RESEARCH AND INNOVATION IN EDUCATION FOR SUSTAINABLE DEVELOPMENT

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ASSESSMENT OF A FORMATIVE MODEL THAT PROMOTES THE DEVELOPMENT OF PROFESSIONAL SKILLS IN SUSTAINABILITY EDUCATION.

Salvador Viciana Caballero  
Universitat Autònoma de Barcelona (UAB), salvador.viciana@e-campus.uab.cat

Dr. Josep Bonil Gargallo  
Universitat Autònoma de Barcelona (UAB), Josep.bonil@uab.es

Dra. Marta Fonolleda Riberaygua  
Universidad Federal de Sao Carlos (UFSCar), Marta.fonolleda@e-campus.uab.cat

ABSTRACT

This chapter describes an action-research project currently being developed in a non-formal education centre. The aim of the project is to promote a change process within an institution based on a formative model proposed by the Complex Research Group (CRG) of the Autonomous University of Barcelona (UAB). This research is in a developmental stage and dedicated to the establishment of a research base and action plan. The research examines i) whether the formative model brings significant changes in didactic approaches; ii) the distance between the theory of a formative model and its application in the classroom; and iii) the strengths and weaknesses in the implementation of the formative model in this type of educational context.

KEYWORDS

action-research, education for sustainable development, formative model, nonformal education

PROBLEM STATEMENT

There is worldwide agreement that overcoming the challenges faced by humanity depends largely on the action of citizens in all aspects of life. This means changes will have to take place in ways of thinking, living and acting. Changes that are produced in a socio-cultural context reveal a more and more evident global crisis emerging from the dialogue between different interrelated crisis of values and action, the crisis of the status of knowledge, and the socio-environmental crisis (Mayor Zaragoza, 2009).

In such a situation a rewriting of political models, of thought and education, of society and life in general is proposed through creative processes and transformations that permit the discovery of new opportunities. In a society of knowledge, human
development must move towards creativity (Innerarity, 2010). In order to face the challenges of the 21st century society professionals in different sectors of society and economy are being asked to add sustainability criteria to their professional activities and develop a competitive perspective. As a result educators whether in formal or non-formal institutions of Education, should play a fundamental role as formative agents of citizenship.

The way education happens within societies and communities is hugely varied due to the fact that it is not just the responsibility of just a few agents and institutions. The terms “formal” and “non-formal” are often used to distinguish different approaches but are not really appropriate to describe all the characteristics of education, such as exactly what happens during learning and how it happens (Hein, 1998 in Guisasola and Morentin, 2007). It is more appropriate to talk about a continuum, from perhaps highly structured scholarly activities at one end, through to open access and individual learning at the other. Other activities, e.g. related to leisure based learning or out of classroom learning could be found somewhere in the middle. This chapter is concerned with the latter approach to learning through the example of the Catalonia “Esplai Espurnes” group.

It is important to look for new methodologies that support the development of new approaches to teaching. The challenge is to define new formative models that favour the development of skills in education professionals that enable them to provide answers in different contexts.

This project has the title, “A formative model for the development of professional competences of teachers in education for sustainability: characteristics, application and evaluation”. It has been developed by the Complex Research Group (CRG) within the Department of Didactics, Mathematics and Experimental Science of the Autonomous University of Barcelona. Its purpose is to define a framework of education for sustainability professional competences for educators in formal as well as the non-formal Education institutions. It aims to develop a formative model to advance curriculum greening (Bonil et al., 2012) through supporting the design of activities to develop necessary and appropriate competences.

FOCUS, AIM AND OBJECTIVES OF THE RESEARCH
The research took place in a specific non-formal education institution: the “Esplai Espurnes” group. This is a non-profit youth association from Esplugues de Llobregat (Barcelona) that has worked as a leisure time educational institution for children
and young people for more than 35 years. We consider that the formative model
developed by the CRG offers an opportunity to achieve innovative formative pro-
cesses, which encourage the development of professional skills in education for
sustainability. At the same time, the model aims to support a change process in
the “Esplai Espurnes” Group. The research plan therefore has two interconnected
parallel processes, as shown in table 1.

