretive analysis tools applied took the form of in-depth and structured interviews and a case study (more descriptive than interpretive in type) through a questionnaire delivered as a complimentary tool and the comparison and validation of interview results. All this was complemented by exhaustive documentary analysis, with results recorded directly in the field by the author.

The theoretical framework of reference examines the concept of sustainability and what it means to guide education toward this topic, drawing a distinction between the sustainability of learning and the learning of sustainability. To ensure the required horizontal focus, it was necessary to carry out an inter-disciplinary study together with the application of constructivist principles as part of a systematic approach. No less important was the search for connections with environmental education and sustainable development strategies. The type of training centres, the profile of the teachers, the characteristics of students and the evaluation model were also factors that could not be overlooked and affected the formulation of considerations, conclusions and proposals, including a system of environmental awareness indicators in the form of quality criteria.

We started with the assumption that while the EAM represents an opportunity, it is very difficult to comply with each of the objectives exactly as they are proposed. The programme requires reformulation, following an in-depth evaluation.

Theoretical framework of reference

The inclusion of environmental awareness in the different vocational practices of VET requires a unifying goal that may be achieved gradually. For the purposes of consistent planning, awareness of the environment must permeate the different decision-making levels in a co-ordinated manner between the two systems, administrations and areas of action involved: the environmental and socio-professional spheres. Reconciling ecology and economy has been a common subject of debate since the Rio conference in 1992 popularised the concept of sustainable development – which, however, can mean different things to different people.

It depends how you look at it: the environment can be seen as yet another variable within the economic system, to be treated in a conventional, classic manner, without taking into account environmental costs (Carpintero, 2005, p. 16); or alternatively, the economy may be seen as being dependent on ecology, on the biosphere, whose laws (physical and biological) determine the principles on which society is sustained.

This study considers that in the interests of developing the various occupations with the common goal of sustainability, the meaning of conceptual principles such as sustainability, environment and sustainable development should be agreed by consensus.

And all this should be done at the various decision-making levels. According to Álvarez and Vega (2005, p. 2) no model makes this construct possible, as the goals to be pursued and the means of achieving them are dependent upon the underlying ideology. The model must be clarified: any educational proposal requires the consolidation of a theoretical corpus.

The paradigm of sustainability. Toward a definition of sustainability

The application of EAM within VET is an environmental education strategy, whose basic aim is the consolidation of EAM throughout all VET courses within Spain by 2007. As with any strategy, however, we must first become literate in it (Tilbury, 2001, p. 1).

Sustainable development is a form of development that offers basic environmental, social and economic services to all members of the community without endangering the viability of the natural, built and social systems on which the provision of such services depends. When we speak of sustainable development, we are speaking of different interrelated aspects that must be considered jointly when problems are analysed and solutions are sought.

According to Mayer (2000), the idea of the ecological crisis being related to lifestyles and social production is increasingly gaining ground. Ultimately, therefore we are bound to assume *'The need to build the theoretical, epidemiological and methodological bases of Environmental Education by treating it as a science of critical education'* (Caride, Meira; 2001, p. 214). Sauv e (1999, p. 10) reminds us that the socially critical environmental education movement described, amongst others, by Robottom and Hart, which began to develop during the 1980s *'included EE within the process of critically analysing inter-related environmental, social and educational realities (incorporating or reflecting ideologies) with the aim of transforming them'*.

To tackle resistance to change, we must raise awareness of how environmental problems are caused and how they can be resolved. *'In order to*

learn how to learn about environmental complexity, we must unlearn and rid ourselves of our preconceptions '. (Leff, 2000).

The 'official definition' of sustainable development gained ground gradually after 1972, following publication of a report entitled 'The Limits to Growth' by the Club of Rome . The concept of sustainability is recent. This declared consensus is, however, more difficult to find in practice. This causes us to reflect on the ambiguity of the concept and means that education covers a fundamental role as far as the future is concerned.

The 'Rio principles' (1992) offered us parameters for envisaging culturally appropriate forms of sustainable development of local relevance to our countries, regions and communities. These principles ⁽²⁾ help us to understand the abstract concept of sustainable development and begin to implement them on a fundamental level through Agenda 21. We must also highlight the European strategy on sustainable development agreed at the Gothenburg Summit in 2001, which gave a major boost to the integration of economic, social and environmental values by stating: *'it is necessary for economic growth to support social progress and respect the environment, for social policy to support economic results and for environmental policy to be profitable* '. If taken seriously, these definitions, which are also commitments, will involve deep-seated changes in the way we produce, consume, work and research – and, by association, in the way we train and prepare people for work, beginning with vocational training. Promoting sustainable development means changing and adapting our current growth pattern to new models so that the European society will begin to see changes in its lifestyle and working habits in the coming years. This is where the good ideas, production and employment will come from. To sum up, society and the economic system need a new model.

Sustainability seems to be accepted as a compromise term, designed to bridge the gulf that separates the developmentalists from the environmentalists. We founder in a basic conceptual fog when we speak of sustainable development or sustainability; we cannot resolve it just by playing around with terminology. 'Sustainability' means durability or maintainability. There is a broad consensus that sustainability involves three aspects: environmental, social and economic. Ultimately it is a form of development that is environmentally sustainable, that does not exceed the 'load capacity of ecosystems', that is economically sustainable and viable for resident indigenous populations, with long-term benefits relating to the environmental and social improvement of the area; it is also socially sustainable as a fair practice.

⁽²⁾ Important amongst these are Environment, planning the future, quality of life, fairness, precautionary principle, holistic thinking.

Reorienting education towards sustainability: what this means in practice

The UN has declared the decade 2005-2014 to be the decade of Education for Sustainable Development. The current paradigm of education must change in some fundamental respects: nowadays we must think more in terms of learning and teaching; of permanent education and lifelong learning; education must be multidisciplinary, gender-sensitive, sensitive to diversity, participative, etc.

