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Production and adaptation of materials for teachers and students: understanding socio-cultural diversity in marginalised and disadvantaged contexts.

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Abstract

This paper will investigate how the development and adaptation of educational materials by teachers and students can promote an understanding of socio-cultural diversity in marginalised and underdeveloped communities. Textbooks cannot always address the diversity of teaching/learning situations in a classroom, nor can they always provide material suited to different educational contexts.

The paper will outline recent research on the representation of diversity in materials, including projects and initiatives dealing with the production of materials in marginalised communities.

We will begin by presenting a brief review of studies on the lack of cultural and linguistic diversity in textbooks and teaching materials. This will be followed by discussion of the advantages of teacher-developed didactic materials in supporting socio-cultural diversity in marginalised communities and contexts. Finally, we will suggest ways to encourage the production of these materials, together with case studies.

Teachers encounter many difficulties in producing materials: lack of time for production and trial; lack of teacher training in this area; limited institutional recognition of the process and lack of space to exhibit materials. This paper will look

at the role of universities and other institutions in materials development; offer guidelines for the development and evaluation of these resources; and consider whether teacher-developed materials constitute an alternative or complement to textbooks.

Keywords: Textbooks, Socio-cultural diversity, Didactic materials, Marginalised contexts, Adaption of materials, Professional development

Introduction

From a review of the literature and participation in research projects on didactic material development, we would not suggest that teacher-developed materials are as yet an alternative to textbooks, but they are worthy of consideration by educational authorities, particularly when it comes to decisions regarding resources. Teachers who have the skills and interest to develop their own materials should be provided with the support and resources they need.

It is difficult to conceive of an educational context where teacher-developed material would be the norm. It would be an unrealistic expectation, at least in the short term, for teachers to dedicate part of their school hours to materials development. Furthermore, this would lead teachers to reject the wealth of readily available, published materials and have serious repercussions for educational publishing. However, we are experiencing something of a crisis in teacher professionalisation and any measures to ameliorate this situation would be well-received (Darling-Hammond 2005; Eirín, García Ruso and Montero 2009). The notion of teacher-produced materials is very much in line with the notion of teacher-innovator: the reflective professional who questions their work and does not simply accept set materials and ways of understanding the curriculum. Teacher-developed materials position the teacher as a 'builder' of the curriculum. "Teachers who elaborate materials for students conjure up people who are inquisitive and concerned about the quality of education, where resources in general and curricular materials in particular play a significant role" (Parcerisa 1996, 60).

In promoting teacher-developed materials, we need to reconsider other curricular issues: the characteristics of materials; the function of materials as outlined in reform documents; resource evaluation guides for teachers, and so on. The notion of teacher-developed materials implies not only an awareness of teachers as reflective, critical professionals, but also an awareness of research on the subject, the role of the university in the process, and suitable evaluation strategies for determining to what extent these materials can be an alternative to textbooks. There also needs to be an understanding of possible reactions in schools regarding this subject.

Diversity in materials in marginalised contexts

Recent studies reveal that ethnic minorities and other marginalised groups do not have a significant presence in textbooks and teaching materials (Actis, Pareda & Prada 1999; Balsas 2010; Castiello 2002, 2010; Garrido 2006; Martínez & Rodríguez Rodríguez 2010; Ronningen 2010; Selander & Aamotsbakken 2009 and Serra &

Alegret 1997). Inasmuch, there is a duty to understand how diversity is depicted in the curriculum and to investigate both the formal features of materials and the context in which they are used (García Colmenares 2000; Hernández & Villalba 2004; López Atxurra & Caba 2002; Leal 1998; Lluch 2003; Miralles & Martín 2008; Rodríguez-Quiles 2006 and Savolainen 2002).

Through the omission of information, textbooks can present a limited, stereotyped version of reality; partially motivated by political, economic and publishing interests. Aspects of this misrepresentation include

- Invisibility: minority cultures are absent or minimally represented.
- Stereotype: groups are homogenous and their features indistinguishable.
- Lack of balance: facts are interpreted by the majority culture.
- Absence of reality: inappropriate representation of historical and current contexts.
- Fragmentation and isolation: experiences minority groups are not considered to be part of the culture or history of the country.
- Lack of ethics: Topics such as slavery, colonisation and exploitation are addressed without considering the ethical implications (Eleuterio Quintanilla Group 1998, 45).