<table>
<thead>
<tr>
<th>Change process in “Esplai Espurnes” Group</th>
<th>Investigation process</th>
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<tbody>
<tr>
<td><strong>Period</strong></td>
<td><strong>Investigation period</strong></td>
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<tr>
<td><strong>Description</strong></td>
<td><strong>Description</strong></td>
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<tr>
<td>Apply the CRG’s formative model to address the need of teachers and students and especially to address the lack of reflection in the design and implementation of educational projects.</td>
<td>Document the change process and identify the aspects that may limit and/or contribute to the application of the formative model in this non-formal Educational context.</td>
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*Table 1: The research is developed in two parallel processes*

The research had the following objectives:
1. To determine the relevance and transferability of the formative model proposed by the CRG in the design and development of formative activities aimed at non-formal Education Institutions.
2. To analyse what the formative model brings to the professional development of teachers as well as in the functioning of the institution to which they belong.

**THEORETICAL BACKGROUND**

*Curriculum greening* is a reflective and action based process aimed at integrating environmental education into curriculum development. This process also has a socio-cultural dimension in the search for coherent alternatives with sustainable values. Curriculum greening implies gaining the competences of complex and global thought in connection with the environment and, at the same time, encouraging responsibility, commitment and action by the education community towards the development of their environmental identity (Geli, Junyent, Medir & Padilla, 2006).

A process of curriculum greening, like any educational process, has to be grounded in a formative model that is also based on an environmental education model. In the case of this research a conception of environmental education conception that includes complexity principles was adopted (Bonil et al., 2010, Bonil et al., 2012).
A complexity paradigm is a rigorous, open and dynamic platform that can help individuals and institutions face the global crises in a creative and transformative way (Bonil et al., 2010). It proposes a change in the way the world is understood and as a result, of the processes needed to understand it (Garcia, 2004). The complexity paradigm is an alternative to the so-called simplifier paradigm (Mueran, 1982).

THE FORMATIVE MODEL PROPOSED BY THE CRG

Formative models are theoretical elaborations that education professionals put into practice in a specific context. They are interpretations and adaptations of theories that are mediated through the worldview of individuals and their beliefs about education and on the role the environmental education should have in educational institutions (Bonil et al., 2012).

The formative model proposed by the CRG aims at shortening the distance between the ideological approach of Environmental Education and its practical outcome in the classroom. It achieves this partly through ensuring that the activities are relevant to the specific situation (the ‘moment’), to the individuals themselves, and that it has a relevance to and impact on the community.

![Figure 1: CRG formative model](image)

The proposed model is based on an intersection of space, time and socio-cultural context where the formative activity is developed (figure 1). This point constitutes a system where the epistemic values of complexity enable the appearance of ideas relevant to the construction of an individual’s worldview. These so called high-level ideas are the foundation of formative action. Ideas such as the ‘unimaginable’ or
‘intangibility’ to use two examples, provide opportunities that allow students to articulate worldviews that help them move towards more sustainable and creative societies.

The construction of the meaning of a high level idea and its connection to practice is shown in table 2. The process takes place through four spheres: conceptual, creative, didactic and research. Each sphere contributes to the meaning of the high level idea and to the design of the educational journey that orientates the educational action. To communicate the high level idea a story is used.

