



Received: 28-05-2014
Reviewed: 03-09-2014
Accepted: 16-01-2015



RECYT Code: 29245
Preprint: 15-04-2015
Final Publication: 01-07-2015

DOI: 10.3916/C45-2015-14

ICT Leadership in Higher Education: A Multiple Case Study in Colombia

Liderazgo de las TIC en educación superior: estudio de caso múltiple en Colombia

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Abstract

In this paper we analyze ICT integration in higher education institutions focusing on the leadership practices of ICT policies, a research field that has not received much attention in higher education studies. An empirical study was carried out using a distributed leadership approach to analyze such practice in higher education institutions in Colombia, a country where a national ICT policy has steered and promoted ICT policy plans. In particular, the inquiry attempted to understand how the leadership of ICT is distributed in different higher education environments. Through a multiple case study, that included semi-structured interviews with leaders and team members, focus groups with professors, document analysis and a survey applied to faculty members ICT leadership practices and their implications were investigated. The results indicate a set of struggles that leaders have to cope with when deploying an ICT policy plan, for instance, coping with a lack of institutional regulations, and fostering educational change despite reluctance. Indeed, ICT leadership is a challenging and underexplored practice in higher education. This paper is a systematic attempt to demonstrate this statement and its implications. These findings are of particular relevance for the work of policy makers, ICT coordinators and leaders in higher education around the world.

Resumen

En este artículo analizamos la integración de las TIC en instituciones de educación superior. Nos centramos en las prácticas de liderazgo en políticas sobre TIC, un campo de investigación que no ha recibido mucha atención en los estudios sobre educación superior. Usando un enfoque de liderazgo distribuido se analizó dicha práctica en instituciones de educación superior en Colombia, un país donde una política de incorporación de las TIC llevó a promover la elaboración de planes estratégicos en dichas instituciones. En particular, la investigación buscó entender cómo el liderazgo de las TIC es distribuido en diferentes ambientes de educación superior. A partir de un estudio de caso múltiple que incluyó entrevistas semiestructuradas con líderes y miembros de equipos, grupos focales con profesores, análisis documental y una encuesta aplicada a profesores, fueron investigadas las prácticas de liderazgo de las TIC y sus implicaciones. Los resultados indican un conjunto de tensiones que los líderes deben enfrentar cuando incorporan un plan estratégico de TIC, por ejemplo, la ausencia de regulaciones institucionales o la necesidad de promocionar el cambio educativo a pesar de las resistencias. De hecho, el liderazgo de las TIC es una práctica retadora y aún poco explorada en educación superior. Este artículo es un intento sistemático por demostrar este enunciado y sus



implicaciones. Estos hallazgos son de particular relevancia para el trabajo de los diseñadores de políticas, coordinadores de TIC y líderes en educación superior de todo el mundo.

Keywords / Palabras clave

Higher education, leadership, ICT policies, distributed leadership, educational policy, educational planning, case study.

Educación superior, liderazgo, políticas TIC, liderazgo distribuido, política educativa, planeación educativa, estudio de caso.

1. Introduction

Within the field of ICT integration in education, one research tradition focuses on the conditions that support ICT use for teaching and learning (Vanderlinde & Van-Braak, 2010). Within this stream, one of the conditions that has only recently received attention is situated at the organizational level, more specifically in what is called the ICT policy planning, referred to as «having a shared vision on technology integration and an ICT policy plan» (Hew & Brush, 2007). The general assumption and common agreement is that ICT policy plans increase the success of ICT integration in educational contexts (Bates, 2001; Wang & Woo, 2007; Gulbahar, 2007). At the national, district or institutional level, ICT policy plans are conceived as a blueprint of what education should look like through the use of ICT (Fishman & Zhang, 2003). Furthermore, such an ICT policy plans outlines learning objectives for the use of ICT, making this process a strategic device and potentially a driver for educational change (Vanderlinde, Van-Braak & Dexter, 2012).