Further issues faced by socio-economically disadvantage communities include:

Ideology transmitted by materials: Most material used in marginalised communities derives from the 'First World'. This material usually comes under the pretext of 'charity' – that is, seeking to address a lack of resources. Nevertheless, it is usually the case that neither the content of the material, nor the approach, fits the context for which it is intended. Instead, the materials reflect a reality with meanings and values that are quite different from the context in which they are supposed to be used.

Teacher absenteeism: Sporadic teacher attendance is a common problem in these contexts. This can be attributed to low wages, lack of incentives, limited training, and lack of government control over teacher attendance. Given this, textbooks provide some direction to teachers, facilitating lesson preparation and offering suggestions for activities.

Condition of schools: It is difficult to imagine improvements in curricular material when a visit to schools in marginalised areas reveals a lack of (or even potential for) facilities such as human resource departments, libraries and meeting rooms. The situation is even more desperate in rural schools, which often lack basic furniture such as desks, tables and shelving. It seems utopian to think of having electricity for a projector or computer when many communities do not even have drinking water.

Lack of funds for curricular materials: The lack of awareness of the importance of appropriate classroom materials can impact on decisions made in the classroom. Teachers are expected to give 'meaning' to their materials, and use those they consider appropriate, or limit their activities to those specified in government materials. The appropriate selection and use of curricular materials is rarely

mentioned in school plans. Similarly, school budgets, which are usually small, rarely allocate funds for purchasing such materials.

Materials are deficient in quantity and in quality: There is no doubt that in many marginalised areas teachers and pupils lack even basic materials. This means that students often have to share materials with their classmates.

Improved publication: Editing and publishing of educational materials requires efficient management and co-ordination so as to produce materials with an acceptable level of quality in terms of illustrations, design and content. Many developing countries lack the resources to produce and distribute textbooks. According to Altbach (1983 331), “Good textbooks require planning, preparation, financing, testing and distribution; they require great quantities of paper, good printing presses and success depends on the co-ordination of economic, government, publishing and printing resources”.

Lack of a materials database: This is a problem common to many education systems, and is particularly serious in under-developed countries. Many teachers are unaware of publications adapted for marginal contexts which could be useful to them. However, teaching materials designed to meet the needs of marginalised communities tend to be of poor quality (Rosemberg, Borzone & Diuk, 2003) with content that is not conducive to meaningful teaching-learning experiences. Most studies highlight an over-dependence on textbooks by both teachers and pupils, and emphasise the need to increase the amount of research on these issues.

Another problem regarding curricular materials affecting this country, as noted by Pearce (1983), is parents lacking money to buy books, which has a serious impact on school attendance. Also, many countries have met resistance to their desire to use their national – rather than colonial – language in schools. There is also a lack of competent translators, and provision for their training. The estimated longevity of books – physical and pedagogical – is another important concern, as this influences the financing of publishers as well as the purchase of textbooks, especially in developing countries. School publishers run into great difficulties establishing realistic timeframes and the decentralised stock of books often increases costs and worsens supervision problems, but improves the availability for booksellers.

It must be remembered that educational materials are “expressions of a type of culture, and provide formulas or strategies for connecting with that culture. This may have problems, however, for didactic materials which may explicitly or implicitly contribute to selecting culture in a biased or discriminatory way with respect to linguistic, ethnic, or religious minorities or even women, thus contributing to the transmission of the culture socially accepted as being superior” (VVAA 1993, 8).

In 2001, the Curricular Materials and Socio-cultural Diversity Conference (Rodríguez Rodríguez 2003a) reached the following conclusions:

- Curricular materials play a leading role in schools and require ongoing analysis and research.
- Curricular materials seldom address socio-cultural diversity in schools.

- Textbooks remain the most widely-used educational material, and for many teachers, their only material.
- In general, publishing companies that produced material during the Educational Reform did not introduce innovations with respect to their earlier materials.
- There is a need for criteria to assess the quality of educational materials.
- Enhancement of materials is difficult to conceive without improved teacher training.
- It seems necessary to reflect on how educational materials address diversity.
- A culture of analysis and assessment of materials should be fostered. It would be beneficial to take advantage of new technologies (internet, email) in order to disseminate previously published materials.
- Schools need time and space to design and analyse materials.
- Teacher-designed, diversity-aware material encourages reflective practice. Moreover, material designed in collaboration with colleagues offers an opportunity for professional development. Schools should foster and subsidise the production of materials.