This Environmental Awareness Module in Vocational Training represents a very important step because it provides a practical example of how to re-orientate education toward sustainability.

This investigation focuses on the design of the strategy that may be found in the document 'Inclusion of the environment in schemes is co-funded by the European Social Fund' (Network of Environmental Authorities, Valencia 1999). We also examined the teaching materials and the training module introduced through Training Centres, considering a case in Malaga (Autonomous Community of Andalusia), using teaching staff whose professional profiles we will analyse. The case study examines the situations before and after a 9 hour EAM delivered during a Cookery Course.

Evaluating student attitudes and performances after nine hours of training and above all throughout the course and after the course presented us with some methodological problems that we cannot deal with in this study. The attitudinal change study, in the words of Alvarez, Gutiérrez and Perales (1996, p. 2), '*must be a priority strand of educational research and innovation and in the case of EE it is absolutely essential... . In order to develop a methodology associated with the teaching/learning of environmental attitudes as a first step, we must know what they consist of, how they are acquired and how to determine our actions as well as how to evaluate them*'.

One of the challenges is how to tackle the inclusion of sustainable development (UNESCO, 1998, p. 42-43), Michael Härte, sociologist and member of the Scientific Committee of the Federal Institute for Vocational Training of Berlin stated in a chapter on environmental education and training:

'Effective environmental protection is about more than applying technological knowledge and complying with standards. In order to act with environmental integrity, it is of the greatest importance that individuals should understand the consequences of their own actions'.

This document also notes that Cedefop developed a research study in 1997 focusing on two themes:

- the impact of environmental changes on the labour market
- the relationship between observed changes and emerging skills

The shift towards a new model has made it necessary to revise previous values; when we speak of sustainability we are not merely speaking of a new concept (Folch, 1998, p. 33-36). There is a need to strengthen and share responsibility for teaching about sustainable lifestyles within a wide range of social groups. (Tilbury, 2001, p. 67; UNESCO, 1997).

With regard to the associationist model of learning (García, 2004, p. 92), constructivist principles are applied such as the relativism of knowledge, its joint construction, people as active agents of their own learning and the control of that learning.

No less important as part of the process is horizontality. The design for the Spanish EAM strategy (Network of Environmental Authorities, Seeda and Analiter, 2001, p. 11) states: *'One of the fundamental aspects of this Module is undoubtedly its horizontal nature, in other words environmental awareness criteria must be present throughout the course...'*

We will have to make an effort to break with the idea that a mechanistic approach is the only way of acquiring knowledge, and replace it with a holistic approach – Bertalanffy's general systems theory or Morin's principles of complexity. (Pujol 2003, p. 18).

Vocational training, environment and employment

Nowadays, within VET, environmental management is considered essential for the exercise of any activity with an environmental impact. This leads to a requirement for legal, occupational and skills analyses within various sectors due to the need to minimise environmental risks.

Conversely, studies in Europe emphasise the main environmental concerns and provide recommendations for the implementation of active and applied policies to all agents involved in the definition, implementation and evaluation of environmental policies, as well as for the investigation of environmental topics at local, regional and global levels.

The European Commission identifies new sources of employment within the areas of 'Waste management', 'Water management', 'Protection and maintenance of natural areas' and 'Control of pollution and environmental management'

Urban ecosystems, atmospheric pollution, drinking water, waste water, development land, climate, waste, noise, traffic, municipal environmental management systems, etc, generate a set of economic-productive activities that fall into the area of competence known as environmental management and

affect various sectors; hence the intersectoral and horizontal impact of this subject (INCUAL - Arbizu, 2002, p.74-82).

There are at least five dimensions (INEM, 2003) to the educational needs imposed by the environmental challenge, which are related to economic and institutional efforts:

1. Environmental production sector.
2. Environmental knowledge sector. The development of this sector is driven not only by the emergence of new social functions of strategic importance but also by the growth in demand for environmental services by the environmental sector.
3. Introduction of new functions and demands for ecological updating of the production process in traditional activities (Environmental departments and areas) and Government.
4. Adaptation of public administrations and social organisations to an ecologically more sensitive institutional and social framework.
5. This change in the technological paradigm involves a new culture of work and adaptation of the skills of all workers in the organisation. Environmental awareness and requalification will tend to affect the workforce in practice, with the consequent educational requirements that any change in routine requires.

Another aspect to which we must devote special attention concerns the way we achieve the transition to sustainability. The EAM makes an extremely valuable contribution as far as this aspect is concerned.

Environmental awareness within the EAM

The Network of environmental authorities has developed a strategy document for development and implementation of the Module, The origin of the Network of Environmental Authorities lies in European Union environmental policy and it is the practical outcome of the provisions of Framework Regulation 2081/93/EEC of the structural funds, which establishes that Member States shall proceed to involve environmental authorities in the operation and implementation of regional development plans and programmes financed with Community Funds.

For this purpose, the European Commission has promoted the creation of environmental authority networks in all Member States.

Because one of the functions allocated to the Network of environmental authorities is the determination of the training and information needs of the

various economic activity sectors and of regional and local administrations for improving structural fund interventions, guaranteeing the application of the community environmental policy laid down in the 5th Program (the 6th is now in force), it is now proposed to include the environment in all schemes co-funded by the European Social Fund for the period 2000-2006.

In the Autonomous Community of Andalusia (as in other Autonomous Communities), the Employment and Technological Development Department, in its Order of 12 December 2000 published in the Andalusian Council Official Journal No 146, on the notification and development of Occupational Training Programmes, proposed the inclusion of an Environmental Awareness Module within all VET courses. It ordered the preparation of teaching materials and Good Environmental Practice handbooks. The Training Centres hired the services of environmental educators to deliver the EAM and students on the various courses within the different specialities receive 9 hours of training.