In this paper, we inquire how leadership of ICT is distributed in different higher education environments, highlighting the sorts of problems that emerge in such activity. As we will argue in the next section, the analysis of ICT leadership from a distributed leadership approach is an appropriate perspective from which to study the challenging nature of ICT leadership in higher education. In order to understand how leadership is displayed in higher education institutions (HEI hereinafter) in which ICT policy plans are enacted, we use a distributed leadership perspective as the main theoretical framework. Compared to traditional perspectives, this approach assumes leadership is diffused and dispersed within organizations (Parry & Bryman, 2006). Instead of focusing primarily on the appointed leader and intrinsic traits, the analysis pays attention to the activity of leadership practices and their effects.

Spillane (2006) develops the notion of distributed leadership in contrast to the traditional conception of a charismatic leader who performs tasks in an organization on the basis of individual qualities. Therefore, the unit of analysis should be the activity of leadership (not the individual) distributed through the interaction between leader and followers across situations. Spillane was not the first to develop the idea of distributed leadership practice as a unit of analysis (Gronn, 2002; Copland, 2003). However, he offers a more consistent perspective embedded in theories of learning such as activity theory (Leontiev, 1981; Wertsch, 1991) and distributed cognition (Pea, 1993).

Accordingly, this theory assumes that followers are not individuals separated from the practice of leaders, as there is a social distribution of tasks. Such interdependence of leaders, followers and their situation means that leadership activity cannot be viewed as undertaken solely by any one of them; rather, each one is a precondition for the analysis of the entire activity. Spillane (2006) emphasizes the role of actors in a socio-cultural situation working with artifacts, which represent vehicles of thoughts. These artifacts are not only devices for achieving efficiency but they also transform the nature of leadership activity. According to Spillane tools, routines and structures enact these artifacts, both defined and re-defined by leadership practice (Spillane, 2006). In our analysis the idea of policies as tools, routines and structures is relevant as we assume ICT policy plans as artifacts (Vanderlinde, Van-Braak & Dexter, 2012).

The work of Spillane has underpinned a recent perspective that emphasizes the need of institutions to have leaders guiding and supporting those artifacts through a distributed approach. Tech-



nology leadership or ICT leadership represents this process of guidance and support in educational settings (Dexter, 2011). As McLeod and Richardson (2011) state, there has been little research on leadership of technology in general, despite recent interest in studying the key role of leaders in educational institutions to enhance innovation. Although research studies demonstrate the complexity of technology leadership –highlighting the relevance of individual and institutional factors when addressing ICT integration– there has been a gap in such studies in relation to understanding how technology leaders should enact this endeavor (Dexter, 2011).

Previous research has identified factors associated with effective leadership, defining three broad categories of leadership practices: setting direction, developing people and redesigning the organization (Leithwood, Anderson & Wahlstrom, 2004; Leithwood & Jantzi, 2003, 2005). These categories have also been applied in relation to ICT leadership practice, focusing on: 1) the vision for ICT within the institution, 2) promoting ICT teacher development and instructional support, and finally, 3) providing ICT access and technical aid, supportive policies and other conditions (Dexter, Anderson & Ronnkvist, 2002; Zhao & Frank, 2003)

A lack of literature when researching ICT leadership in higher education has been claimed (Van-Ameijde, Nelson, Billsberry & Van-Meurs, 2009). Therefore, following these studies and recommendations, we aim to study how the leadership of ICT in different higher education environments is distributed, focusing on the practice of leadership, paying attention to the artifacts, and the situations that should be considered in this unexplored context of higher education.

2. Methodological design of the research

This study was situated in Colombia, where a national ICT policy has been in place since 2007, consisting of the elaboration of guidelines to formulate and implement ICT policy plans in HEIs. Through this policy, named PlanEstIC, more than 100 HEIs throughout the country were steered to elaborate, implement and evaluate their own plan (Osorio, Cifuentes & Rey, 2011). Although this project was not a single initiative from the government, compared to other regions in Latin America this policy developed a National ICT policy oriented on strategic planning for ICT. Therefore we consider this a relevant case to increase knowledge about ICT leadership. As Hinojosa and Labbé says: «From a regional perspective, the introduction and use of ICTs in education in Latin America is not different than in the rest of the world. Where the region differs from many developed countries is that there is very little evidence on the characteristics of policies and the extent to which they are being implemented» (Hinojosa & Labbé, 2011: 12)