Other factors contributing to the lack of cultural diversity in materials include: lack of commitment by publishers (Gómez and Romero 2005); lack of commitment by public administrators to support teachers in creating materials relevant to local contexts (Parcerisa 1996 and Rodríguez Rodríguez 2009); unstable borders between countries, which complicates the specification of material content (Justin 2006 and Rodríguez Rodríguez 2006b); and the disregard for certain groups when developing content (Castiello 2010 and Opsal 2002).

Several studies highlight the lack of attention to geographical diversity in certain countries, as well as the lack of consideration for developing peoples in textbooks (Araya 2008; Badanelli 2008; Martinha 2010; Russo 2009; Rodríguez Lestegás 2010 and Valls 1994). Likewise, in the majority of countries, the socio-cultural reality of local contexts is barely reflected in materials (Braga 2010 and Ravelonahary & Clemons 2010).

As for the measures proposed for addressing socio-cultural diversity, some authors suggest "the most appropriate approach would be to propose a reference material – textbook – with various possibilities for use, depending on the needs of each moment, which could be accompanied by supplementary materials. Therefore, rather than diverse materials, we would be speaking about diversifiable materials" (Blázquez 1994, 255).

The case for teacher-developed materials

Current research on curricular materials reveals serious shortcomings in textbook use and content. Teachers continue to make decisions regarding materials under the influence of publishers, which to a large extent end up determining school curricula (see Gimeno 1995; Torres 2008 and Martínez Bonafé 1998, 2002). The literature cites the need for educational administrators and schools to propose measures for teachers to be able to come together as a working and learning community around

the design and evaluation of their own resources (Parcerisa 1996; Reyes 1998 and Rodríguez Rodríguez 2003b, 2006a).

“Proposing a new situation marked by the independent production of materials and the use of a variety of resources, is equivalent to promoting an enrichment of the school environment and looking at it as a place for the interactive construction of knowledge. It also implies breaking the boundaries between scholastic and non-scholastic spaces, therefore, sooner or later the diversification of materials requires the use of resources from outside school institutions” (Reyes 1998:240).

In addition, the elaboration and adaptation of materials by teachers implies a collaborative culture. As Montero indicates (1996, 60-61):

“The increasing confluence of teachers and other professionals in the territory of the school has evident repercussions when addressing the issue of teacher professionalization. Therefore, even when referring especially to teaching professionals, we must not forget the implications of the confluence of different professionals for the quality of educational situations and needs and training demands it generates.”

The process of elaborating didactic materials is enriched when it is carried out in a collective way (García & Porlán 1990; Grupo de Didáctica de las Ciencias Sociales del Proyecto IRES, 1996; Gutiérrez, Palacios & Torrego 2010, Lledó & Cañal 1993 and Maté 1996). Teachers and students contribute to the ‘significance’ of the process, through exchanging ideas. This encourages further investigation into areas of interest, as well as a search for materials to serve as examples. Moreover, materials elaborated by teachers respond to the interests and needs of students, providing space for improvisation, and incorporation of new ideas stemming from the context where the materials are being used. Likewise, teacher-designed materials provide a greater opportunity for classroom resources to meet the demands of the Educational Reform: significant learning, addressing diversity, and dealing with students' contextual and psycho-developmental differences. This process implies adjusting to the demands of varying levels within a class, provides a space for research-action, the possibility to better contextualise teaching and address diversity, and represents a break in the boundaries between school and non-school spaces: “thus, a diversity of materials, sooner or later, requires the use of resources from outside school institutions” (Reyes 1998, 240). This facilitates participation in the process by teachers, parents, students and other professionals and improves the quality of materials.

However, we are aware that the elaboration and adaptation of materials entails certain disadvantages and problems. Gimeno (1995, 124-125) anticipates some of the main problems arising from teacher-produced materials:

Curricular innovators among us have not, for the most part, focused on encouraging the participation of teachers by making their own resources, aside from fostering efforts to organize the use of varied materials (including textbooks) accumulated in school, for which adequate facilities and personnel would be required. It would not be surprising, as we have seen, if, beyond

alternating language and the publicity of good intentions, the reforms ultimately have the effect of intensifying consumption of increasingly expensive materials.

Similarly, as mentioned by Area (1994, 95): “It would be idealist and chimeric to think that the production of materials by teachers could become so wide-spread as to represent a solid alternative to the industrial market. Teachers lack the working conditions to simultaneously take on this task and others specific to their profession, and it is neither possible nor appropriate to give up commercial products.”

