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Interpreting internal school factors on the educational integration of IT

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ABSTRACT

A qualitative study of four secondary education state maintained schools in Catalonia, with a long tradition of using IT, was carried out following an interpretive methodology. This study sought to identify the main internal factors that impinge directly on the quality of integration of information technology into these schools. These factors appear to be the schools' internal decision making procedures, the basic pedagogical conceptions on the access to IT by the students and its use, and the participation levels of teachers in the innovation process. Drawing on the information gathered, some general conclusions are put forward.

Keywords: case studies, formative evaluation, information technology, integration, organisation

INTRODUCTION

This paper describes a research study into some factors that could contribute to a sound integration of IT in four secondary education schools. The schools of the study were chosen because of their apparent success in implementing IT, success which seemed to be recognized by the teachers themselves and by people that visit or are acquainted with

these schools. This success was also often rather vaguely perceived in terms of positive learning outcomes of students gained by using IT, and in terms of user satisfaction, both by students and teachers.

The purpose of the research was to summarize the fragmentary and dispersed indications of such perceived successes on the process of the educational integration of IT. Also, taking into account that evidence does not speak for itself, the aim was to interpret this evidence in its own context, generating knowledge on the internal mechanisms of IT-related innovation at school level.

Rather than a simplistic and reductionist interpretation, the integration of information technology in education should be understood as the everyday and standardized use of computing resources in the widest range of curricular subjects, with a reasonable equilibrium between its use as an instrument for teaching, an instrument for learning and a learning instrument.

THE RESEARCH MODEL

Research model
The so-called naturalist research paradigm (Husen [1], Martínez [2]) provided the setting for this study on the integration of information technology into these schools. Without wanting to go over the conceptual and methodological characteristics and differences between the positive or rationalist and the naturalist or interpretive paradigm (Benedito [3], Blomeyer & Martin [4], Cook & Reichard [5], Elliot [6], Gimeno & Prez [7], Taylor & Bodgan [8] and others) it may be worth commenting on some of the most important factors of the naturalist paradigm.

As Guba [9] points out, the naturalist approach draws near to reality without preconceived theories or hypotheses. The design of the research still develops as the research process itself is actually carried out: it is concerned with an open and resultant investigation model, in which the subjectivity of the instruments used is taken into account and in which maximum importance is attached to relevance. This research model, which is of a qualitative type, is based on the idea that there is not just one reality, but instead, multiple interpretations of facts. This enables the study to be centred on the significances and their possible values in a specific setting or context.

According to Goetz and LeCompte [10], the objective of all ethnographic research is to describe the "characteristics of variables and phenomena, with the aim of generating and perfecting conceptual

categories, discovering and validating relationships between phenomena, or comparing the constructions and hypotheses generated, from phenomena observed in different settings".   Torres, as quoted in the prologue of Goetz and LeCompte, states that "the aim of educational ethnography is focused on discovering what occurs daily, by means of contributing significant data, in the most descriptive way possible, in order to later interpret and be able to understand that data and intervene more suitably in this ecological niche known as classrooms".

Following this methodology, the research was carried out focussing on three main areas of qualitative analysis of the integration of information technology into these schools: the school's internal decision mechanisms, teacher's conceptions on students and IT, and teacher participation and opinions.

Characteristics of the schools
The four schools in the study were state maintained schools of very different sizes, urban settings and levels. All of them had an important history of using computers, publicly recognized, and they have had links with other schools. In this paper they will be referred to with the numbers 1, 2, 3 and 4. Their main characteristics are given in Table 1 below:

	School 1	School 2	School 3	School 4
Number of students	282	304	970	1,427
Students aged 12 or older	57	94	970	1,427
Number of teachers	17	25	50	97
Number of computers	15	27	16	120
Student/computer ration	18.8	11.3	60.6	11.9
School environment	Affluent urban area	Middle class small town	Middle class middle size town	Middle class middle size town
Average training courses followed by teacher	3	3	0.5	n/a

Table 1: The four study schools

Schools 3 and 4 are just secondary level, whilst 1 and 2 are primary schools which also cover the first two academic levels of secondary education. The internal functioning of schools 1 and 2 strongly relates to the pedagogic approaches and practices of both primary and secondary levels.