According to the guidelines of PlanEstIC, a team in each HEI was selected and guided through whole process with coordination at the national level, creating leadership conditions to deliver the individual plans. Our empirical research started with an initial exploratory stage in one of the seven regions in which PlanEstIC was conducted, focusing on seven institutions of the selected region. Within each HEI, the leader and team members were contacted for an initial interview. It was important to select HEIs that met two minimum conditions: an explicit ICT policy plan and an ICT unit established. Essentially, ICT units are the teams in charge of integrating technology in different areas within an institution. Although many HEIs around the world have a team in charge of IT support, we were looking for ICT units that fulfill one of the guidelines of PlanEstIC, i.e., they incorporated at least three different roles composed of a technological role, a pedagogical role, and a planning or financial role.

After the implementation of PlanEstIC, all these institutions should have had their plans and teams arranged, but we wanted to explore initially if these plans were explicitly formulated and teams were still operating. Following initial contact, it became apparent that only three institutions had appropriate conditions to study ICT leadership in relation to developing an ICT policy plan. The graph in Figure 1 shows the structure and composition of selected the cases after the exploratory stage.

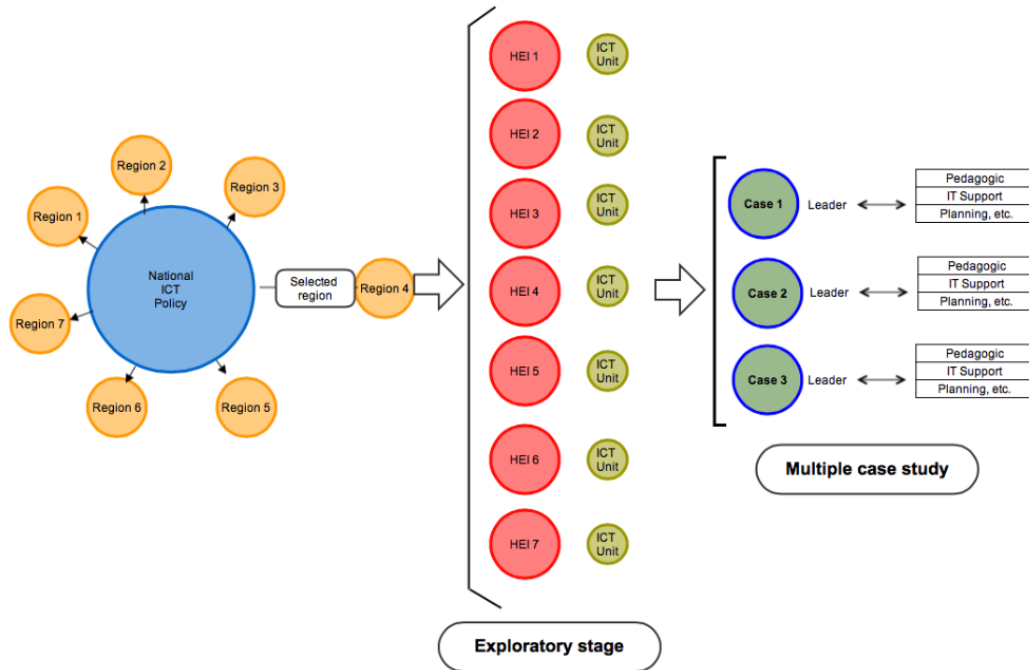


Figure 1. Structure and composition of research cases.

To answer the research question, a mixed methods design was carried out with three case studies. More specifically, in organizational studies, it is now considered that qualitative approaches are of particular relevance in analyzing the roles of leaders and their followers (Mumford & an-Doorn, 2001). Especially case studies are illustrative for leadership processes (Bryman, 2004). Several instruments were applied in each HEI to explore the leadership practices, taking into account that not only the team but also professors are essential in the situated analysis of such practice. In our case, professors engaged and reluctant to use ICT were contacted and a focus group was arranged covering issues in relation to the general strategy to integrate ICT in the institution, as well as their experience of teaching supported by the ICT unit. After these initial approaches, a survey was employed at each institution to measure the general perception of the staff regarding the strategy to integrate ICT in the institution and the achievements and failures of such strategy. Table 1 shows the number and type of methods applied in each HEI.