Education professionals are faced with the fact that it is a slow process requiring a great deal of time, competition from materials elaborated in other contexts, teacher dependence on other materials; lack of time not only for producing materials, but also for putting them into practice and adapting them; lack of training in this activity and doing so in accordance with the curriculum; lack of recognition by school authorities compared to other activities like organizing events and extracurricular activities and lack of a space to exhibit these materials

Similarly, there can be resistance to teacher-developed materials. This includes resistance to giving up textbooks; resistance to materials production as an opportunity for professional development; and a general resistance to educational change and to contextualising work proposals (De Miguel et al. 1996; Garcia Llamas 1999; Moore 2002; Murga 1995, Paredes 2004 and Richardson 1997). This resistance is reinforced by the lack of institutional support for the process. Some universities do not seem interested in materials development, giving priority to other issues such as ICT. In some situations, materials development is not at the forefront of teachers' concerns. Indeed, in some countries it is not a priority (see Rodríguez & Meri 2002).

Some studies of teacher-developed materials

Some of the criticisms directed at materials, and textbooks in particular, have focused on the fact that textbooks can block the potential for teachers to take ownership of their teaching; thus contributing to the deprofessionalisation of those teachers who subordinate their work to textbooks (López Hernández 2007). However, as Gallego (1995 363) notes:

(The teacher) is a reflective practitioner who has self-knowledge and, therefore analyses situations, deliberates and decides according to their own way of thinking. As an active participant in the classroom situation (which is complex, ambiguous, problematic and unstable), the teacher is forced to redefine and translate curricular elements according to the beliefs, implicit theories and personal constructs with which they perceive and interpret the demands of the curriculum and classroom events.

An innovative, professional teacher is a teacher who is discerning in their teaching practices as well as the materials they use in the classroom. Those teachers that do not reflect on their teaching practice and the curricular materials employed in their

classroom often uncritically accept the everyday school routine, using materials simply as an aid to structuring their class.

This lack of reflection on materials could be interpreted as a lack of self-esteem. Teachers may assume their work choices should be determined by others, thus 'forfeiting' the opportunity to implement their own ideas. Lack of time – or apathy – can lead teachers to put the development of study programs in the hands of other professionals or other materials.

Teachers can lose touch with the fact that all circumstances and all materials offer unrepeatable opportunities to learn, reflect and investigate. Another aspect worth considering is that many materials are produced without taking teachers into account, despite the common notion that teachers, and teaching practice, are the focus of the materials. To address this, a number of materials have been produced by Galician teachers and research groups (See Jiménez 2006a, Castro & Rodríguez Rodríguez 1996; Gutiérrez Roger et al. 1994; López Facal 1996, Montero & Vez 1992 and Rodríguez Rodríguez & García García 2011).

In preparing this paper, I have reviewed materials elaboration experiences that focus on the benefits of the process. Some of these cases involved marginalised contexts (see appendix). The major benefits identified by those involved in the materials production process include: allows adaptation to different levels within a class; allows more contextualised teaching and attention to diversity; allows participation by teachers, parents, students and other professionals; contributes to the professional enrichment of participants; the materials are normally open to feedback and improvement and are adapted to the differing needs of students.

Considerations for teachers producing/adapting materials

Teaching professionals aiming to produce their own curricular materials need to consider:

Management of the curricular materials: Didactic material should be dynamic; it should flow through a research-action framework where materials are continually reinterpreted through practice. In order to achieve this, teachers require a degree of autonomy – as individuals and a group. As Montero (1996) indicates, teacher autonomy is a clear indicator of their status as professionals: the ability to control their own decisions, including those involving curricular materials.

However, although this autonomy is always relative, it can contribute to considerable strides in the work with curricular materials. Autonomy helps teachers acquire strategies for selecting and evaluating the materials they use. Through autonomy, teachers should make suitable use of media to facilitate access to information, organise information and ideas, develop values and attitudes, shape expectations and facilitate models for action.

Research on curricular materials as part of teaching practice: Teachers should be encouraged by universities and teacher-training institutions to participate in research on curricular materials; either by putting together work groups with school

colleagues or by taking part in interdisciplinary teams. This can be an opportunity for helping teachers and their colleagues take part in projects to reflect and discuss issues involving materials based on their own practical experience, thus, awakening the need to test and experiment with materials inside the classroom. However, this should be approached professionally; decisions on practice should go beyond the color of materials, the number of pages, or whether evaluation activities are included.

