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The Virtual Management of Schools

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Abstract. This paper presents a research conducted in fifty schools in the province of Toledo in Castilla-La Mancha (Spain) in which the potential of virtual tools and digital resources in the development of management functions and school organization was analyzed. Through a quantitative and qualitative methodology we check educational communities' opinions about main virtual tools and digital resources to improve communication, administrative tasks, academic activities and digital relationships in order to enhance the quality of educational institutions. We have reached remarkable results, such as: school organization, digital communication among all members of school communities, educational programming, along with teaching functions can be significantly improved with the use of institutional interactive networks that include communicative functions and school management in a virtualized way.

Keywords: school organization; collaborative virtual environments; networking; e-management

Introduction

This research aims to analyze the potential of virtual tools in the development of management tasks in a sample of secondary schools in the province of Toledo (Spain). The main objective is to check educational community opinions about how ICT can improve the organization and management of schools. The organization of schools is still in many cases under archaic operational structures that do not integrate digital tools into the routine organizational processes that affect mostly board of management's work (Preece, 2000; Halverson, & Smith, 2010). The management of schools may be substantially improved through collaborative work and the design of digital structures in order to monitor the information, downloading of bureaucracy and paperwork of the school (Fulk, & DeSanctis, 1995; Blanchard, & Markus, 2004; Minocha,

2009). The main management tasks that can be improved with ICT strategies in schools are the following (Vázquez-Cano, & Sevillano-García, 2013; Vázquez-Cano, 2013): coordinate academic activities and complementary guidance of teachers and students; develop academic schedules for students and teachers, coordinate the activities of heads of department, coordinate and direct the action of tutors, coordinate faculty development activities and organize teacher training activities, encourage the participation of different sectors of the school community, participate in the development of the proposed educational project and the annual programming, and romote coexistence in school.

Among the tools and actions based on Web 2.0 to enhance the management functions, we can highlight: virtual tutoring, virtualized attention to diversity, cloud computing, virtualized control of curriculum development, digital and computerized management of the school activities, social networks and websites for the international exchange of students, sending digital messages to different members of the educational community, faculty and their families for the call of regular meetings and information, virtual secretary for virtualization of all information, management of discipline (information and administrative data through interactive database), control and management of teacher absences and their substitutions in a virtualized way (Blank, Berg, & Melaville, 2006; Bouras. Giannaka, & Tsiatsos, 2008; Bishop, et al., 2010).

Virtual school organization

School of XXI century is characterized for being into the Information and Knowledge Society (Chapman, Allen, & Harris, 2005; European Commission, 2010; Archambault, Wetzel, Foulger, & Williams, 2010). Organizational aspects so invariable and settled as the traditionally time-space, classrooms, buildings and organizational resources have significantly changed. At present, it is changing the school organization incorporating ICT and structures involved in the concept of virtuality (Clark, 2001; Baker, & Ward, 2002; Murray, 2008). A school that prepares students for the society in which they live and where ICT play an essential role which change all organizational dimensions (Jones, 2004; Wenger, White, Smith, & Rowe, 2005).

A global and technological society that is changing the paradigm of school management, making it more universal and open from the principle of collaboration. The main objective is bringing innovation to organizational forms of learning organizations, so they can innovate, adapt and change (Warren, 2005; Zigurs, 2009). The society of the future will be, therefore, a society that must invest in intelligence, a society in which each individual could create their own educational paths; in other words, it will be a learning society.

Modern societies are immersed in the dynamics of rapid change that generates demands into the educational system. The new technologies of information and communication, the processes of immigration and multicultural societies, new forms of relationships between people and cultural and social groups or so-called economic and cultural globalization, among other things, cause that the new realities and issues search for an answer in the educational system (Taylor, & Adelman, 2000; UNESCO, 2009). A summary of what will be the new society

from a very dynamic life of the people and the changes that happen quickly can be summarize, as follows (Vázquez-Cano, 2013): the globalization of the economy, the appearance of new employment sectors, the promotion of change, industrial automation, interactivity, complexity, the immediacy of outputs and outcomes, and the efficiency and progress.