Research process
The research process included several stages [11]:

- initial contact with the schools with explanation of the aims of the research, negotiation of the methodology, guarantees of confidentiality, use of the data, and use of the conclusions (stage 1);
- collection and analysis of relevant documentation provided by the schools, with specific attention to the inclusion of references to information technology in the documents and to the level of curricular integration of IT (stage 2);
- carrying out of structured interviews with members of the board, the IT co-ordinator and with teachers (stage 3);
- analysis of the individual interviews (stage 4);
- detailed writing of a provisional report on the findings of each school (stage 5); and, drawing up of the conclusions of the research (stage 6).

Stage 3 was enriched by observations carried out in the computer labs while being used by students, and by informal conversations with teaching staff in school breaks. In these talks information was sought on the degree of satisfaction of teachers concerning the use of IT by the teachers themselves and by pupils. The design of the structured interviews was modified during the research process. In almost every situation, the interviews turned into conversations in which the questions asked and answers given were formed indiscriminately by the researchers and teachers, thus setting up a constructive and reflexive conversation about the quality of information technology integration in the school.

INTERPRETING THE RESULTS

Analysis of the integration of IT
The analysis of this integration was carried out in three main areas which provide information about the different aspects of the schools:

- the procedures of decision making;
- the schools' conceptions about the access of students to IT and the use they make of it; and
- the teachers' participation and opinions.

Schools' internal decision mechanisms

The educational regulations establish that in Catalonia's state maintained schools the school board of directors is elected by the faculty for a given period. In practice there are a variety of possibilities of complying with such regulation: either the school endeavours to find a general consensus (school 1), or there is a tradition of rotative access (schools 2 and 4), or, very often, the school follows the usual mechanisms of candidates standing forward in a voting process. This is the case of school 3, in which, additionally, most of the members of the board belong to the same school department.

When some of the teachers of schools 1 and 2 put forward the suggestion for starting IT-related activities it was considered that this concerned all the teaching staff and the corresponding decisions were agreed by the faculty. This approach is still being followed. In school 3, on the other hand, the initiative came from teachers of a single department and since then the decisions are proposed by each different department and taken by the school board. On account of its structure and number of teachers involved, school 4 set up a specific information technology committee whose proposals are submitted to the powerful school co-ordination committee, a very idiosyncratic and widely representative board of this school.

At present, all the decisions in schools 1 and 2, including those relating to IT, are made at faculty level, independently of who makes the proposal (school board, IT co-ordinator and teachers). In school 3, the science and mathematics department which includes IT-related subjects has a certain degree of autonomy but the decisions are made by the school board. In school 4, the specific IT committee still reports to the co-ordination committee which is responsible for making the decisions.

Conceptions on the students' access to IT

Student's access to IT is a fundamental issue that underpins the school philosophy and practice. Schools 1, 2 and 4 have explicit statements in their school policy documents. It is worth considering the nuances of such statements. In school 1, the access of students to IT is considered as a student's right and the school should provide equal opportunities for everyone. School 2 considers access as an opportunity to enhance learning and commits itself to helping most students take advantage of this opportunity. In school 3 access is regarded as a complimentary curricular activity. In school 4 access is regarded as a student's right but students are obliged to make use of it.

Self access opportunities for students and pupils are minimal in school 3 and permitted during their free periods and at lunchtime in schools 1 and 2. School 4 provides the biggest opportunities: any time of day and Saturday mornings including when there is a class being conducted, provided there are spare computers in the computer room.