Curricular materials development as part of the school dynamic: Debate that teachers may have on new curricular materials should be shared within the school, promoting a dialectical relationship between teachers' knowledge of curricular materials and the knowledge that may exist within the school as an entity. It should be the case that:

Didactic materials are not isolated, but instead are blended into activities, combined with methodology and embedded into class organization. This makes it possible to analyze the foundations, assessments, and dimensions of the task, ...in effect, to reflect on the curriculum and the dilemmas of practice. Consequently, didactic materials as well as their design and evaluation by teachers can constitute another way for teachers to reflect on the conditions that determine the production of knowledge, renew their practice and to develop their professional dimension. (Cebrián 1993, 240)

Consideration of materials from non-educational contexts: Materials from non-educational contexts (museums, government, community associations etc) should be used as class resources for several reasons:

- To enrich teachers' educational practice by including new materials, some of which are conceived and designed for schools
- To employ materials that relate to a 'real-life' context and student's interests
- To encourage reflect practice, by considering links between schools and the surrounding community/environment.
- To develop a deeper understanding of how materials support curriculum design and the curriculum framework.

It is important that teachers become familiar with the various Educational Reform documents underpinning curricular materials development. A study by Rodríguez Rodríguez (2001) found that a high percentage of teachers lacked knowledge regarding the Curricular Framework, Curriculum Design, and Didactic Examples, among others. It should be noted that this knowledge is essential to understanding not only the role of materials in the curriculum, but also to understanding the Reform itself.

'Professional' discussion and reflection on the role of materials in the curriculum: This is necessary for professional development of teaching staff and should be guided by:

Specification of the pedagogical model: Teachers need to be aware of the pedagogical model for materials and their use. As Martínez Bonafé (199, 123) states: “a curricular material is a theory about the school. It is not simply the physical medium for instruction, instead, it is also a way of understanding the development of the curriculum as well as the work by teachers and students”.

All curricular material, whether school textbook, evaluation guide, or other, represents a certain pedagogy, which materialises into a model of teaching/ learning: Who is the end-user? The student learner is the person who should guide the development of the educational activity. A teacher with a professional attitude towards education should ask themselves such questions as: Is the student already familiar with the curricular material? What is the psycho-developmental stage of the student? What is the student's social background? How do teaching objectives determine the format of materials, the contents etc?

It is often the case that curricular material are contextualised in a way that has little to do with students' reality. For example, research by the Eleuterio Quintanilla Group (1996, 1998) and Castiello (2010), showed that materials scarcely reflected the reality of immigrants, and the study by Chagas Deiró (1987) referring to the Brazilian context, demonstrated that materials included “distorted” allusions to the reality of indigenous people. Materials in this way can become de-contextualised and even de-curricularised resources. Nevertheless, despite their drawbacks, these material need not be totally rejected. As Guitart (1998, 41) observes:

We find that they contain errors because they are produced by people who are not in contact with the students who will use them or because the specific teacher who will utilize them did not participate in the production process. Nevertheless, their use also presents advantages, which will be considered and weighed. We shall also bear in mind that these materials are instruments in the hands of teachers and they will be at their disposal at all times to facilitate the educator's work, which means their use and intention can be adapted or changed, complementary materials can be added or the material can be left unchanged. In order to contemplate printed curricular materials with such intentionality it is first necessary to analyse what they contain and what they do not contain, what is hidden in their midst and is not evident, as well as the concepts that are held regarding materials.

Encouraging teacher production/adaptation of materials: Reyes (1998, 241) proposes some institutional measures to foster teacher production of materials, including

- Materials development skills in teacher education courses (design, audio-visual production, typography and computer programming)
- Ongoing professional development in materials development and evaluation
- Building teacher awareness of the rationale driving selection of curricular materials
- Promotion of debate on school autonomy and its implications

- Providing schools with the resources necessary for developing their own materials

Gimeno (1995) poses a set of strategies for decisions regarding curricular materials including: clarification of curricular policy (especially in terms of control); public financing for the production and distribution of quality products; provision of information and training to users; and fostering professional development. Throughout this process, the educational administration plays a critical role in promoting innovation through:

- Supporting the production, publication and diffusion of curricular materials by competent and experienced teams. These materials should serve as examples to publishers and the teaching staff. Moreover, teachers should be allowed to work and experiment with the materials.
- Establishing evaluative criteria for educational publishers.
- Encouraging publishers to risk innovation. Publishers and the administration could collaborate on alternative routes for innovation (e.g. institutional dissemination of new approaches to bring them to public attention, awards and other types of public support for publishers).
- Including reflection on curricular materials in teacher training programs.
- Promoting public awareness of education of significant proposals in the new education system (Parcerisa 1996, 148).

