Ten Years of ITEM Research
Analysis of WG 3.7's Published Work (1994 – 2004)

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Abstract: In this paper we review articles published in the proceedings of the conferences of the IFIP Working Group 3.7 in order to classify them by the most relevant topics and to identify the main research patterns followed by the Group. We have also established the major research methodologies used by the Group to carry out its work. Finally, we end up with a brief comparison with the information systems and technologies (IS/IT) field of study with the purpose, on the one hand, of recognising common tendencies and, on the other, of diagnosing how mature is information technology for educational management (ITEM) research.

Keywords: ITEM research, conference proceedings, research topics, research methodologies.

1.   INTRODUCTION

After the first international conference on information technology for educational management (ITEM) took place in Jerusalem in 1994, Working Group 3.7 of the International Federation for Information Processing (IFIP) had held a total of five international meetings. At such reunions researchers, academicians and professionals have been able to contribute to a better development and understanding of all problems associated with the use of information technology (IT) for educational management. Most of these contributions, generally presented as papers, have been published and over time have become an important accrual of knowledge and experience.

ITEM studies have been considerably enriched by the varied profiles and backgrounds of the participants in these working conferences, to the point of acquiring certain characteristics of its own. This has already been put forward in *'ITEM: synthesis of experience, research and future perspectives on computer-assisted school information systems'* (Visscher *et al*., 2001). Nevertheless, ITEM analysis has been approached from very different

perspectives that respond to diverse academic disciplines, which is probably the underlying reason for the area's conceptual richness. After ten years of uninterrupted periodic meetings with outstanding academic results, it seems convenient to take a pause to reflect on what has been achieved in the past and to decide upon courses of action for the future. This is a necessary practice in any relatively new area such as this one, which is encumbered with certain difficulties owing to its immaturity and ambiguity, as well as its eclectic and interdisciplinary nature and the ever changing IT scenario.

Following this the paper's aim is to study the literature resulting from the international ITEM conferences organised by IFIP Working Group 3.7 in order to identify and classify the most researched topics or themes and the methodologies employed.

2.   ANALYSIS METHODOLOGY

This study has been carried out on the basis of the publications that have followed the working conferences, which have compiled a selection of papers presented at the work sessions. These publications have been edited by prestigious companies specialised in publishing scientific papers. Table 1 shows the city where the conference took place, the year, title of the book, publisher, place of edition, date of edition and number of articles published in the book. In order to classify each article under a certain topic and methodology, we have studied the titles and abstracts, only reviewing the actual text in those cases in which classification was unclear according to the mentioned criterion.

Table 1: International ITEM conferences and resulting publications

Place	Year	Title of the book	Publisher	City	Year	Number of papers published
Jerusalem	1994	Information Technology in Educational Management	Chapman & Hall	London	1995	31
Hong-Kong	1996	Information Technology in Educational Management for the Schools of the Future	Chapman & Hall	London	1997	26
Maine	1998	The Integration of Information for Educational Management	Felicity Press	Maine	1998	17
Auckland	2000	Pathways to Institutional Improvement with Information Technology in Educational Management	Kluwer	Boston	2001	11
Helsinki	2002	Management of Education in the Information Age: The Role of IT	Kluwer	Boston	2003	14
Gran Canaria	2004	Information Technology and Educational Management in the Knowledge Society	Springer	New York	2005	18

The resulting information has been classified into three groups. Firstly, according to topics studied in each article. Secondly, considering the research methodology applied to each paper to further group them considering the type of approach employed. Finally, we have compared results with a similar analysis carried out by Claver *et al*. (1999) applied to IS/IT research, as there are solid common elements in both fields.

3. DATA ANALYSIS

Table 2 contains the most relevant topics discussed at the international conferences of IFIP Working Group 3.7 as they have been published. The table shows the number of papers that have dealt with each topic and the percentage these represent of the total number of papers both of each publication as well as the accumulated total, which is shown in the last column. We have decided to use large work areas for our classification in an attempt to obtain significant results. Otherwise, a more detailed classification might have made the results confusing or unclear. For example, Grover *et al.* (1993) suggests 20 IT related topics applicable to any study area, and authors such as Claver *et al*. increase this number up to 30.

Table 2: Papers classified by research subject

Topic	CONFERENCE						
	1994	1996	1998	2000	2002	2004	Total
	N. %	N. %	N. %	N. %	N. %	N. %	N. %
Strategies to integrate IT into educational management	2 6.5	1 3.8	2 11.8	1 9.1	1 7.2	2 11	9 7.7
Assimilation and integration of IT into educational management	4 12.9	9 34.6	6 35.2	3 27.3	4 28.6	1 5.5	27 23
ITEM state of the art. The discipline's present situation and trends	1 3.2	1 3.8	- -	- -	- -	1 5.5	3 2.7
Assessment of IT support to educational management	2 6.5	5 19.2	2 11.8	4 6.3	2 14.3	5 27.9	20 17.1
National, regional and local experience in the use of IT for educational management	10 32.3	- -	2 11.8	1 9.1	1 7.1	4 22.3	18 15.4
IT applications in educational management	9 29	7 27	2 11.8	- -	- -	2 11.1	20 17.1
Mathematic tools employed to make models for educational management	3 9.6	2 7.8	1 5.8	- -	- -	- -	6 5.1
IT applications for teaching	- -	1 3.8	2 11.8	- -	3 21.4	2 11.1	8 6.8
Teacher and manager training in the use of IT for educational management	- -	- -	- -	2 18.2	3 21.4	1 5.5	6 5.1
TOTAL	31 100	26 100	17 100	11 100	14 100	18 100	117 100

