

ICT and PLCs, for a Better Professional Development of Human Resources in Education

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Abstract— This study scrutinizes the use of information and communications technology (ICT) in professional learning communities (PLCs). A qualitative study consisting of a 39 interviews of diverse education agents (i.e. teachers, school principals educational consultants) was led in this research. These education agents were asked to further articulate about their needs in term of training and the role played by ICT within PLCs' for their professional development. The results have disclosed that enhancing the ICT skills does facilitate the collaboration among members within PLCs'. In fact, participants expressed their interest in improving their interactions and collaboration within PLCs, via ICT training. Ultimately, the idea of technology integration represents a major advantage when it comes to PLCs' enhancement.

Keywords— Professional learning communities (PLCs), Information and communications technology (ICT), professional development.

I. PROLOGUE TO STUDY

Some educational organizations' studies argue that innovation and improvement in teachers' competence cannot be adequately established if those operate in isolation [1].

Nowadays, collaboration between practitioners within a school is considered as an auspicious solution when it comes to developing and installing long-lasting changes in educational organizations [2], [3]. But such collaboration is not easy to achieve due to a significant lack of data, the school body background and mainly the unforeseeable state of affairs of teachers and leadership body. The challenges, conflicts, defects, feebleness and tension between members render collaboration within the community much easier said than done [4], [5].

For the aforementioned reasons, interpersonal behavior development would be useful for employees at all levels either working in teams or with students [6].

PLCs' are a group of individuals working in a well-structured manner and promoting collective work. These PLCs aim to build up a communal vision of the school and learning, better develop the existing capacities, identify the issues and finally resolve problems and conflicts [7], [8], [9].

The rationale behind PLCs is to improving students' achievements and encouraging staff to better develop their

aptitudes via group discussion and contemplation [10]. The chief advantage of these PLCs is that they represent the best way for staff development in general [11] and teachers in particular [7]. The use of ICT in these communities is a very efficient mean of communication and sharing. It facilitates the exchange of data and the time management for members [12].

ICT integration in PLCs' allows for further improvement of the social interaction in these learning communities and contributes to the development of members' training [13], [14]. Obstacles related to the complexity of change in a community make the development and improvement of the organization difficult to accomplish especially if the later works without cooperation or communication [15].

Collaboration between members of society is deemed as the ultimate solution for developing and implementing sustainable changes in educational organizations [3]. The use of technology presents a major obstacle in encouraging virtual communities networking [16].

This research addresses the needs of principals, teachers and school counselors in term of ICT and the role played by technology in their PLCs' when it comes to improving their professional development. Our research will tackle three axes surrounding a single issue that is: Who is the starting point of the ICT's implementation in PLCs'? What is the role of ICT in PLCs? What are the needs in term of training of school agents?

II. CONCEPTUAL FRAMEWORK

Our conceptual framework has three key concepts: professional learning community (PLC), the professional development of education operators and information and communications technology (ICT).

A. Professional learning communities (PLCs)

PLC is a mean for a well-structured professional development where members work together to improve their teaching [17]. The primary goal of this community, apart from the knowledge, expertise improvement and teachers collaboration, is the scholastic productivity and student success [18].

Five essential characteristics define the PLCs [19]: vision, beliefs and common values, shared leadership (involvement of all stakeholders in decision making and commitment to each other), collective learning among teaching staff to effectively meet the needs of students, physical conditions (e.g. meetings timetables and material and human resources) and finally, sharing practices and the dissemination of expertise.

These features will be complemented by three other essential keys [20]: student learning, the development of a collaborative culture that strives for school improvement academically and adoption of follow up results which will highlight the evolution of student achievement.

B. Professional development of educational agents

To accomplish a fitting development of employee skills, it is crucial to develop the learning activities (knowledge improvement) and allow the organization's employees to increase their capacity in performing their tasks [6].

Thus, good cooperation between the Human Resources (HR), the teacher and "teacher - teacher" is important for both of the educational and professional development of teachers [21], [22], [8]. Studies claimed that changes in educational organizations in term of scholastic performance enhancement are scarcely addressed [23].

The schools management must undertake some rigorous policies for successful students. It would be relevant to create leaders within the teams so they become welded, strong and effective [24]. This strengthens the claim that the professional development of teachers cannot be done without good leadership of the principal, who should play an imperative role in its oversight. Good collaboration between the different education operators is primordial in ensuring their educational and professional development [25], [22].

C. Information and communications technology (ICT)

The entry of new ICT in school organization has led several organizational changes in HR management thus enabling costs reduction and services improvement.