Curricular materials, whether produced by publishers or teachers, should fulfill these requirements: materials should allow for the inclusion of diversity – i.e. be adaptable to multiple educational contexts; they should involve a diversity of resources so that teachers can have more than one source of information; they should provide scope for analysis and reflection, and gathering a variety of contents regarding concepts, procedures and attitudes; they should be sufficiently versatile so that they can be adapted by teachers to their planning and programming needs; to the extent that it is possible, materials should be pre-tested, be in line with the school's curricular project, and be scientifically rigorous so as to avoid conceptual or methodological errors; facilitate the incorporation of other materials into the didactic process, be designed by multidisciplinary teams, and be free of sexism and racism; they should foster the professional development and autonomy of teachers; be meticulous in formal aspects such as design, typography and overall appearance; and finally, they should address the global and interdisciplinary nature of the curriculum.

It is also important to bear in mind the role that new technologies can play in the production of didactic materials. From a curricular standpoint, working with new technologies may represent an important opportunity for professional development, new avenues for reflection, and the potential for establishing new channels of communication. New technologies can:

- Improve the quality of materials through: access to images and texts from other cultures and contexts; ease of producing montages and other enhanced forms of presentation; high-quality printing; access to multimedia – photography, video, music etc.

- Facilitate connectivity and the sourcing/sharing of materials from the wealth of resources available online. However, it is becoming increasingly important to learn to be selective with resources.
- Facilitate connections/relationships between teaching professionals.

A common problem for teachers is not so much the existence of materials but being able to access and share them. Through new technologies, teachers are able to exchange materials more regularly. Tele-collaborative projects are a good example of this potential. In this field, the internet fulfills three roles (Martínez Bonafé 2002, 118): a source of information, a tool for disseminating information, and a means of communication

We should remember that for teachers to become authors of their own materials requires specific skills and training in identifying the different types of materials, their potential, their uses, and their characteristics. We are also referring to training that allows us to conduct professional development through materials, as well as understand the learning potential of working in a group to develop materials.

Aspects related to school organisation and curriculum materials: Teachers need training to understand the influence spaces have on decision-making regarding materials; the implications of curricular materials on the development of school projects; how textbook activities affect lesson timing; and to what extent school timetables influences the structure and characteristics of textbooks and materials (Rodríguez Rodríguez 2001).

Strategies for analysing materials: Many studies mention the lack of teacher training regarding the evaluation of materials, and lack of awareness regarding model and materials evaluation proposals, and potentials uses for these resources (Fabiana 2006; Rodríguez Rodríguez 2009). It is essential that teachers become acquainted with models and materials evaluation guides, as they represent an important framework for reflecting on the role of materials in the teaching-learning process; conducting research on curricular materials; and ensuring that work with curricular materials is not isolated from other elements of the didactic process.

Action research and materials: Training must enable teachers to analyse their activity, and help them compare and assess the possibilities of media in their context. Training should aim to help teachers design and undertake research, as well as to develop their capacity to critically analyse research.

Participation of others in the materials elaboration process: It is essential to encourage group training, to demonstrate the value of interdisciplinary work and show how to take best advantage of the contributions of a historian, chemist or journalist, for example, when preparing didactic materials.

New technologies and materials: ICT can improve the quality of materials and provide almost immediate access to a variety of information for preparing resource proposals. Furthermore, social networks offer a great opportunity for exchanging materials and experiences. It is important to note that ICT have been helpful in the integration of minorities and the design of high-quality didactic materials for

underprivileged communities (Cañedas 2001; Cebrián & Noguera 2010 and Granados 2008).