Table 1. Research methods: Participants, methods and objectives			
Source	Method	No.	Objective according to theoretical framework
Team leader	Semi-structured interviews	3	Understand the general strategy formulated and implemented (ICT policy plan/planning). Understand leadership activity and system of practice.
Team	Structured interviews	3	Understand leadership activity (as followers)
Professors engaged with ICT	Focus groups	3	Understand perceptions and beliefs concerning ICT policy planning
Professors reluctant to use ICT	Focus groups	3	Understand perceptions and beliefs concerning ICT policy planning
Professors	Survey	N= 348	Measure overall attitudes toward the ICT policy plan administered



Document analysis was also part of the methodological design. The documents were predominantly ICT policy plans, official documents (such as those relating to foundation of units) minutes from meetings, and several Excel files containing the strategic plans of units and institutions. All structured interviews, semi-structured interviews and focus groups were transcribed and coded. For the analysis of qualitative data, Atlas.ti 7 software was used. Codes were assigned to sections of each transcription.

We used two clusters of codes. The first group was related to tools, routines and structures. The second related to leadership practices, including setting of direction, staff development and the redesign of the organization. When all coding was completed, the Atlas.ti 7 program was used to capture all text segments within one specific code. These reports (Yin, 2003) were useful to obtain main themes that emerged from the qualitative data. For the survey, descriptive data were analyzed. Due to the nature of the problem and the research question, it was found irrelevant to compare or establish statistical generalizations between HEIs. Therefore, the survey was employed to complement the understanding of beliefs and attitudes among academic staff at each institution.

The research design was structured in a case study approach (Yin, 2003). We consider that these cases were a good opportunity to analyze ICT leadership under particular conditions. A first vertical analysis allowed understanding of each case using the reports from Atlas.ti 7 and a later cross-case analysis was applied. As criteria for the quality of the research design, an analytical generalization was pursued: previously developed theory was used as a template to compare empirical results (Yin, 2003).

3. Analysis and results

Initial findings from the exploratory stage showed that institutions without an established team or a formal ICT policy plan tended to have two kinds of problems. First, when a plan exists but there is no unit in charge, efforts are pointless; and second, when a unit is appointed but there is no explicit plan to integrate technology in educational processes, there is a lack of vision, efforts cannot be guided, and strategies and activities cannot be measured in the long term. Based on this initial analysis, we selected three cases that fulfilled the conditions stated above (an explicit ICT policy plan and an ICT unit established). As we stated initially, ICT leadership is a challenging and under-explored practice in higher education. To support this argument and to answer the question regarding how the leadership of ICT is distributed in different higher education environments, we structure our findings in three sections.

First, we describe the nature of these units (structure, functions, etc.) and situate the role of artifacts through a vertical analysis of each setting. Second, through a cross-case analysis, we study the leadership activity in these contexts, using as a lens the threefold categories of leadership practice (setting direction, promoting teacher development, and redesigning organizational work) translated into ICT leadership contexts. Finally, we discuss the challenging nature of ICT leadership practice in higher education attending to certain implications for these scenarios.

3.1. Foundation and structure of each unit (within-case analysis)

We started analyzing on each setting the interdependence of leaders and followers in institutional situations in which they enacted ICT policy plans through tools, routines and structures (artifacts). As our point of departure is a deep definition of ICT policy plans, we paid attention not only to the official documentation but also to the process of delivering and enacting it within the organization. As will be described, units were appointed to deliver an ICT policy plan within each institution. However, there were different conditions for starting such endeavor depending on institutional and organizational structures, meaning different socio-cultural situations (Spillane, 2006).