This brings new forms of social organization, where the simultaneity appears as a constant. An age where modernity has already left passage to technological post-modernity, virtual reality and new ways of interacting in not only physical spaces but with a technological base (Martin-Kniep, 2007). We understand the need to share in a world increasingly open and ongoing participation of all citizens and social agents (Jaeger, & Bertot, 2010).
For years, we have been hearing about major changes as a result of this knowledge society, to adapt to it and to learn from and with it. But the truth is that although ICT falls gradually in teaching materials (often from fashion and not from the conceptual and procedural pedagogical justification) the organizational structure of schools finds itself in a considerable delay with respect these new ways of apprehending reality (Hiatt-Michael, 2001).
One of the problems that we believe the school has failed to assume is the gap and the speed at which information flows in an escalation of unprecedented technological innovation.

And we talk about school in the sense of organization, not so much teaching. There are notable approximations to integrate ICT into the school curriculum, but the organization of the school does not respond with participatory and collaborative structures that support the structure of the school that opens to a technological world and a society increasingly interconnected (Henderson, & Mapp, 2002). Given the new challenges of the Information and Communication Society should be a priority of the current educational processes to integrate the media in the educational process to reflect on them, their languages, ways of reporting on the world in order to contribute to the organization of schools.

These organizational strategies are based on the knowledge of organizations and on theoretical positions based on the resources and theories based on dynamic capabilities (Blanchard, & Markus, 2004). They generally distinguish between two levels of knowledge management: strategic management (creation of core competencies) and operational management (distribution of knowledge and information).) A changing society requires organizations to adapt and revise their consistency and forms of action in relation to the needs of the environment. The innovation was a purpose of leading creative organizations and becomes a widespread need and a problem that constantly arises at different levels and with different strategies. Management and technology innovation for the organization of the school enhance the teaching-learning processes as well as relationships among educational community members in different dimensions (Vázquez-Cano, 2013): To help schools to develop institutional capacity enabling them to enhance self-review processes, planning and strategic action aimed at institutional improvement. Ensure the development of a collaborative culture among the agents of innovation, so that professional dialogue, sharing

experiences, ideas, values, learning with others, and so on., could be highly achieved. Facilitating the learning of skills and techniques that make possible the cultivation of self-review process, planning, development, evaluation and collaborative work from the viewpoint of improvement and professional development as permanent training framework on teacher. Increasing the professionalism of teachers in the field of collaborative institution that promotes self-direction without impairing the ability to respond to the needs of individual or social. To facilitate the institutionalization of change. Connect the pedagogical and organizational.

In developing plans for technology, schools may want to: Consider how technology can help when making decisions about how to deliver excellent teaching, effective school management and improved accountability. Think about the scope of the knowledge and resources available to pupils beyond the bounds of the classroom and the textbook, to the very best online lessons, digital resources and tools. Consider the scope of professional tools in the hands of teachers, so they can carry out assessment, record and access data easily when they need to. Ensure teachers are equipped with the skills to integrate digital technologies and new approaches successfully into their teaching, and set a clear expectation that no teacher should ignore the importance of technology in learning. Deliver an ICT curriculum that engages pupils and equips them with the skills and knowledge needed for further study and the 21st century workplace. Manage technology infrastructure and services professionally, offering access to tools and resources anywhere, anytime and achieving best value when purchasing technology.

Method

The method used has been a multiple case study (Biddle, & Anderson, 1989). This method try to extrapolate theories by contrasting hypotheses learned in a context within different contexts. Our study aims to assess the appreciation of the educational community about the functionality of ICT tools in the development of director of studies' functions in the school. For data collection techniques have been used questionnaires, ethnographic interview, and participant observation on one side and on the other hand, monitoring the operation and content of the social network as an active participant. These techniques have an important complementary value, as the interview can understand and grasp what an informant thinks and believes, how he/she interprets his/her world and what meanings they use and manage. We analyze the next sample of schools in the province of Toledo (Spain):