Characteristics of materials produced by teachers themselves

Curricular materials, whether produced by publishers or teachers, must meet certain requirements:

- Include alternatives for dealing with diversity, and multiple educational contexts. Content should be as varied as possible, and offer options to suit different needs, so that teachers are not limited to one source of information. Special attention should be given to cross-sectional issues.
- Resources should be diversified so that teachers can draw on a variety of information sources.
- Allow for analysis and reflection.
- Variety of content related to concepts, procedures and attitudes.
- Sufficiently versatile – can be adapted by teachers to fit their planning and programming needs. Should also reflect differences in students and their abilities.
- As far as possible, materials demonstrate pre-testing. They should be accompanied by explanations/suggestions to help teachers interpret and adapt the content.
- They should be in line with the school's educational and curricular project.
- Should be factual and scientifically rigorous, and free of conceptual and methodological errors. They should not contain technical mistakes and should include meaningful, well-selected examples, and updated bibliography and information that is well-organised.
- Should facilitate incorporation of other materials into the didactic process.
- Although good materials can be produced by a single author, it is advisable they be designed by multi-disciplinary work groups.
- They should appropriately address issues such as sexism, racism, and individualism.
- Should foster professional development of teachers and encourage their professional autonomy.
- Should be mindful of formal aspects having to do with design, typography and overall appearance.
- Should address the global and interdisciplinary nature of the curriculum.
- Should be flexible enough to allow inclusion of other materials into the didactic process.

Conclusion

The production or co-production of materials by teachers can pose challenges; however, the potential advantages are well worth the effort. On occasion, self-produced materials may seem to go against the current of government proposals or school decisions. Opportunities to promote materials innovation activities need to be found and fears need to be confronted. It is true that elaborating one's own materials

requires time, training, and willingness by schools. Innovation in schools entails struggle and frequently causes unease among the teaching staff. Nevertheless, these difficulties are never as great as they initially seem.

The places we are called to are steep and dangerous. So what? Are heights attained on level foot? It is not even as steep as some would think. Only the beginning is rocky and seems unviable, just like many roads, that when seen from a distance appear blocked, seem cut and tortuous because distance deceives the eye. But later, when one draws near, things that the errors of the sight had accumulated and made look like a single image, stand out one by one; then what had appeared to be precipices because of the distance are transformed into mere slopes. (Séneca: *Dialogues* "On the strength of the wise man").

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Appendix

Summary of educational projects where materials have been developed by teachers, or with their close involvement.

Authors/ co-ordinators	Project Title	Project Outline	Evaluation
Rodríguez Rodríguez, J., Castro Rodríguez, M ^a M., Rodríguez Silva, M ^a B. & Pose Blanco, A. M ^a . (2002)	<i>A week without textbooks</i>	For one week alternative materials to textbooks were produced. Students invited to develop teaching materials for classroom work.	<ul style="list-style-type: none"> - Contributed to disproving the idea that best material is 'given' and 'prefabricated' - Pupils with special educational needs involved in development of materials - Learning by making - Family Involvement strengthened community relations - Example of university outreach
Various, (s.f).	<i>Quilloac (No more child abuse)</i> Ecuador	Team of academics from Azuay University and other professionals prepared teaching video to preserve	<ul style="list-style-type: none"> - Materials at service of the community - Awareness of possibilities for university intervention in social problems seen as positive

		'Cañar' culture. Audiovisual material - supplementary to textbooks	
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Rodríguez Rodríguez, J., Castro Rodríguez, M ^a M. and Ramos Fernández, R. (1996)	Didactic materials proposal for interdisciplinary educational intervention in formal and informal settings (As Pontes de García Rodríguez, Galicia, Spain)	Aim to involve formal and informal educational institutions in development and use, for purpose of promoting educational activity to boost natural, social and cultural resources of the municipality and encourage active participation by all citizens in the awareness and configuration of their locality.	<ul style="list-style-type: none"> - Working from an interdisciplinary perspective - Reflection on the influence of political changes on decisions about materials - Reflection on the relationship between personal and professional issues on decisions about materials - Search for information
Rodríguez Rodríguez, J. (1997)	Apiculture in schools	Material for members of school community wishing to develop their teaching by means of natural environment.	<ul style="list-style-type: none"> - Dealing with all phases of design, development and evaluation of the material - Attention to the contextual diversity in Galicia - Addressing contents not usually covered in textbooks
Rodríguez Rodríguez, J. (2003c) (Co-ord)	Congress on materials and educational experiences regarding The Prestige.	Brought together over 50 examples of materials developed by teachers. Unforeseen Prestige accident 'forced' them to develop and adapt their own materials to meet the needs of the moment.	<ul style="list-style-type: none"> - Development of collaborative culture among teachers - Relevant and current topics included in classroom dynamics - Action research reflection on practice. - Contributed to reconstructing history - Elaboration of variety of resources - Opened school up to community