<table>
<thead>
<tr>
<th>Description</th>
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<tbody>
<tr>
<td><strong>High level idea (HLI)</strong></td>
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<tr>
<td>The vector that orientates the process of the worldview construction – for example – unimaginability</td>
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<tr>
<td><strong>Conceptual sphere</strong></td>
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<td>This sphere involves the reformulation of the HLI into a more specific component. The conceptual sphere should make a powerful statement that can be referenced throughout the educational activity. It should promote reflection on students’ worldviews.</td>
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<tr>
<td><strong>Didactic sphere</strong></td>
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<td>This sphere involves thought about the methodological decisions such as working rhythms, group dynamics and individual tasks of the educational activity.</td>
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<tr>
<td><strong>Creative sphere</strong></td>
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<tr>
<td>This is an emotional dimension and encourages a consideration of the beauty of the connection among people in the world. It has a strong metaphorical component. Decisions taken in this sphere orientate the design of the workspace.</td>
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<tr>
<td><strong>Research sphere</strong></td>
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<tr>
<td>This sphere should promote the educational activity as an opportunity to review different points of view and to give time for reflection and systematic analysis.</td>
</tr>
<tr>
<td><strong>Story</strong></td>
</tr>
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<td>The story is a chapter related to historical events that convey the meaning of the high level idea by giving emphasis to people and their cultural context.</td>
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*Table 2. The construction of the meaning of a high level idea*

The design of this formative process is dynamic and constantly reviewed. The meaning of the spheres are related to each other and at the same time, together, all the spheres build a global meaning (Bonil et al., 2012). This model is useful for designing educational activities and also supports training for a sustainable and post cosmopolitan citizenship (Dobson and Bell, 2006). The content becomes a cultural asset that will facilitate participation in the decision-making at any level and in any context within their community.
METHODOLOGICAL APPROACH

The process of action-research was developed from the model proposed by Kemmis and McTaggart (1988) where it is described as a sequence of steps represented as a cycle or spiral. In this research, the first cycle was the establishment of the research base (figure 1) which is seen as the starting point to build the CRG formative model. It is important to point out that the process is not actually as precise as suggested in figure 2, as a result of the different overlapping steps of each cycle. The data collection methods includes audio recordings, field diaries and interviews with the stakeholders. Action research is characterised as being both participative and collaborative. It focuses on the educational practice and on the emancipation of the team of teachers. It makes a special effort to change ways of working (consisting of speech, organisation and power relations) and it is understood as a formation tool. It aims at the transformation of organisation.

This investigation aims to maximise the collective dimension as opposed to an individual one and was planned and executed by the stakeholders themselves. For this reason, teachers of the “Esplai Espurnes” group and researchers of the CRG make up the stakeholders in this double process. On the part of the “Esplai Espurnes” group the process was started with the participation of the group manager and the person responsible of group projects. From the CRG’s side, the researcher acts as a facilitator. The collaboration between the facilitator and the participants allows for the negotiation and investigation of questions and issues of mutual interest.

The work of the stakeholders in the research took account of the power relations and the mutual exploitation of the specialized knowledge different groups in the Centre and GRC hold. The flow of information between them is of prime importance and a basic tool. It is therefore meant to start the development of a communication methodology and shared action while trying to establish the research group as an agent and as a research framework.

SPIRAL I DESCRIPTION: ESTABLISHMENT OF THE BASES OF THE RESEARCH

The research process is still being developed and as a result only the first spiral has been completed. The activities in this cycle and the results are described in figure 2, together with ideas for the continuation of the next spiral of research. In the first cycle, actions related to the change process and the investigation process were progressed in parallel since the two processes are interconnected. Actions related to the steps proposed by Kemmis and McTaggart (1988) were taken.
Planning:
The team of teachers at the Centre shared and debated ideas from the CRG. As a result the “Espai Espurnes” team understood that changes needed to be made but were unsure about the process. The CRG suggested that the formative model represented an opportunity to implement change, though it was recognised that the models needs to fit a non-formal education context. Three questions were posed as a starting point before setting a plan of action:

a) What are the problems?
b) How do they affect the way the institution functions?
c) What can be done to change the situation?

The answers given initiated a debate. Diagnosing the starting situation in particular is considered a priority in any improvement process.
Acting:
The plan of action agreed involved a review of the institution’s organisational documents including the ideology of the centre, the objectives of the current course programme (2013-2014) and the organisation of the different fields of action in which the institution participates. Following these reviews, two meetings took place that examined the gap between what the policies and programmes stated and the reality of educational activities taking place.