Table 1: Data

	High-Schools	*Private-Public High-Schools*	*Private Schools*	*Total*
City	25	10	5	40
Rural	10	0	0	10
Number of Students	3845	1301	301	Total 50 Schools

	Total: Students	5447

The comparison among the various schools in the province of Toledo aims to generate hypotheses confronting theories learned in different contexts. The range and types of institutions rather than representing a difficulty becomes a methodological enrichment that generates greater validity to the findings; providing a general explanation in multiple contexts. Furthermore, comparison of these schools is productive for the following characteristics: From a regulatory point of view include a full range of types of schools that currently exist in Spain. Replicating the same study, variability and balance (rural vs. urban and public vs. private). Because we present schools with a variable number of students and families, which gives sample variability.

Thus, contrasting these schools and test our hypotheses and conclusions in multiple educational settings, we provide a method to generate substantive theories, with different levels of depth concerning the amount of information collected and the sample of people involved: students, teachers, families and school inspectors (Kemmis, & McTaggart, 1988). The phases in the research process were as follows:
1. Refined instruments are applied in the first phase of immersion in all schools in the province of Toledo, prior to this, it is performed a validation of the questionnaire and data collection instrument by the Education Inspection Services of Toledo.
2. Data is collected by education inspector's visit and the results are analyzed in different schools in the province to enrich theory and case study contrasting results.
3. Results are contrasted in the different educational areas and discarded the questionnaires or unreliable results.

Our key informants in the sample were as follows: Teachers of the schools analyzed in the province of Toledo. All head of department of the analyzed schools. All guiding and orienting team in each school. All members of management teams (Principal and head-master) of the schools analyzed. A sample of fifty students. A sample of fifty parents.

Triangulations
The Triangulations developed are as follows: Triangulation of data analysis (families, students and teachers). Triangulation techniques in collecting data (Likert questionnaire and open questions). Triangulation longitudinal temporarily and permanently.

For the analysis of these triangulations, we have adopted the principles of a holistic study focused on the relationship of systems or acting, referenced to personal, stay in the context expressing the feelings of the researcher and ethical commitments, reworking the instruments from the context and even in our final analysis will be modified to be applicable in the future on other broader contexts.

Techniques and tools
The techniques and tools tried and collect as much information as possible about the objective of the research. The following techniques are related data collection projects in the three levels of depth and key informant:

Level I. Interview by questionnaire and open questions to the management teams of the schools studied.

Level II. Sample of teachers, using questionnaires and inspectors personally visited all the high-schools analyzed with a stay of between three and six days. During these visits they used the following instruments: Interviews (Individual semi-structured interviews to teachers. Opinion questionnaires to teachers. Inspector observation for checking the functioning of different virtual tools on the management of schools. Collection of information for further analysis).

Level III. Sample of families and students through a questionnaire and individual and group interviews.

In these interviews were passed the following instruments: Interviews and opinion questionnaires to different members of the school community.

Results
The quantitative results obtained were analyzed using the SPSS statistical package. We used descriptive analysis and contingency tables and were facilitated frequencies and percentages of the variables analyzed. Results are shown below organized according to the objectives of our research. First we will address the expectations of teachers (including management teams), and later analyze the students and parents expectations.

Expectations of educational community about the ICT use in management of schools
We have analyzed what were the expectations that educational community had about integration of ICT in management practice. The descriptive results are presented in the following tables:

Table 2. Descriptive statistics: AREA 1: Monitoring and execution of management tasks with ICT support.

AREA 1: Monitoring and execution of management tasks with ICT support.			
1. What action based on ICT means an improvement of management functions?			
	Family	Teacher	Supervisor
a) Virtual	65%	72%	90%
b) Communication of Absences	97%	90%	100%
c) Academic Information for Families	89%	79%	88%
d) Virtual	65%	69%	87%
e) Digital agenda	85%	77%	93%
f) Electronic Assessment Information	91%	74%	99%
2. How do you rate the inclusion of ICT in management duties?			