López Facal, R. (1996)	Grupo Aula Sete	Team of teachers concerned about professional training and need to renew content and materials in	<ul style="list-style-type: none"> - Collaborative work, - Theoretical foundation - Resource Assessment - Experimenting with materials - Contextualisation of resources - Follow up of proposal
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		Geography, History and Social Sciences classrooms	
Veiz et al. (1995)	English Language Modular Packs	Diverse team of professionals aiming to revitalize commitment to foreign language curriculum development.	<ul style="list-style-type: none"> - Collaborative work among teachers from different levels - Indispensable tools for identifying similarities and differences - High degree of personal and professional satisfaction - Acceptance of observation and criticism by others - Professional development - Proposing hypotheses.
Schmidt, M ^a A. and Braga García, T. M. (2003)	Recreating history: Production of didactic material based on local history.	"Involving school community, esp. students in third grade, in collection of documents from family archives. "	<ul style="list-style-type: none"> - Identification of sources - Immersion in the environment - Respect for local culture. - Collaborative work. - Special involvement by students. - Action Research
Martinez Bonafé, A. (Coord). (2002)	<i>Experiencing democracy in school</i>	Proposal and resources to work on the topic of democracy in school	<ul style="list-style-type: none"> - The discussion group as a training strategy - "These are not the best possible materials" - Importance of organising the discussion process - Promoting open discussion
Molina Gómez, R. (2003)	<i>Dorna: embark on health</i>	Materials proposals for health education for young people aged 14 and 15.	<ul style="list-style-type: none"> - Friendly and flexible materials - Address diversity and heterogeneity - Reflection of the experiences that they could have in relation to consumption. - Varied and diverse. - Serving a specific educational project. - Constant re-evaluation of educational practice. - Professional development
Gaia Project, Science Project 12/16, Ceres Project, Ínsula Barataria, Aces Project , Routes through Barbanza Mountains, Instituto Xelmírez-1 Secondary School, R.O.D.A. Project, Liáns Group	(Various)	A variety of proposals to contextualise teaching.	<ul style="list-style-type: none"> - Collaborative work, - Shortage of resources - Contextualisation - Preparation of materials and reports - Learning to learn - Evaluation of resources

Rodríguez Rodríguez, J. and García García, I. (2010)	Ulla Elemental	Proposal contextualised in municipality of Vedra (A Coruña, Spain) to contextualise teaching-learning proposals.	<ul style="list-style-type: none"> - Involvement of different professionals and institutions in the process of elaborating materials. - Attention to needs of rural communities. -Development of a process.
Gomes Ferreira, A. and Louro Felgueiras, M. (orgs.) (2009)	Building Telling European Heritage. Pedagogical Perspectivas	<p>"Its objective is to show that buildings are a witness to European cultural heritage. For primary students the materials will draw attention to features of buildings and ask children to interpret them; for secondary and tertiary students we will, in addition, draw attention to controversial issues within or between communities to which buildings present an enduring testimony".</p> <p>(http://www.eubuildit.net/)</p>	<ul style="list-style-type: none"> - Development of a collaborative culture among teachers - Production of variety of resources - Exchange of educational proposals among teachers from a variety of European countries.
Rosales, X. M. (coord.) (s.f).	Proxecto Terra	<p>"A project for cooperation with the field of education by the <i>Colegio Oficial de Arquitectos de Galicia</i>, for all stages of Mandatory Education for the purpose of improving the knowledge that schoolchildren should have of our architecture and our territorial identity"</p> <p>http://proxectoterra.coag.es/</p>	<ul style="list-style-type: none"> - Development of a collaborative culture among teachers - Resources produced to address specific needs of the context. - Involvement by professional from different fields.

<p>Soñora, F. (s.f.).</p>	<p>Proyecto Cimántica</p>	<p>“...developing and associating the key concepts used to understand and study climate change. Climate change is, therefore, the framework used to explain the main environmental issues – energy, waste, water resources, biodiversity, landscape and land use, rural environment and urban environment http://www.climantica.org/</p>	<ul style="list-style-type: none"> - Involvement by teachers and students in the elaboration of didactic materials. - Materials diversity - Involvement by professionals from different fields.
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