Such development has divested the administration of several tasks and gave it the opportunity to address other more important activities and particularly those of strategic magnitude. The commissioning of ICT in an organization gives place to employees and executives who will be able to divest the HR management from the routine administrative tasks [6].

In scholastic organizations, employees consist mainly of the teachers who, thanks to internet connections at their places of work, can communicate and exchange a lot of information. ICT applications in a community management allow to: optimize the efficiency of administrations, facilitate the archiving and retrieval of information, quickly inform employees of changes in a society and engage employees in administration functions. Needless to say that it continually surveys the key changes in management, anticipates the impacts and strategic decisions using simulations, enables professionals to attend to other activities, integrates the

human resources processes in the information system and encourages internal communication among employees to improve their working relationships [6].

The integration of ICT in a PLC facilitates communication, sharing and the development of communication. If the notion of a community remains polysemous when referring to a group of people involved in a process of learning or sharing practices, it is then imperative to discern interactions within digital spaces [26].

III. RESEARCH METHODOLOGY

This qualitative study was conducted via semi-structured interviews within a sample of teacher, school principals and educational consultant of elementary, secondary and post-secondary education involved in PLCs' and using ICT in their practices.

The data collection method that was deemed befitting for this study is a qualitative one consisting of semi-structured interviews. Such methodology is more appropriate to study the appointed phenomenon in more depth than other methods e.g. a large-scale survey or an experimental research [27] due to the novel and exploratory nature of the studied concept.

The study resulted in a 39 interviews (following the saturation principal). Participants are divided as following: 15 in primary, 16 in secondary and 8 in post-secondary. All selected participants are experienced in PLCs'. Table 1 presents the distribution of the various participants in our research.

TABLE I
DISTRIBUTION OF THE PARTICIPANTS IN THE RESEARCH

Elementary	Secondary	Post-secondary
4 directors	2 directors	1 directors
2 deputy directors	4 deputy directors	1 deputy directors
6 teachers	8 teachers	1 teachers
3 educational consultant	2 educational consultants	5 educational consultants

Semi-structured interviews were conducted using a semi-structured interview grid which was by then transcribed in full and made the subject of a thematic analysis. The first questions aims for preparing the participant (give him an overview about the study purpose and put him in the subject's environment). This first part also allowed us to be more acquainted with better the participant and the level of his involvement in the PLCs.

The second part of the interview aims to find answers to our research questions. By the end, the participant has the last word to conclude and issue his opinion with respect to the conduct of life in a PLC and to express the requirements to improve life in this community. The data collecting's procedure took place in the participants' workplaces. The interview began with presentations and the study purpose.

Then the first questions were given in a way to leave more response freedom to the participant. Other questions were then posed in order to reach more precise research objectives.

In the end, the interviewer provides the opportunity for participants to make comments, express their needs and ask questions. Semi-structured interviews last a maximum of 60 minutes. They were recorded using a tape recorder and then copied into a digital storage medium. Once transcribed information, the researcher must ensure that the transcribed text is faithful to the recordings. The written corpus was analyzed using an inductive logic. First, each unit of meaning was subtracted from the corpus and grouped into categories. Then, within each category, themes emerged, which enabled us to provide answers to specific research questions.

IV. RESEARCH FINDINGS

The data collected revealed three main themes: 1) the identification of operators responsible for the implementation of ICT in PLCs, 2) the role of ICT in PLCs and 3) training needs felt by PLCs' members.

A. Operators that have implemented ICT

We have identified both a formal participation (the ministry) and informal participation (principals and teachers) in the implementation of ICT in PLCs.

The formal implementation, coming from the ministry, was pulled through consultation with in the field-people and was based on a request to the institutions to delegate a representative to ensure that the implementation meets the needs of the environment: "It's the MELS (Canadian ministry of education) that saw the rise of information technology and communications in 2002 and decided to apply to all private and public colleges in the area, asking them if they had an issue on the integration of technologies. And they asked us all to delegate someone" (Participant 4).

As for the informal settlement, initiated by the participants, some respondents revealed that it is the teachers who are responsible for the ICT's integration in their PLCs, "It came from the need of teachers, relative to technology, to see what was happening elsewhere and share practices" (Participant 36). As for the remaining majority of the members, the employ of technological means for their PLCs' is behind the initiative of the direction. The implementation methods are quite diverse and aimed originally for the schools, which has spread later to the PLCs that have emerged along the way in schools: "it was the direction, one time, I think two years ago, when the software suggested by the IT resources, we agreed to try it" (Participant 27).

In Fig. 1, we present a thematic tree illustrating our first theme.