	Family	Teacher	Supervisor
a) Excellent	81%	75%	80%
b) Very good	5%	10%	9%
c) Good	4%	5%	6%
d) Regular	10%	10%	5%
e) Poor	0%	0%	0%

Table 3. Descriptive statistics: Digital communication among all members of the educational community.

AREA 2: Digital communication among all members of the educational community.			
1. What action based on ICT means improved communication among members of the educational community?			
	Family	Teacher	Supervisor
a) E-mail	75%	67%	78%
b) Networking	95%	89%	100%
c) Virtual Tutor	40%	54%	78%
d) Virtual Agenda	67%	57%	69%
e) Videoconferencing	15%	5%	34%
2. How do you rate the inclusion of ICT to improve communication among members of the educational community?			
	Family	Teacher	Supervisor
a) Excellent	71%	45%	75%
b) Very good	9%	15%	9%
c) Good	10%	10%	6%
d) Regular	9%	12%	6%
e) Poor	1%	18%	4%

Table 4. Descriptive statistics: Advice, guidance, participation and information with ICT.

AREA 3a (Family): Advice, guidance, participation and information with ICT.						
1. Rate the use of virtualized tools in the development of management functions.	10%	22%	326%	421%	549%	62%
2. Rate the use of virtualized tools in the development of personal and professional competences.	10%	21%	319%	421%	525%	634%
3. Rate the use of virtualized management systems in your expectations about the school.	10%	23%	323%	425%	538%	611%

AREA 3b (Teachers): Advice, guidance, participation and information with ICT.						
1. Rate the use of virtualized tools in the development of management functions.	18%	26%	316%	420%	530%	620%
2. Rate the use of virtualized tools in the	1	2	3	4	5	6

development of personal and professional competences.	6 %	10 %	19 %	21 %	25 %	34 %
3. Rate the use of virtualized management systems in your expectations about the school.	1 0 %	2 3 %	3 23 %	4 25 %	5 38 %	6 11 %

Figure 1 shows main digital tools and resources considered useful by educational community members.