If, say, we were to consider each different type of application for educational management as a research topic this would probably result in an

excessively large group of topics. In this case we have decided to group all such applications in one single category making no distinction regarding the specific applications. We consider that this offers a clearer vision of the attention given to this topic at the different conferences, which would be more difficult to perceive if the analysis were more fragmented. A total of 9 topics were identified, although some have an irregular appearance over time.

The last column of Table 2 reveals that the most popular topics over the years have been Assimilation and integration of IT into educational management (23%), followed by Assessment of IT support to educational management (17.1%), IT applications in educational management (17.1%) and National, regional and local experience in the use of IT for educational management (15.4%). All together these topics represent 76.2% of all papers studied (117). Interestingly, the most recurrent topic over these 10 years of publications has been Assessment of IT support to educational management, which has been repeatedly dealt with because of the importance of analysing the results obtained after implementing new strategies, policies, techniques or tools.

On the other hand, although Assimilation and integration of IT into educational management is the topic which has received most attention (23%) it has progressively lost importance judging by the decreasing number of papers that address it. This is probably due to the fact that a certain maturity has now been reached in ITEM and a solidly built theoretic body of practices and recommendations is now being developed and is obtaining good results.

Also, there are two themes that have followed a diametrically opposed evolution through the years this analysis covers. The topic Mathematic tools employed to make models for educational management of certain importance during the first three conferences, has not been dealt with at all for the last three. This also reveals a strong connection between authors and subjects, so that if certain authors do not take part in the conferences certain topics will not be discussed. Conversely, the theme we call Teacher and manager training in the use of IT for educational management is relatively important in the last three editions whereas it was totally absent from the first three. The reason for this is probably the growing importance of training as a crucial factor for a successful implantation of information technology, a matter that is also present in any IT related field.

A subject that has always been present, albeit discreetly, in the publications that follow the conferences is the one we call Strategies to integrate IT into educational management. This gives evidence of a consensus regarding the need to make an effort to plan future actions, especially if they are far-reaching, independently of technological developments and advancements. Finally, another subject present though not directly related to the field of Working Group 3.7 refers to IT applications for teaching, which has appeared in several publications over the last ten years.

4. RESEARCH METHODS

As regards research methodology, the papers we have reviewed can be divided into theoretical studies and empirical studies. We have grouped the theoretical studies into conceptual and illustrative categories and the empirical ones have been classified as case studies and field studies. We will describe each of these methods briefly so as to understand them better.

Theoretical studies are fundamentally based on ideas, structures and speculations rather than a systematic observation of reality. Although non-empirical articles may contain some empirical observation or fact, these will be of secondary importance. In other words, emphasis is on ideas rather than facts. Theoretical studies can be of a conceptual and illustrative kind. The first describe structures, models or theories and offers explanations and reasons. The illustrative ones, on the other hand, intend to guide practice and make recommendations for action or establish stages in which to attend to certain circumstances. The emphasis is on what and how rather than why.

The essence of research carried out in empirical studies is to observe the reality object of investigation. This is where we can place case studies. These kind of studies are becoming ever more numerous in the field of IS/IT, mostly for the following reasons (Benbasat *et al*., 1987): (a) the researcher can study IS/IT in their natural environment, learn about the state of the art and generate theories based on practice; (b) it allows researchers to answer questions as to how and why and therefore to understand the nature and complexity of the process that is taking place; and (c) it is appropriate for investigation in areas with few previous studies and is often the first stage of empirical research. But case studies have often been criticised for their lack of scientific rigor, though this is not due to a problem in the method itself but rather to the fact that often the name 'case study' has been given to what is merely a recounting of anecdotes (Lee, 1989).

Field study is another empirical research method that analyses several organisations regarding one or more variables. There is an experimental design, but no experimental control, which means that the researcher collects information concerning uncontrolled situations. The object of study operates in its usual fashion while research is conducted. The aim is to relate results to certain explanatory variables. It is similar to case study in that phenomena is analysed in its natural environment without introducing any variations in it. But the methods differ in that field study is not interested in the whole phenomena but only in specific aspects or variables. Also, the analysis of information in case studies is merely qualitative whereas field studies generally use quantitative methods.