Data collection procedure and tools

The qualitative and interpretive research tools that were used to evaluate the development and inclusion of the EAM in the VET were as follows:

- Unstructured in-depth interview
- Case study (more descriptive than interpretive) by means of a questionnaire.
- Observation case report form
- Documentary analysis.

Programme creation and development were evaluated. Various actors, managers and experts were chosen for the stages mentioned.

The experts interviewed belonged to different levels.

Level 1: National Strategy design Managers/experts; belonging to the state administration and the Autonomous Community.

Level 2: Managers/experts in the production of teaching materials.

Level 3: Manager/experts in strategic design within the Autonomous Community of Andalusia

Level 4: Managers/experts in the process of teaching and learning an EAM within a training centre.

Levels 1 and 3 are more closely related with programme management, they possess economic resources and a certain decision-making ability.

Levels 2 and 4 are more closely related to education. The sample selected in level 2 is related to environmental educators who design and teach materials following level 1 and 3 guidelines. (See figure 1, annex 1).

The in-depth interview questions to the 11 professionals originated and grouped around programme design, development and evaluation at different levels within a training centre and among the students. The interview conducted is shown in Table 1 (see annex 1).

An open category system was established (see table 2, annex 1) and a manual coding system, allocating words, phrases, topics or paragraphs to each of the set categories, which are as follows:

1. Professionalisation (related to questions: 1, 2 and 3).

To determine the level of professionalisation and experience of interviewees with regard to EE and VET and the level of relationship with the EAM. We were concerned with the professional experience of managers expert in the design of the Strategy at national and Autonomous Community level, of managers expert in preparing teaching materials and of training centre managers expert in coordination and course delivery.

Subcategories

- 1.1. Current function.
- 1.2. Previous experience.
- 1.3. Qualifications and training.
- 1.4. Relationship with the EAM.

2. Conceptualisation (related to questions 4, 5, 9, 10).

Level of knowledge and ideas of professionals within the various areas indicated about the significance of education and environmental awareness – what it is, why it is necessary, how it is developing and what are the problems that stand in its way (in this case, its inclusion in VET).

Possibilities and tools implemented for the evaluation of knowledge and attitudinal changes during and after course delivery and difficulties encountered with this.

Our aim was to establish a list of elements that could stand as quality criteria with the aim of establishing a check on environmental awareness processes relating to this module and comparing them with the answers. They could also serve as proposals for an evaluation model.

Subcategories

- 2.1. Concepts and knowledge.
- 2.2. Actions and goals.
- 2.3. Problems.
- 2.4. Development.
- 2.5. Environmental awareness indicators.

3. Institutionalisation (related to questions: 6, 7, 8)

How the EAM was generated, developed and set up; this also involved looking at the possibilities and the level of inclusion of environmental practices within the activities of training centres and the various vocational courses for different professional families, since this is the main objective. Opportunities, i.e. the existence of sustainable development strategies and strategies for national and Autonomous Community environmental education, which constitute basic pillars for institutionalisation of the module in the same way as other strategic documents such as the 5th European Environmental Programme and the existence of the United Nations Decade of Education for Sustainability (2005-2014).

Subcategories

- 3.1. Creation and development.
- 3.2. Opportunities.
- 3.3. Difficulties.

We present the results of the interviews in three tables, one for each of the categories (Tables 1, 2 and 3) (see Annexes).

We chose a VET Cookery Course (900 hours' duration) to complement our investigation. We chose the occupation covered in this VET course out of all the occupations because it is one of the most pertinent to environmental factors:

- biodiversity and natural spaces;
- water;
- waste;
- energy;
- air.

Tourism is also a sector that has become one of the pillars of the Spanish economy and catering provides employment for more than one million people. This branch of business employs more workers than in any other occupation; the Hotel and Catering sector numbers more than 250 000 enterprises.

In our case study, we delivered a questionnaire to students on conceptual goals to be achieved. Attitudinal and behavioural goals will form the subject of another study with a different timescale.

Fourteen questions were asked, five relating to general goals and the other nine related to specific goals.

Case study results were recorded by entering the answers in tables that allowed them to be compared before (pre-questionnaire) and after (post questionnaire) the module was delivered. The same questionnaire was delivered to the selected group before the 9-hour training period and after the period without the students knowing that they would have to answer the questionnaire again (see table 3, annex 1).

Analysis of data, discussion and interpretation

As far as professionalisation is concerned, qualifications and experience are desirable in two fields, environmental and socioprofessional, to ensure that opinions and decisions are contextualised within the occupational vocational training field and the field of environmental education for sustainability. Other factors we considered essential were the coordination and involvement of the competent administrations within the three levels that are in any case reflected in the sample selection:

- national;
- regional;
- local.

The design of this strategy forms part of what we could term a 'system of shared management', i.e. we hope that the functions and tasks allocated to the professional category and level of each level of responsibility are different but contribute to the various aspects of EAM application now and in the future. Although the selected sample was qualified, the functions and tasks were not specific to course application monitoring and evaluation.

Environmental training and qualifications are mainly possessed by those managers who are actively engaged in the teaching of courses (including this EAM) and the design of EE materials and most such managers do not have an academic and working background within a socioprofessional field. An almost total absence of environmental experience and training was noted within levels most typical of the managers and decision-makers or their advisers.