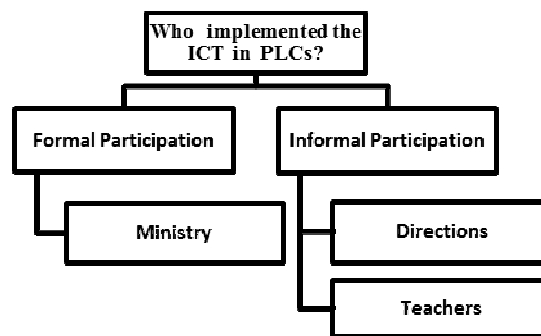


Fig.1 ICT implementers

B. The role of ICT in PLCs

1) *ICT plays the role of a facilitator in the PLC*: The ICT's implantation in PLCs has played a major role in improving communication among its members. Its favorable impacts are displayed within the PLC and in the classroom.

According to the participants, using different technological means such as data sharing interfaces or those of remote communication has played an imperative educational role in the work between the PLC's members. This teamwork has allowed them to validate their work by keeping up with what takes place in other schools and substantially helped them in staying in touch with technology progress in their areas, "it helps to validate our work by seeing what others are doing in their respective colleges. It helps to be aware too. We are a group of technology enthusiasts of and are constantly communicating with Skype, Facebook, Twitter; it keeps abreast of all kinds of discoveries, developments, so it really helps to stay on the cutting edge of our field" (Participant 11).

2) *ICT is a hindrance to some participants*:

Some members of the PLC confessed about having experienced obstacles in technology use thus a pressing need for training in the technological tools used in their PLCs. Undeniably, this need is reflected in the complexity of the PLC working mechanisms which fairly entail an assortment of an advanced technological tools. There are two major obstacles that were raised by the participants: the complexity of the ICT's use and the limited knowledge of the members in this area.

Some participants perceive the use of technological means to communicate or share information within a PLC as a constraint to interact with the community members; as for others, the technology presents a major obstacle because of the difficulties they find in understanding the new communication technologies. "We still have much work to do, because you have to constantly remind teachers to use the software to take notes. Till which we realized is that the teacher should not wait until there is a crisis to put a note in the student's file. He must do so even for small events" (Participant 27).

Also, the insufficient knowledge that some encounters highlights the necessity for a better ICT development and that

could be achieved through training at their PLCs, "There were some who were not very comfortable, how to manage an agenda on the internet. So now, in a few meetings, I was able to help a little in there "(Participant 41).

Fig. 2 presents a thematic tree schematic our second theme.

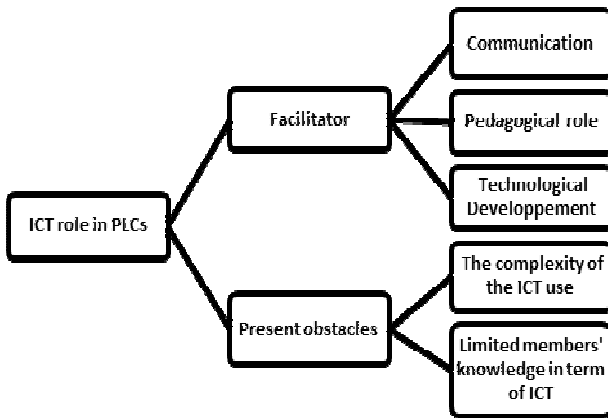


Fig. 2 ICT role in PLCs

C. Requirements for ICT training improve communication

Even though the majority of the participants expressed a wish to use ICT in PLCs while others articulated about the difficulty in keeping up with the technology evolution and call for a proper training to meet the expectations of their PLCs' and the requirements of their field's evolution .In fact, there are three types of training: training in PLC, individual training and class training.

In a PLC, participants communicated a need for training and coaching for people who are facing difficulty in communications' technology use: "We can suggest workshops as well as alert network managers or other members that, for example, certain software can do that such and then ask for training on an issue or software like that "(Participant 8). But a good ICT training helps participants develop their individual skills, "It influences my teachers. I see an opening and I see that it "For example, the interactive whiteboard. Recently, I saw something I did not know, this is software called "Mouse Cheese". It is a wireless mouse (s) that is connected in a way that the student can use it to answer questions on the interactive whiteboard "(Participant 13).

ICT develops not only the individual skills, but also the class related ones and an ICT training within a PLC, according to some participants, is a further ado to the classroom learning experience enhancement. In the classroom: "Students who refute a decision made by us decisions. If the student's record was not well documented, we are guaranteed to lose our cause. So, teaching practices, it means that the teacher has a lot of notes to take about what happened during the class either before or after, but it's necessary. In terms of learning, this is more serious "(Participant 27).