Teacher participation and views
The availability of information about the educational use of IT is the base of participation. In school 1, the school board of directors and the IT co-ordinator have complete information and teachers have general information. Teachers of a specific level have full information about that level. In school 2, the IT co-ordinator has complete information, teachers and the school board have general information, and teachers of a specific level have full information about that level. In school 3, each teacher knows what he or she is responsible for while the IT co-ordinator has general information. The school board is poorly informed of the details of the IT use in each level and subject matter. In school 4, each department has complete information about their own activities. The IT co-ordinator and the co-ordination committee are fully informed.

According to the school conceptions on students and IT and also on the level of teacher participation, there are different views of the degree of freedom of the use of IT, both for students and for the teachers themselves. Schools 1 and 2 state that teachers have the choice of using IT and, in school 2, the school climate encourages them to do so. Nevertheless it is accepted that certain teachers scarcely use IT. In school 1, the use of IT is mandatory for all pupils because of the decision taken by the school. In school 3 teachers are completely free to choose but whether or not the department as a whole has decided to use IT will affect their decision. In school 4 the degree of freedom depends on the decisions taken by the co-ordination committee and the school priorities.

CONCLUSIONS AND RECOMMENDATIONS

The research shows that school 3, whose organisation is based on the autonomy of the school departments, lags far behind in the educational integration of IT because of the lack of a global school project. The decisions concerning the use of computers in the curriculum appear to be related to specific people and to specific subjects. The researchers were surprised by the poor student-computer ratio, which can be attributed to the compartmentalization of resources and goals. An unexpected outcome

of the research was the beginnings of a reflection process inside the school which could lead to the implementation of a global IT school policy. School 4, which also has a strong departmental structure, avoided this danger from the very beginning by creating a widely representative specific IT commission. Although schools 1 and 2 initiated IT activities in a very personalised way, they quickly moved towards the participation of the faculty by setting a global school policy, whose implementation was eased by their much lower enrolment and by their structure which is not based on the autonomy of school departments.

From the research that was carried out, several recommendations can be deduced. Firstly, the success and the quality of the integration of information technology into education directly depends on the organisation of the school and its versatility, on the internal information channels, on the processes of decision making and on the collective responsibility assumed by the teachers. Specifically, it is worth stressing the need for an organisational perspective about the incorporation of information technology, in a realistic way, with the available resources -materials, time and personnel. This depends on the global approaches of the school regarding their definition of what all the pupils at all school levels, and particularly in the final levels, need to know about information technology, both in knowledge and skills. It is also essential to analyse what this knowledge should be in each of the school subjects.

Secondly, the co-ordination of IT has a capital importance. By obtaining a sufficient operating level of the IT resources, which can be eased by the homogeneity of computer systems and programs, the co-ordinator ought to adopt a role of integrating and facilitating the participation of the staff, and of ensuring the decentralization of the use of technology. Its main roles should be support, simulation and diffusion of information. The IT co-ordinator should not assume the pedagogic responsibilities and obligations of the other teachers on the grounds of technological specialisation; every teacher ought to assume their own pedagogic responsibilities and not delegate them to the IT expert. The intervention of the IT co-ordinator in the classrooms ought to be limited only to when it is essential and, in exceptional cases, for particular supportive actions.

Finally, it is worth stressing the fact that integration of IT is both a school responsibility and an individual teacher responsibility. This means not only letting students work with IT and providing organisational measures to foster this work, but to rethink the contents and didactics of school subjects and the role of the teacher.

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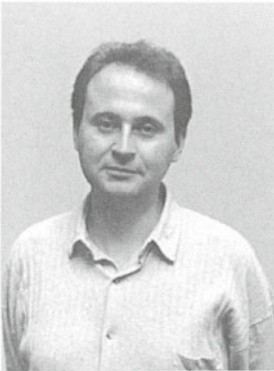
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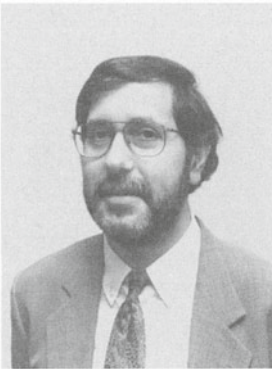
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