3.1.1. Case 1

In case 1, University Council created the unit in 2008. At that time, the Minister of Education was in charge of a national project to give pedagogical support to a set of universities to implement a methodology for the development of an on-line program. From the time the university was selected



to take part in the project, this ICT unit was appointed to participate; the appointed leader saw an opportunity to create a broader team within the institution to build a participatory policy on ICT (including professors and students). Therefore, in the same year, an institutional ICT policy was formulated and endorsed by the University Council. This participatory policy (bottom-up) documented needs, activities, and actors in charge; similarly indicators were delineated to achieve each activity. According to the leader, that artifact was an initial attempt to establish ICT leadership but there was a need for a more accurate strategy.

Therefore the team elaborated another artifact, called the «Virtual Strategy», to operationalize the policy to a great extent. This was an overall strategy that set out principles, a methodology and a way for the ICT unit to lead ICT integration within the institution. The process of elaboration of this artifact was built on a distributed perspective, meaning that tasks were spread among the team; even graphic design (one of the areas in the unit) was carefully considered to create an attractive and clear artifact -the Virtual Strategy- potentially known by every member of the educational community. Enhancing the previous version of the policy, this artifact defined a pedagogical model (inspired by international models), the role of teachers and students in virtual learning environments, and quality standards.

3.1.2. Case 2

The foundation of the ICT unit in this case was preceded by an institutional process of reflection on needs and opportunities in using ICT for teaching and learning. That process started 12 years ago and the unit was one of the first outcomes. Founded at that time the unit was in charge of the design of digital content and virtual learning environments. Indeed, PlanEstIC was a later external artifact that was preceded by an institutional policy-making and ICT leadership process started in 2007. At that time, the ICT unit led to a group of professors and a research group (on educational informatics) to undertake a project on ICT integration to support academic staff. The University Council endorsed this project, linking it to the institutional strategic plan. The next year, the unit started developing the project through six strategies, including an overall diagnosis of different dimensions of ICT integration. At the end of the year, PlanEstIC was placed as an external artifact, useful in delivering a first draft of an ICT policy plan (2009) and taking advantage of all the know-how brought by the Minister of Education.

However, as the unit leader mentioned in the interview, this external policy was not sufficient to run a formal ICT policy in the institution. Despite the knowledge transferred and organizational learning acquired, another kind of leadership was needed beyond the ICT policy plan which had been developed. Three years later, in 2012, the ICT policy plan was finally endorsed and the University Council approved the document, but only through a long and challenging process of policy-making (explained in the next section). Five strategic lines are described in this artifact: ICT diffusion, pedagogical training, pedagogical support, monitoring and assessment, and infrastructure. The overall strategy appointed a leader for each one of the strategic lines (our interviewed leader was in charge of one of them). A positive effect from this strategy was that 80% of the academic staff surveyed was aware of a formal ICT training strategy in the institution. Similarly, 58% considered that the institution offers to appropriate conditions for staff to innovate with ICT.

3.1.3. Case 3

Four stages are described in the historical documentation of the ICT unit in this case. The first stage started in 2003, with a previous process of pedagogical training and an ICT diffusion campaign, which included the participation of the Rector, academic staff and administrative employees. The next year, the unit was founded and a second stage consisted in the formal development of several strategies -locally designed artifacts- by this unit. These strategies included research, communication, outreach services, and teaching and learning. As we could analyze in our case study reports, each of these artifacts was composed of different projects representing tasks to be enacted. For instance, one of the strategic lines (teaching and learning) drove a first training program for teachers that later became a strong and renowned program even outside the institution as



an ICT training strategy for teacher development. A third stage of the ICT unit enhanced strategic lines within the university through the production of blended courses in different academic programs. In addition, at this stage, a permanent connection with the Minister of Education was established to develop projects and agreements through outreach services. The fourth stage (to date) was the consolidation of the current team, defining areas of expertise such as pedagogy, quality assessment, support system, financial management and marketing of e-learning, and design and development.

Compared to the other cases, one important feature in this ICT unit is a «shared leadership» practice. This means that since 2006, the appointed director has been sharing the coordination of the unit with another member, distributing administrative and managerial responsibilities to enhance decision-making processes. The unit has also continued to establish projects with the Minister of Education; the leaders mention that the quality of the unit is due to the level of commitment and the «high-pressure style» they are used to coping with when giving reports and detailing outcomes to the Minister. Despite this positive performance outside the institution, the leaders declare that opposition to the overall strategy from staff and other units within the institution is a common source of struggle.