Table 3 shows a classification of papers considering the research methodology employed. Similarly to Table 2, in Table 3 the total number of papers is shown as well as the percentage of each according to the methodology used and progress over time of each method, expressed for each of the publications considered. The last column shows total values.

Table 3: Papers classified by research methodology

Research methodology	CONFERENCE						
	1994	1996	1998	2000	2002	2004	Total
	N.	N.	N.	N.	N.	N.	N.
	%	%	%	%	%	%	%
Theoretical studies	**15**	**15**	**4**	**5**	**4**	**7**	**50**
	48.4	**57.7**	**23.5**	**45.5**	**28.6**	**38.9**	**42.7**
Theoretical – conceptual	6	4	2	1	1	4	18
	19.4	15.4	11.8	9	7.2	22.2	15.4
Theoretical – illustrative	9	11	2	4	3	3	32
	29	42.3	11.8	36.4	21.4	16.7	27.3
Empirical studies	**16**	**11**	**13**	**6**	**10**	**11**	**67**
	51.6	**42.3**	**76.5**	**54.5**	**71.4**	**61.1**	**57.3**
Empirical – case studies	13	10	9	2	7	8	49
	41.9	38.5	52.9	18.2	50	44.4	41.9
Empirical – field studies	3	1	4	4	3	3	18
	9.7	3.8	23.5	36.4	21.4	16.7	15.4
TOTAL	31	26	17	11	14	18	117
	100	100	100	100	100	100	100

An analysis of Table 3 shows that most of the articles published are empirical, exceeding the theoretical ones by more than ten percentage points. Except for 1996, there is a clear preponderance of empirical studies in all conference publications, which suggests that tendencies regarding research methods in the field of ITEM are quite homogenous. We find a similar situation in the field of IS/IT, in which as from the middle 80s empirical studies prevail over strictly theoretical ones (Alavi and Carlson, 1992).

We can also see that amongst the theoretical studies the illustrative type is the most frequent and very nearly doubles the conceptual kind. This situation is typical in any emerging field in which an ample heuristic is transformed into recommendations and good practice guides based on the author's experiences. Similarly, the fact that most of the empirical studies are case studies shows that we are facing the first stages of research. This supports our previous comment that case studies are especially useful during the explorative phases of any investigation, whereas field study requires a broader understanding of the phenomenon and therefore is better suited to more advanced phases of research (Lai and Mahapatra, 1997).

5.   COMPARISON WITH OTHER AREAS OF STUDY

ITEM is a field in which information systems and technology have an outstanding role. This explains the many common characteristics that both fields share, mainly their relative youth compared to other more consolidated disciplines such as Sociology, Psychology, Economics or Computer Science. Both ITEM and IS/IT have benefited from all these fields in some way and particularly ITEM has received important

contributions from IS/IT, as with design strategies recommended to develop ITEM applications (Tatnall, 2001).

Therefore it is not surprising that there are so many coincidences between both fields regarding topics of study. We have, for example, the investigation carried out by Claver *et al*. in 1999 concerning the most frequent topics in IS/IT research as regards papers published in *Information & Management* and *MIS Quarterly* between 1981 and 1997. Referring only to the two-year periods 1994/95 and 1996/97, which are the only ones we can compare with ITEM publications for the 1994 and 1996 conferences, there is a great coincidence in the percentage of studies on certain topics, as is shown in Table 4. Such themes are *Assessment* and *Strategies*. There is, on the other hand, only an approximate connection with other topics during part of the given period, such as with *IT Applications*. However, as regards *Assimilation and Integration of IT* results are totally different, probably because this topic had already been sufficiently dealt with in IS/IT literature before the period we have considered.

Table 4: Comparison of scientific production regarding certain common topics in the IS/IT and ITEM fields

IS/IT field			ITEM field		
Topic	1994/95	1996/97	Topic	1994	1996
IS assessment	6.5 %	14 %	Assessment of IT support to educational management	6.5 %	19.2 %
IS strategies	5.9 %	0.8 %	Strategies to integrate IT into educational management	6.5 %	3.8 %
IT applications	9.8 %	26.9 %	IT applications in educational management	29 %	27 %
IS alignment with organisational management	3.9 %	10.4 %	Assimilation and integration of IT into educational management	12.9 %	34.6 %

6. CONCLUSIONS

The interest in overcoming problems derived from adapting a new and changing technology such as IT to educational management has set the standards for ITEM research during Working Group 3.7's ten years of existence. In such a brief period of time no less than six books have been published, with the work conferences' main conclusions, that allow us to confirm that this area of study is now reaching its maturity. The topics handled, the employed methods of investigation and the parallelism between ITEM and IS/IT study percentages are all evidence to this.

Nevertheless, ahead of us is the task of completing a compact body of learning made up of theories that can help ITEM acquire its own identity.

This is not easy owing to its multidisciplinary nature and its strong dependence on such a changing support such as IT.

This study should be extended by referring to literature on the use of IT applied to educational management other than that published by our specific working group. This would undoubtedly broaden our views on this extremely interesting field of study.

7.   REFERENCES

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