Conceptualisation is another of the ideas that grew out of our considerations. Our option is related to a sustainable education where learning is conceived as a process of change and the emphasis is laid on an ability to build up sustainable and active communities and institutions. The results indicate that educators have a very clear vision of the transforming nature of education, although a certain overlap may be noted between the expression of environmental improvement as a work goal and as an action for achieving the GEP code. The attitudinal and procedural objectives to be achieved are specifically stated in both in strategy documents drawn up by the Network of Environmental Authorities and in the teaching materials drawn up at national and Autonomous Community level, which is at odds with the lack of specific mention of attitudinal goals in the EAM programme documents produced by public employment services (see: <http://prometeo.us.es/recursos/guias/formacioncompl/FC-AM02.doc>).

Within typical management environments, the prevailing idea is that this is a process for including the environment within the field of occupational training scenario and each specialism and only one of the managers made more

specific reference to awareness and the inclusion of habits. Ideas relating to changes in values and behaviour abounded when we examined educators who focus on contacts with people within the educational process, including achieving the transformation necessary to progress toward a new sustainability-based social and economic paradigm.

Within both areas (managers and educators) the negligible and sometimes non-existent initial training of teaching staff in environmental matters was expressed as a fundamental concern. This suggests to us that a professional environment for educators should perform this function and also that of delivering specialist courses to the other teaching staff and technical staff. This module could be delivered by the course teaching staff themselves, if they have a university qualification or an equivalent vocational qualification, but it will be difficult to achieve conceptual goals and even more difficult to achieve attitudinal goals due to the lack of environmental skills possessed by teaching staff in general. For this reason it is essential that environmental training should be delivered; we understand that actions to improve the quality of trainers and process may be diverse and complimentary.

The importance of this EAM is clear during the strategic design stage, but no actions are planned as part of the strategy that would make it more valued by the various actors, i.e. that would achieve an understanding and acceptance of its importance and a greater will to play an active part in its inclusion.

Conversely, no mechanism exists for evaluating changes in behaviour and the achievement of GEP during the development of the various vocational courses, or once the module is completed.

Institutionalisation is a topic of no less importance. A Strategic Creation and Development Plan is in place but has not yet been evaluated. During this process, there has been no emphasis on informing and training at manager and educator level or on awareness-raising actions that would lead to an appreciation of this EAM and to the dissemination of knowledge and skills related to environmental matters to help resolve problems within the area covered by each manager.

Supports and control by administrations and coordination between administrations are seen as key aspects by both managers and educators: as we saw when we discussed conceptualisation, this has so far not been done, despite being required in all areas. Both levels consider the evaluation of learning goals by the students, with regard to the achievement of GEP, to be very important throughout the course as well as when the student finds employment. But the various parts of the evaluation process must be carefully differentiated from one another, and the necessary tools properly designed. This indicates a shortcoming – as does the fact that no evaluation proposal is available on the longer-term evaluation of attitudinal and procedural goal achieve-

ment. It is also necessary to carry out an evaluation of design and needs. The study also makes an important contribution in this section.

As far as creation and development are concerned, it is evident that environmental educators with enough experience to ensure that the process attains a level of institutionalisation that fulfils the quality criteria we have referred to in the Environmental Awareness Indicator category, are essential. It will also be essential to set up a database of experts on the module and thus also to create an Environmental Educator job profile.

Evaluation of the EAM and the achievement of goals have been highlighted as difficulties within the EAM process and this applies to the future institutionalisation of the process with a control and quality system. Evaluation, as we have seen, may be divided into four very different sections and a guiding thread must be present to lead us through the process at different times. Both management and education levels see evaluation in terms of the student's learning goals and the achievement of GEP throughout the course as well as after the student finds employment; but the various parts of the evaluation process must be carefully differentiated from one another and the necessary tools must be designed.

Case study general conclusions

The case study, also carried out as a validation method, served to show that teaching of this EAM by the teacher (specialising in environmental matters in this case) was not useful in clarifying the concept of the environment or in elucidating the causes, consequences and solutions of many of the local, regional or global environmental problems that are significant within cookery, such as those relating to water and energy consumption and the generation of toxic or non-biodegradable products.

It should be noted that in the drawing up of the questionnaire that was delivered to the students, and in analysing the data obtained, we took into account the teaching materials published by the Network of environmental authorities and by the Autonomous Community of Andalusia, as well as good practice handbooks published by public employment services on catering.

For example, the reuse of oils was not considered in any of the answers, although half considered the use of containers for collection and delivery to authorised oil managers. None mentioned the reuse or recycling of organic material as fertiliser.

It also was not the case that the EAM had been useful in demonstrating the legislative process (penalties and prevention), the need to invest in technological solutions or the need to earmark funds for such measures. No knowledge was demonstrated of the existence of the concept of an ecological crime

in the criminal code and associated penalties, voluntary rules relating to eco-congestion (ISO 14.000, EMAS system) or individual responses determined by awareness and responsible behaviour.

Another significant finding was that the pupil responses did not consider energy-saving measures; half of the students were not aware of renewable energies or their significance. Little was known about water-saving measures and devices. Although the group started out being totally unaware of the significance of the three Rs (Reduce, Reuse, Recycle), they were at least able to name them afterwards. Reuse or choosing returnable containers as a way of reducing packaging was not known about beforehand or mentioned after the EAM had been taught.

General conclusions. Proposals and recommendations

- 1) The initial hypothesis was confirmed. The educational model that provides the framework for EAM programming is that of education on sustainability. To achieve the goals as they are set, it is nevertheless important to place the emphasis on the sustainability of the learning process and not only on the learning of sustainability. This means that the programme must be reformulated.
- 2) Sustainability of the learning process requires an overall systematic view, complex thought and the application of constructivist principles.
- 3) The EAM represents an opportunity that was borne out by its practical implementation in all VET courses.
- 4) It will be necessary to establish the inclusion of a GEP (good environmental practice) code in course activities and also in training centres and the sponsoring administration.
- 5) Establishing sustainability as a common goal in the development of different jobs requires conceptual principles with which all the actors involved can agree.
- 6) Two fields of experience must enter into dialogue during this exercise. Expert environmental educators must have experience and/or training in the socioprofessional field and in the reality of VET. Experts in socioprofessional management fields must have experience in the field of environmental education.
- 7) Environmental educators are sufficiently trained to deliver this EAM with a guarantee of success, but it is necessary to reach out to and take into account the entire community of teachers within different specialities; it is they who are responsible for governing the GEP code application process.