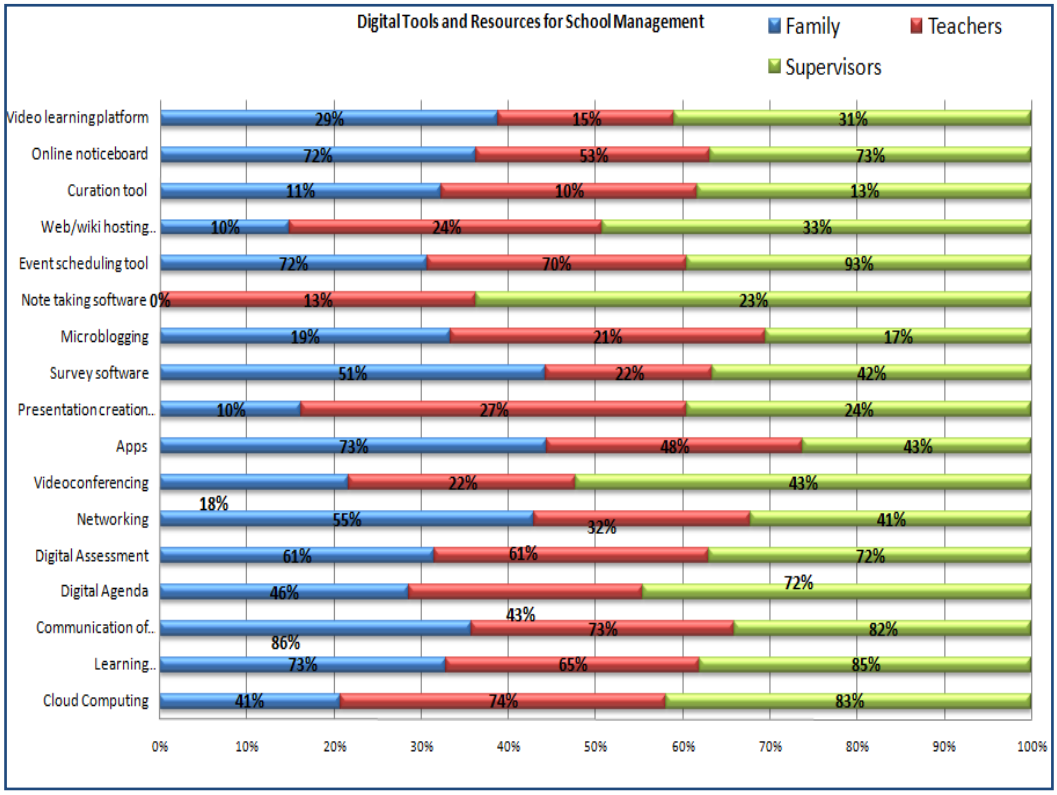

Figure 1. digital tools and resources considered useful by educational community members

Our research demonstrates that the educational communities analyzed very highly appreciate the fact that schools must integrate the principles of open government and e-leadership. Besides, the expectation that the principles of open government with the support from the ICT would substantially improve the performance of the schools was found to be common among all the members of the educational community. The open government at schools mediated by the ICT could create a learning environment as an aligned and synergistic system of systems that creates learning practices, human support, and physical environments that will support teaching, learning, tutoring, and counseling. Supports professional learning communities that enable leaders to collaborate, share the best practices, and integrate the ICT skills into school organization. Allows equitable access to data, technologies, and resources. Provides architectural and interior designs for group, team, and individual learning and supports expanded community and global involvement in the learning process.

Communications technologies provide pathways for the connections among students, parents, families, administrators, and teachers who are at the heart of all strong learning communities. School management information systems based on ICT support transparency, collaboration, and participation through connections that are essential for people to get involved in the education system. Furthermore, e-leadership and online management programs enable busy families to be in contact with the school anytime, anywhere, while fostering the exchange of ideas and best practice with all the members of the educational communities Virtual environments are transforming schools to increasingly use technology to manage the complex array of tasks for which they are responsible, including management of personnel, food and transportation services, supplies and instructional materials, security, and, of course, student information.

Conclusions

It seems clear, and this is consistent throughout the literature on school organization, that what defines a school organization is not only its conformation in a formal structure, but with greater determination on how to operate the school structure. In this structure it plays a crucial role the relationships and how to address the problems and processes of the schools. Social computing networks have opened an exciting new dimension to the schools. Virtualized Management of the school by teachers, members of the management team and family is a system that minimizes the time and integrates all members of the educational community. *These 2.0* tools enhance the following dimensions: integrate effectively to all members and sectors of the educational community of a school, save time and energy in the development of school organization and academic management of schools, keep up to date parents on the status of tasks, exams, absences, tests and exercises of their children, allow to see information about the school or their children through the digital bulletin board service or email alerts, facilitate the expansion or reinforcement of academic activities at home and encourage the creation of an interactive network in order to (co) manage the school.

Among the main features we highlight the following ones: make a direct management, user-friendly and updated daily, generate database exportable and recoverable per year for statistical and internal evaluations of the school, the discipline and truancy of students are two areas of school management that are substantially improved with this type of applications, communication among faculty, educational departments, tutors, parents and management team becomes more fluid, continuous and solvent, communication can be activated according to the profile of community member in order to optimize the communication channels and the quality of the information provided, encourage the active participation of all sectors in the educational process of students, and save time and improve the processes of school organization and academic management of schools.

Online school interaction among all community members also incorporates more sophisticated forms than declarative and procedural information exchange (i.e., questions and answers), such as transactive learning (knowledge about who

knows what) and developing shared mental models through processes of sense making. The Internet is not a separate social reality, it is rather an extension of other forms of life and another means of staying connected. We suspect that people not only have more relationships than in pre-Internet times, they are in more frequent contact with their relationships, and the strengthening of the bonds through more frequent contacts means that ties can be more readily mobilized for aid. In sum, communication sharing in online school communities is facilitated by means of intrinsic and extrinsic motivation, personal characteristics, collective social capital, shared culture, and appropriate features of conversational technologies.

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