Observing:
Through an analysis of the discussions possible reasons for the institution’s current situation were identified that assisted in contextualising the change process. The observation stage pointed out that:

- The institution undertakes activities in many fields.
- The training of teachers at the centre is based on an out of date formative model.
- Taking into account the difficulty of coordinating schedules, the availability and responsibility of the teachers, it is not always possible to ensure a high quality of learning.
- The high turnover of teachers through the Centre creates instability and little solidarity in the team of teachers. An effect of this is that there is the need for a significant ongoing investment of time and resources in training new teachers.
- The increase of activity over the last few years has generated growth that is probably difficult to sustain. Every year new projects are initiated while previous ones are maintained.

Reflecting:
Once the possible causes of the problems were identified, a diagnosis was made and based on this a review made of the different areas of the Centre’s work. The aim was to detect where it might be possible to introduce the formative model and initiate the change process. One of the key tasks in this process was to identity the most appropriate teachers to take part in the project. Once this was done an open research group was created with a permanent core of members together with the opportunity to include other teachers and different stakeholders such as experts and trainers that could contribute to the project on an ad hoc basis.

It was considered that such an open group would contribute towards the sustainability of the project outcomes through providing continuity during the proposed change process. The work of the open group is related to High Level Idea (Bonil et
al., 2012) used to orientate the design and the development of the project through articulating the intended change process. This High Level Idea is one of the elements that will be reviewed in the following cycles of the process of investigation-action.

RESULTS OF THE FIRST PHASE
The results of the first spiral of the investigation led to a number of outcomes regarding the change process, the research process and the process of investigation and action.

Outcomes regarding the change process:
- Bearing in mind the out of dated model of teacher training at the Centre it is necessary to rethink the way in which new teachers are trained and the way that former teachers might be reintegrated back into the team should this take place.
- It is necessary to rethink the number of projects and activities that the Centre is engaged in so that they can be undertaken sustainably regarding the availability of human resources.
- Activities should start and end with the action. There should also be time for reflection about the design and the execution of activities. This reflection time does not currently take place.
- A common project should be designed that that involves the whole Centre and in which every member can make a meaningful contribution.

Outcomes regarding the research process:
- The formative model proposed by the CRG can orientate a change process but it needs adapting to a non-formal Education context.
- Using a High-Level Idea can support and accelerate this change as long as the teachers at the Centre are able to make it concrete, build on it and share it.
- Taking time to reflect on the professional skills of the teachers at the Centre is needed to develop innovative educative processes.

Outcomes related to the process of investigation and action:
- Careful consideration needs to be given to the people and institutions that participate in the research, the members of the permanent core of the open research team and the team will work with the Centre teachers.
- The focus of the investigation regarding the projects of the “Esplai Espurnes” Group.
- The continuity of the project - which cycles will be carried out next.
DISCUSSION AND RECOMMENDATIONS

The experience of the first cycle of the investigation-action allows decisions to be made about the continuity of the project. Bearing in mind the outcomes of the review, the continuity of the project can also be considered from a more global perspective that reflects on the performance of a project and in which all the teachers and stakeholders in the Centre feel represented.

In the future, the intention is to establish five phases of activity each following the spiral of investigation and action:

- **Phase 1 – Theoretical reflection:** This will involve discussions based on a selection of readings related to curriculum greening and the formation of educational teams in the context of a non-formal Education.

- **Phase 2 – Formative actions:** Following the theoretical reflection several formative actions will take place. These will include seminars developed by the CRG’s experts and workshops in institutions where CRG’s formative model has already been incorporated. These will be conducted by both the research team and the Centre teachers.

- **Phase 3 – Designing an educational project:** Based on the CRG’s formative model and the reflections made in Phase 1, an educational project that fits with the Centres activities and based on a High-Level Idea is planned.

- **Phase 4 – Project Implementation:** The project is implemented over a period of seven months. Each part of the project activity includes the performance of the activity, a period of time after the activity to collect impressions based on the field notes and teacher interviews.

- **Phase 5 – Project Assessment:** Three feedback, review and assessment sessions are planned with the teachers where the project activity and follow-up are considered. A final assessment will also take place.

REFERENCES