- 8) All this suggests that training and awareness actions are required:
 - For trainers within the various specialities and for environmental educators.
 - For managers within sponsoring bodies and training centres.
- 9) The setting up of a permanent technical department answerable to the competent administration or any relevant body could represent a significant step forward.
- 10) The consolidation/institutionalisation of this programme in the next stage, 2007-2013 requires the inclusion of quality criteria and application of an overall evaluation model ⁽³⁾ that follows the same focus proposed in the programme, applying a systematic and constructivist approach.
- 11) The creation of a register of 'environmental trainers' accredited by the environmental authority.
- 12) This EAM may constitute a tool for promoting the inclusion of the environment in public policies.
- 13) The case study that we carried out during our research demonstrates and supports most of the conclusions reached. Delivery of the EAM did not serve to clarify the concept of the environment or to clarify, under any circumstances, some aspects such as overpopulation and energy wastage or soil pollution. It was barely effective in increasing the perception of the existence of problems such as waste, noise or water pollution or the greenhouse effect or global warming. The same applied to acid rain.

Final conclusion

VET is a reflection of employment needs arising within the various manufacturing sectors. We undoubtedly need to adapt economic and productive activities to environmental law and standards. In this context, introduction of the EAM may be considered a paramount achievement that requires consolidation by applying evaluable quality criteria.

The Ministry of Employment and Social Affairs is currently carrying out a study on the level of introduction of the EAM by the various Autonomous Communities. The year 2006 was the target year for general inclusion of the module. Aspects to be described and evaluated in this comparative study relate to:

- Sponsors: body responsible for inclusion in the Autonomous Community;
- Some statistical data: type of courses in which the module was included;
- Application: was the module applied exactly as specified or was it altered

⁽³⁾ See annex 2: Quality criteria. Proposals for an environmental awareness indicator system

in some way (structure, content, form of delivery, etc);

- Teaching materials: type of materials used, some are included;
- Evaluation: what, who, how and when;
- Environmental inclusion: when included with other course activities, whether the application of these environmental knowledge and attitudes are useful and viable for the student's professional development;
- Trainers: what is the profile of the trainer;
- Training trainers: were the trainers given any training courses;
- Complementary support services: was there any type of technical support, advice, etc;
- Training centre: way in which the training centre was involved and level of application of some good environmental practice.

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ANNEX 1

Figure 1

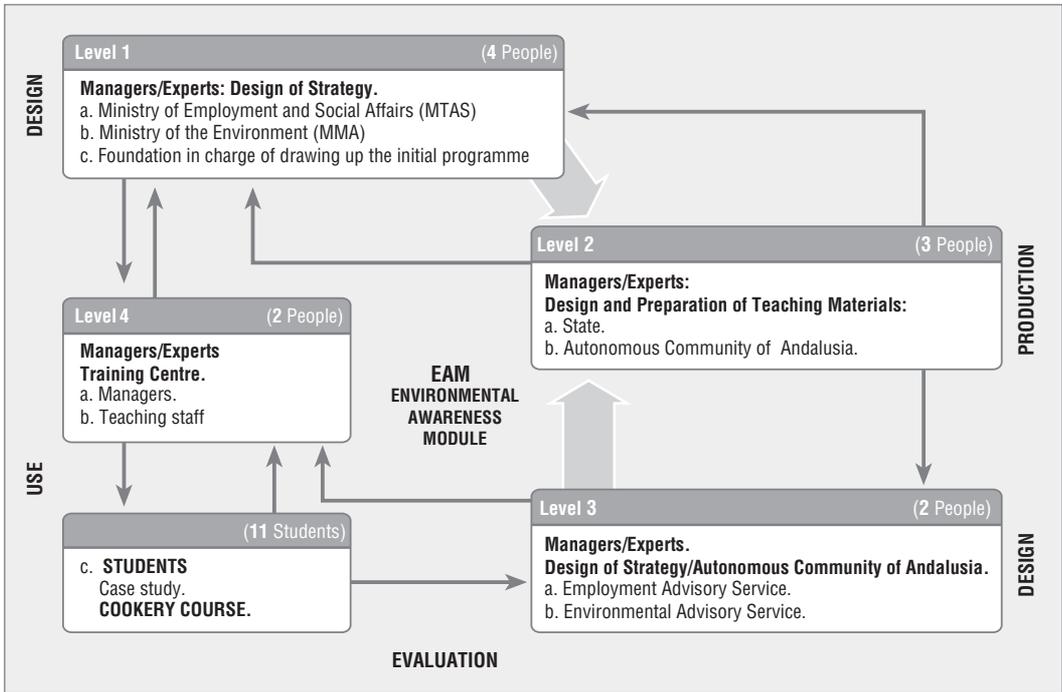


Table 1: Interview

1. What functions do you perform at present in your workplace?
2. What is your relationship with the Environmental Awareness Module of VET courses?
3. What is your specific professional background and experience in relation to training? And in relation to environmental education?
4. In your opinion, what are the potentials and pitfalls with regard to delivery of the module?
5. What changes have been made and what changes are necessary ?
6. National and regional strategies exist in both environmental education and sustainable development. Do you believe they are related to or should be related to the above module?
7. What type of relationship exists/should exist between VET managers and Autonomous Community managers of environmental education?
8. What is or what should be the impact of the goal of including sustainable behaviour in the professional activities to be carried out during your course and/or during the future employment of the students? How can this be evaluated?
9. What impact does the evaluation of this module have on the overall evaluation of the course to which it refers? What impact should it have?
10. What are the main obstacles to be avoided in the future in delivery of the module with regard to the profile of the teaching staff, use of teaching materials, student evaluation criteria, achievement of good environmental practices during the course and in the students' future employment...?
11. Is there anything you would like to add to this questionnaire?