3.2. How is ICT leadership distributed within the organization?

In this section we describe findings from the cross-case analysis. We focus in each category of leadership practice applied in ICT leadership contexts, i.e., setting direction, staff development and redesign of the organization (Dexter, 2011). Having considered both vertical and horizontal analyses, our findings lead to a reading of practices as a set of struggles that leaders and teams encounter in each institution.

3.2.1. Policy-making: Struggles in setting direction

As stated above, an in-depth definition of ICT policy planning highlights the process of leadership rather than the final product (document). Therefore, we paid attention to different kinds of challenges identified when analyzing ICT policy planning. One challenge is the process of development and gaining support from directors. Another is to convince Heads of Departments, coordinators, and - clearly - academic staff of the relevance of the plan. A third common struggle was the pursuit of a common vision of ICT integration within the institution. All our units of study were related to the Academic Vice-Rector, which implied that they were in a strategic position to promote their vision. Indeed, they were all in an arena in which they could obtain support and gain a reputation that would allow them to achieve ICT integration. However, we found that followers of these units (academic staff who were enthusiastic about and engaged in ICT integration) encountered resistance from their own colleagues.

Equally, we found that levels of support for the ICT policy plan from academic staff tended not to be high among our case studies. From the staff surveyed, only in Case 2 we were able to find majority acceptance (56%), in contrast to the other cases in which favorable attitudes were held by less than 50%. In all the cases, a common feature of the practice of these leaders was a permanent struggle in the implementation of a formulated plan. For instance, promoting a shared vision also implied that leaders and their teams dealt with reluctant academic staff as part of policy-making. As claimed by one of the teams, the strong beliefs held by such staff concerning technology were a major struggle. Some of these staff members perceived the policy-making as «top-down» and «informative» (in a prescriptive sense), despite interviews with leaders mentioning a participatory process.

3.2.2. Encouraging educational change: Struggles in developing staff

As the literature states, technology leadership has to do with broader functions than technical support alone. Curriculum management and fostering educational change should be part of such an endeavor (Tondeur, Van-Keer, Van-Braak & Valcke, 2008). In our case studies, teams at each



university had to struggle not only with implementing an ICT policy plan, but also trying to create conditions for innovation and educational change at different levels.

A common struggle in all the cases concerned time and this was expressed in relation to various aspects: time for academic staff training to develop ICT skills; time for academic staff to implement innovations in their courses; time for members of the unit to attain defined goals. This kind of struggle is relatively straightforward and is connected to a financial issue that intersects all ICT policies. In one of our cases the main achievement was that team members and academic staff were given time for ICT training and support activities on ICT. However, cross-case analysis showed that this could be explained as an overlapping of different policies. Indeed, in this case, the allocation of time was possible because an administrative policy regarding funding for staff could be approved (one of the members of the team was also a member of the Administrative Council which defined the ICT policy).

As the leader mentioned, one of the most important factors in an ICT policy is the concrete allocation of time for team members and academic staff to engage with related practices, rather than a short allocation for ICT integration. As we expected, even engaged academic staff complain of lack of time when attempting to innovate: If you want to use all that (pedagogical and technological support from the ICT unit), it requires too much time. Setting up a whole on-line course, involves you spending a lot of time, a lot, a lot (Member of academic staff, Case 1)

3.2.3. Administrative regulations: Struggles in redesigning the organization

As stated above, leadership activity is a situated practice that is constrained and framed according to possibilities and institutional conditions. Among these conditions, we also mention institutional governance as a complex web of factors such as the legislative framework, policy funding, autonomy, and market regulations (OECD, 2003). In our cases, legislative and administrative regulations regarding the payment of staff, types of recruitment (staffing), and even educational models supported by ICT (e-learning, b-learning) exert a considerable influence on ICT leadership.