In Fig. 3, we present the thematic tree corresponding to the third and last theme.

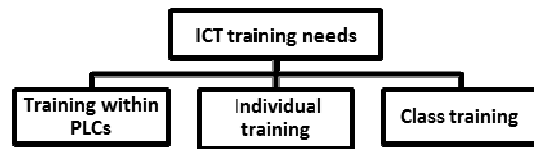


Fig. 3 The three needs of ICT's training

V. DISCUSSION AND CONCLUSION

This article has focused on the implementation and use of ICT in PLCs' as a mean of facilitating and professional development for teachers, school principals and pedagogical consultants. In short four great themes in and two sub-themes were identified: 1) ICT's implementers, 2) The role of ICT's role in PLCs which in itself can be divided into two sub-themes: a) ICT represents ease for CAP, b) ICT presents an impediment to the PLCs' development .Ending the last great theme which is (3) the need for an ICT training to enhance the PLCs' communication.

The results revealed that the main ICT's implementers are the MELS, teachers and school principals directions .After having already integrated the ICT, it was noted that technologies play a crucial role in smoothing the work within a PLC. Nonetheless, combining ICT and PLCs requires training members to perform their duties.

The three main agents who have promoted the integration of technologies in PLCs are the Ministry, school direction and teachers. We remarked, however, that the majority of participants emphasized that the push for of ICT integration comes mainly from the MELS and school principals. Indeed, the main reason disclosed by the participants is that these two actors have the power to both influence, act and tilt the balance in favor of ICT implementation in their PLCs. Pressuring PLCs' members to use ICT in their community s' work was an important factor in its integration. Yet, this does not rule out the teachers whom have included quite a few technology tools in their PLCs to facilitate their work.

The aforementioned agents' decision to integrate ICT in the working mechanism of their PLCs stems from the significantly positive impact of technology on the individual professional development of each member. The participants 'perseverance on the fact that ICT play a facilitating role in improving life in the group demonstrates the astounding ability of the community's participants of to assimilate ICT to provide for their needs.

Integrating the new technologies in PLCs has indubitably improved the performance as well as the professional development of the members. Yet and despite all these encouraging points, this study has revealed that some people do encounter countless problems while using this new feature to scrutinize their PLCs' progress. ICT represents a major hindrance for some members due to the complexity of technological tools incorporated such as data sharing via Web sites, using the new software for communication and surprisingly even using the basic tools e.g. headphones, webcams, digital agendas, can be sometimes problematical.

Hence, they were conscious about their lack knowledge about it and reinforce the fact that technology integration is indeed taxing.

To achieve a well-grounded professional development to the three education operators all while overcoming the difficulties encountered by some PLCs' members, a constant new technologies training is recommended. Moreover, such suggestion was strongly endorsed by several participants. Actually, the best way to rise above the obstacles related to the initiation of ICT in PLCs is preparing members, both on a theoretical and practical level, to this amazingly increasing new trend. ICT's training within PLCs is an effective mean to ensure professional growth for education operators all while allowing them to be up to date with the technological advancements.

Several authors [13] presented socio-technical specifications for the development of networked learning communities and the pedagogical integration of ICT in teacher training. Also, researchers devised some principles for designing the ICT's integration in order to promote social interactions within and between learning communities. They then emanated conditions for successful pedagogical integration of these new tools for the renewal of teacher training. Other authors [16] support in their research on virtual communities of practice which use technologies that the utility of an online social networking tool in creating professional partnerships and knowledge dissemination face obstacles in their implementation. What's more, some authors [14] in their research on virtual professional learning communities versus the face-to-face ones, claim that teachers perceive video conferencing as an effective tool in facilitating communication in a PLC when the distance and time are barriers to face-to-face meetings. Nevertheless, despite the similarity of our results, our research insists on the professional development of PLCs' members which can only be attained through unremitting CT training. Indeed, the escalating evolution of technology requires a continual updating of the members to guarantee their effective performance.

To conclude, this research examined the use of technology in a PLC in ensuring a better professional growth for teachers, principals and pedagogical consultants. The study revealed that the development of these agents is well supported by the use of ICT within the group. Despite the met obstacles chiefly related to the complexity of the technology use and the lack of knowledge demonstrated by many members, the best way to counter this problem is engaging in a continuous training that follows the technology evolution in the PLC and prepares the various educational agents to face the challenges expected by this collaboration. The next stage of our work will be to recruit participants who are involved in virtual PLCs and who have had ICT training to further our research particularly to the study field of online PLCs.

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