Table 2

PROFESSIONALISATION	Current function	Previous experience	Qualification and training	Relationship with the EAM	
CONCEPTUALISATION	Concepts and knowledge	Actions and goals	Problems	Evolution	Environmental Awareness Indicators
INSTITUTIONALISATION	Creation and Development	Opportunities	Difficulties		

Table 3: **Questionnaire**

<p>P.1 WITH REGARD TO GENERAL OBJECTIVES</p> <ol style="list-style-type: none"> 1. What does the environment mean to you? 2. What environmental problems of a general (global) nature are most important to you? 3. What problems of a regional/local nature are most important to you? 4. In your opinion, is there any solution to these problems? If so, how can they be resolved? What measures are necessary? 5. What relationship do you think cookery has with the environment and with environmental problems? <p>P.2 WITH REGARD TO SPECIFIC OBJECTIVES</p> <ol style="list-style-type: none"> 1. Give two examples that show how the origin and provenance of products used in cooking affect the environment. 2. What do you understand by the three Rs? 3. Name two sources of renewable energy. 4. What do you think can be done with used oil? 5. List 5 products that can be recycled and are commonly used in the kitchen. 6. How can we reduce waste produced by packing in the kitchen? 7. State correct environmental guidelines for the efficient use of water. 8. State correct environmental guidelines for the efficient use of energy. 9. Are there any kitchen cleaning products that are harmful to health and to the environment? Which ones?
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Table 4

	Current function	Previous experience	Qualification and training	Relationship with the EAM	
Level 1	E.1.	Centre Training Area Manager.	Since 1999. Attended and delivered EE Courses 23 years of practical experience in EE .	Graduate in Education and Sociology	Keep up to date with events occurring with regard to the module.
	E.2.	Coordinator-manager of the MMA-OAPPNN-CENEAM Environmental Training programme for 6 years.	Taught more than 10 courses of more than 100 hours in Teaching Methodology (since 1993).	Graduate in Biological Sciences. Environmental technician. Specific and varied training to Masters level.	Took part in the working group for creating the original design of the module and its method of implementation. Taught this module on a couple of occasions.
	E.3.	Financial management in the Technical Office of a Secretary General in the Ministry of the Environment.	Experimental 360 hour course in Occupational Training in 1998. Planning of Environmental Training in CENEAM. Speaker, coordinator, seminars, meetings ...in EE.	INEM Occupational Training Instructor since 1991. Higher Medical Technician for Environment Ministry Autonomous Bodies for the specialism of EE	Took part in office in charge of drawing up and correcting the module from its origins to publication.
	E.4.	Responsible to the ESF resource coordination management authority in Objective 1 regions.	No specific experience.	INEM Training Scale.	I suggested that Module should be taught during all the Training co-financed by the ESF and after much effort I succeeded.
Level 2	E.5.	Heritage interpretation. Design in Planning. Creation of Exhibitions. Head of the Social Dynamisation Area of the Foundation since 2000.	In EE since 1985. Private Enterprise related to Doñana. Monitor, guide. VET course tutor. Civil Service Technician and responsible for EE programmes in Doñana for 13 years.	Graduate in Biological Sciences.	I was given the job of producing teaching material at national level.
	E.6.	I coordinate environmental education programmes and Local Agenda 21 Dynamisation programmes	Publication of guides, games, articles, audiovisual scripts, presentations, VET tutor, coordinator of the Environmental Management and Sustainable Development Masters degree.	Qualified teacher Graduate in Humanities.	Author and coordinator of the EAM support material and answerable to the Employment Department. Coordinator and organiser of the EAM Presentation Seminar in November 2004, Seville.
	E.7.	Design, organisation and development of EE programmes.	25 years of experience in EE	Graduate in Biological Sciences.	Coordination, design, teaching, editing and follow-up of the publication of teaching materials in Andalusia.

	Current function	Previous experience	Qualification and training	Relationship with the EAM	
Level 3	E.8.	Manager of the Environmental Education Department of the Directorate General of EE of the Environmental Department of the Council of Andalusia. Coordination of the magazine Aula Verde and Educam DVD.	No experience in training. Head of the Environmental Department EE Service for 4 years and Head of the Department of Environmental Education for a further 5 years, editing the Aula Verde EE magazine from issue 23 to 28 inclusive.	Graduate in Physical Sciences. Graduate in Geography and History.	In 2005 took on new responsibilities for training actions based on the European Social fund (lifelong learning). Training actions for the EAM of VET courses to prepare the trainers delivering the courses. (December 2005 in Cadiz, Seville and Granada).
	E.9.	Head of Training of Trainers Department in the Directorate General of Training for Employment of the Andalusia in Employment Services (for 4 years).	5 years of practical experience in VET INEM, delegation of Seville, Forem, and other collaborating VET centres. Courses for civil servants in IAAP [Andalusian Public Administration Institute]. Training Technician (approximately 9 years)	Graduate in Education Expert Course in the Organisation, development and evaluation of VET. University of Seville	Coordination of the project to prepare teaching material for the EAM delivered during VET Courses within the Autonomous Community of Andalusia. First experience in the environmental field.
Level 4	E.10.	Coordination Assistant for the teaching body. Planning of budget Audit Courses.	No professional experience in training or EE. I am taking a Higher Technician course in Occupational Risk Prevention and am now becoming aware of environmental matters.	Social Graduate.	I decide who delivers the Module and on what dates.
	E.11.	Teaching the Environmental Awareness Module.	Botanical Garden Guide. Preparing EE teaching material	Graduate in Biological Sciences. Special training in the Environment I take part in various associations.	I monitor the modules.