According to one of the team members, in on-line modalities there is a need to clarify several economic and academic issues. For instance, there are issues concerning the hiring of staff when implementing blended and e-learning programs: what is the rate and cost of time for an on-line member of academic staff, assuming that he/she will invest more time in the beginning of the course? Similarly, rewards for enthusiastic staff members have not yet been formalized; as one staff member stated, «Those of us who have invested time deserve a reward for that extra mile we give» (Member of academic staff, Case 2)

Quality assurance is another struggle for leaders and their teams in relation to the implementation of on-line and blended modalities. One of the leaders in Case 3 described the struggle with the Administrative Board of the institution, which demanded that on-line courses have the same number of students (40) as regular classroom courses. The leaders in this case instead defended the idea of a maximum of 30 students per course because when that number is increased «It doesn't stimulate interaction or social knowledge construction».

4. Discussion and conclusions

In order to answer the research question, this paper has demonstrated how challenging ICT leadership is in a higher education context. To accomplish that goal, we have studied this phenomenon from a distributed leadership approach, as we consider it a powerful framework for analyzing the nature of such activity in a little-explored field. We found that formulating an ICT policy plan and establishing an ICT unit are preconditions to fostering innovation with ICT in higher education. However, our analysis shows that further attention must be paid to policy making, steering educational change in academic staff, and dealing with administrative regulations. All these aspects constrain and frame ICT leadership practices. Concretely, using the three categories of ICT leadership (setting direction, staff development, redesign of the organization) it is possible to mention the relevance of this study for different roles involved.



For policy-makers and decision-makers at educational institutions this paper reveals the necessity of promoting ICT units envisioning them beyond IT support functions. As a matter of fact, setting direction implies not only an ICT policy plan but also a team in charge of its enactment, two prior conditions that we highlight from our initial findings.

Consequently, ICT units have a great responsibility and actually are key mediators for educational change, for instance, promoting new teaching practices as part of staff development. However, such activity leadership implies a permanent struggle with academic and even administrative staff. Indeed, educational change involves both pedagogical and administrative issues (legislative framework, policy funding, etc.) as a way to redesign the organization; any ICT unit should take this into consideration when enacting ICT policy plans.

For leaders and members of ICT units in higher education, these findings are relevant to understanding leadership as a matter of appropriate distribution of tasks depending on the ICT vision elaborated and the artifacts to hand (locally designed or received). ICT policy planning and policy-making are ongoing processes (Taylor, 1997) revealed in our cases through the persistent (and challenging) work of those teams when elaborating and redefining artifacts to increase possibilities of enacting an ICT policy plan.

Similarly, this study represents a contribution for education policy analysis in the Latin America context. Particularly the analysis of policy enactment in higher education deserves further research as we stated above, considering a deeper definition of ICT policy plans, i.e., a process more than a document to implement.

From this regional perspective, the methodological approach applied can be useful in increasing evidence based knowledge about ICT leadership in the region, since the cases illustrate the issues experienced by ICT teams that attempted to enact ICT policy plans. As literature shows, many countries in Latin America are formalizing ICT policy plans but few of them are incorporating systems for evaluating the enactment of those policies (Hinojosa & Labbé, 2011). In this regard, a possible limitation of the study is the focus on a particular region in Colombia with specific dynamics; further studies should analyze differences among regions, and even countries, on ICT policy planning. Another possible limitation is related the scope of this study on solely institutions with an ICT policy plan. Further studies should, therefore also analyze dynamics of ICT leadership when such a plan is absent.

Leadership practice and associated analytical categories have previously been conceived and tested through school-level research (Dexter, Anderson & Ronkvist, 2002; Leithwood, Anderson & Wahlstrom, 2004; Leithwood & Jantzi, 2003, 2005; Zhao & Frank, 2003; Vanderlinde, 2010; 2013). Despite these contributions, this study outlines that when applying such framework in higher education, the high complexity of such environments deserves more attention from scholars.

Furthermore, we consider that ICT leadership in higher education should focus on different dimensions which are still under-explored, such as cultural and institutional issues. Indeed context as sociocultural situations shape differently leadership activity (Spillane, 2006). In the context of Latin America, where this study was carried out, research on ICT policy plans and leadership to enhance educational change should take this into consideration for further studies.

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