Table 5

	Concepts and knowledge	Actions and goals	Problems	Evolution	Environmental Awareness Indicators	
Level 1	E.1.	Horizontality.	Relate all VT to the Environment.	Training and Initial Awareness of teaching staff.	Training. Departments, Consistency Plan in Centres. Technical Department.	Environmental Awareness Indicators Horizontality.
	E.2.	Include the environmental and awareness topic in occupational courses.	Students learn about and reflect on their jobs and their effect on the environment (resources, processes, waste and space, create a code of good environmental practices. Effective training and positive repercussions on the environmental quality of our surroundings.	Implementation has not been followed up. Number of hours in the EAM not respected. The permanent specialist tutor did not take part in the process. No introduction-training plan for organisation managers or specialist lecturers.	Each Autonomous Community implemented the module at his own convenience and without coordination. Need to coordinate the way the project is started up. Actions to raise awareness of the importance of the EAM. The EAM manager should be a specialist guided, trained and made aware by environmental educators. Relationship with EE and SD strategies	Relationship with EE strategy. GEP for Professional Families. Relationship with EE strategy. Must not be an easy option. Relationship with specialist lecturer. Preparation of code of good practice. Involvement of Autonomous Community, e.g. managers Carry out the survey on students at a later stage.
	E.3.	The EAM must be adapted to any occupational situation	Practical and useful. Little effect in changing behaviour.	Lack of specific links to each occupation.	Search for horizontality at the beginning, middle and end of the course.	Horizontality throughout the course. There should be a relationship between VET and EE managers More practical than theoretical.

	Concepts and knowledge	Actions and goals	Problems	Evolution	Environmental Awareness Indicators	
Level 2	E.4.	Basic awareness within the reach of all workers.	Any action financed with Structural Funds respectful of the environment	No interference in Autonomous Community affairs	A set of changes proposed in April 2005. Experts from 6 Autonomous Communities Updating of the collective laws.	Any action co-financed by the Structural Funds is bound to be respectful of the environment and promote sustainable development. Affects the behaviour and professional activities of students
	E.5.	Integral professional education	Reaches all sectors of society Code of Good Practice that is useful to the course and for the students' professional activities.	Horizontality throughout the course and all modules.	The EAM must be made longer	Horizontality is necessary. The EAM should be related with EE and SD strategies. The EE and VET managers should be in contact with one another
	E.6.	Sustainability as a new social economic paradigm. New social sensitivity Education in values and for action	Should lead to a change in attitudes and behaviour	Little training of trainers in environmental subjects. Difficulty in evaluating changes in behaviour and GEP	New challenges for VET Occupational and professional expectations of environmental topics.	All-embracing nature of all human action Relationship with EE and SD strategies and between labour and environmental administrations. Established GEP
	E.7.	It is not possible to evaluate someone's environmental awareness after 9 hours.	Increase the receptiveness of workers to the application of good practice in their field.	Lack of environmental training of trainers. Impossible to evaluate the improvement in someone's environmental awareness after nine hours of EE.	Is effective in that future workers will be more receptive to the application of good practice. Could be evaluated with many resources and a good design produced by specialists.	Co-operation between EE and VET managers Evaluate using many resources and a good design.

		Concepts and knowledge	Actions and goals	Problems	Evolution	Environmental Awareness Indicators
Level 3	E.8.	Specific environmental training that may be added to each of the Training specialisms delivered.	Conservation of natural resources and the Environment in general through the job.	Little preparation of monitors or trainers in environmental awareness.	Prepare VET Course Trainers. Students should have had to pass a minimum Good Practice test in order to practise their professional activities.	EE and SD strategies are included at the end of the module.
	E.9.	Make people aware of the need to protect the environment, includes environmental habits and behaviour in occupational practice, habits and behaviour that may easily be extrapolated to daily life.	Acquisition or changes in attitudes that promote environmental protection in the work environment in order to contribute to the planet's sustainable development.	The trainer must be aware of environmental protection and have totally taken on board the habits this involves.	The obligation to include the EAM in VET courses (previously voluntary) and its funding from the Directorate General of Training for Employment. Must avoid teaching this module as a set of contents.	Include in the contents of the training specialism (horizontality). On the proposal of the Network of Environmental Authorities, set out in the White Paper on EE in Spain and in the Andalusian Environmental Education Strategy. (section 6.5). Coordination between administrations. Not just contents, the aim is to make aware, to develop attitudes, to raise consciousness.
Level 4	E.10.	It gives students an idea.	Preventive culture	9 hours do not count for much Reluctance of students who do not see the relationship with their chosen specialism. I am not aware of the existence of these strategies	Extended content and the duration.	If the strategies exist, they should be taken into account
	E.11.	Education for a change in behaviour	Able to reach a certain proportion of the population. Consciousness-raising, principles of conduct respectful of the environment, assisting in the future development of their jobs and their daily habits.	No interaction with the permanent teaching staff Becomes an isolated activity	The teaching staff should acquire some knowledge of the subject	Must relate to the Andalusian environmental education strategy. Relationship between EE and VET managers Coordination between those involved.

Table 6

		Creation and Development	Opportunities	Difficulties
Level 1	E.1.	We prepared an Action Plan up to 2006 in coordination with the Regional Employment Service and the Workers Commission Trade Union Confederation and the General Workers Union.	Environmental Training and Communication measures We drew up 20 codes of Good Practice for the various professions. Training Courses for teaching staff.	Evaluation of the EAM and achievements of goals.
	E.2.	Developing professional work audits of students. One year or one and a half year surveys of the training process of a significant sample	Include the subject of the environment in all VET courses.	Affects overall course evaluation little or hardly at all.
	E.3.	The EAM should be 30 % of the course.	Increase environmental culture in the training field.	There is no relationship between VET and EE managers
	E.4.	If done by an environmental expert this would probably be technically better and encourage recruitment. If delivered by the course tutor, it will be automatically applied. Satisfaction with the achievement. The evaluation should have more effect.	The 2007-2013 programming is being designed. We are pioneers in the application of this module in Europe.	INEM is not part of the Network of Environmental Authorities even though they were invited.
Level 2	E.5.	Must have an effect in minimising the impact: energy saving, water-saving, appropriate waste management.	A lot of effort has been put into achieving this. Training of teaching staff in the subject of evaluation and above all how to draw up a Code of Good Practice.	Short duration. The evaluation should affect the course evaluation. The importance of the Module has not been appreciated.
	E.6.	Reluctance to include EE in VET. EE and VET speak a different language. Continuous advice on environmental subjects. The EAM should pervade all course contents.	Incredible opportunity to develop strategies.	To access support material on the Internet. Little training for trainers. Biological bias to environmental training. Occupational and environmental requests are ignored.

		Creation and Development	Opportunities	Difficulties
Level 2	E.7.	The decision to include this EAM is the recommendation that comes from the Environmental White Paper and the Andalusian environmental education strategy.	Teaching of EE itself, VT. Analyse and upgrade training in new qualifications relating with EE and the labour market.	Lack of specific courses for teaching of the module.
	Level 3	E.8.	A survey could be carried out on students after the event, asking them about good environmental practice. Bridges that should have been erected (between ourselves and the Employment Department) were not put in place	Creation of pro-environmental attitudes in future professionals.
E.9.		Training of teaching staff in environmental matters.	For the application of evaluation strategies: Experimental or quasi-experimental designs, observation scales, interviews with trainers. Compare the volume of investment in training with the volume of saving for sustainable practices in enterprises.	Difficulty in achieving coordination due to the complexity of administrative structures Lack of a culture of environmental responsibility in the world of work. Difficulty in evaluating the impact of this training (deferred evaluation).
Level 4	E.10.	I don't know anything about the origin of the EAM. There is a Council order. The evaluation currently lacks validity in the overall course evaluation. The course tutor must apply the Good Practice.	The awareness of preventive culture it instils in future workers within enterprises. Environmental specialisation of EAM tutors.	The permanent course tutor and the students feel they have been deprived of 9 hours. The permanent tutor is neither aware of nor continues the environmental task. I still think recycled things are more expensive (e.g. paper).
	E.11.	Taught by specialist staff Support and control by the administration Subsequent follow-up of behaviour acquired by the students.	The delivery of this EAM is a great accomplishment in both lifelong learning and occupational training. Enterprises should assume environmental responsibilities.	May be considered an easy option. VET and EE managers should maintain a smooth, consistent and two-way relationship. The EAM evaluation does not affect the overall course evaluation. It is not given the importance it deserves. Lack of communication between those involved.

ANNEX 2

QUALITY CRITERIA PROPOSAL FOR A SYSTEM OF ENVIRONMENTAL AWARENESS INDICATORS

Design indicators

1. Relationship between this training strategy and others such as regional environmental education or sustainable development strategies.
2. Involvement of Autonomous Community managers from Employment or Environment Departments
3. Use of teaching material quality indicators designed for the EAM.
4. Criteria used to promote participation.
5. Has an EAM communication campaign being conducted?

Process indicators in the Training Centre

6. Introductory training for training centre managers and teaching staff in all specialities.
7. Preparation and application of a code of GEP in the training centre. Establishment of pathways for participation in centre management.
8. Profile of teaching staff delivering the course. Experience and training in socioprofessional and EE fields.
9. Availability of material resources that are appropriate for environmental criteria.
10. Upgrading of training centre equipment to environmental criteria.

Course process indicators

11. Integral worker training. Behaviour and attitudes that are respectful of the surrounding environment, inside and outside the workplace.
12. Application of the following principles:
 - a. Constructivism.
 - b. Systematic focus.
 - c. Horizontality.
 - d. Interdisciplinarity.
13. Improvement of understanding, analysis and awareness of environmental matters (local and regional situation). Gather suggestions from students.
14. Use of Environmental Awareness Techniques
Motivation Techniques: Constructivist principles (contact with reality, experiences of students, use of games, diversity of resources, relaxed environment).
Consciousness-raising Techniques: Sensory education and approach (use the senses). Become aware. Emotional life and emotional development.

Role playing and simulation techniques: Effective-emotional and conceptual development. Development of skills aimed at a positive attitude to environmental matters. Thematic approach (natural and social environment) to reality in a global manner, interconnection.

15. Preparation of a GEP Code.
16. Setting of course programming. The trainer, who is truly knowledgeable about the special subject he or she teaches and is the leader of the learning process, must act as a mediator of environmental content.

Results indicators

17. Ethical positioning for acting and taking part in problem solving.
18. Pro-environmental attitudes by students with regards to:
 - Use of resources (care of material, facilities, etc.).
 - Waste created during the course
 - The group as a whole (respect, participation, solidarity, etc.).
 - Environmental activities proposed by the monitor.
 - All directed at a code of values during the course for trainers and participants.
19. Application of a GEP Code to the specialism in question.
20. Evaluate and determine the level of application of GEP in the future professional duties of students. Determine the acquisition of pro-environmental behaviour.
21. Use of evaluation and results to improve efficacy and efficiency in future activities.