HOW DO UNDERGRADUATE TEACHERS PROMOTE ICT INNOVATION: A CASE STUDY IN CHILEAN PRIMARY TEACHING PROGRAM

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Abstract

There is a gap between ICT expectations and opportunities in teaching training processes, and what is actually observed in classroom practices. In initial teaching training (ITT), this issue becomes even more important, as a result of the asymmetric relationship between the abundant social uses of ICTs, their widespread presence in the school system and the low impact on the processes of Training of those who study a Pedagogical career. In order to find new answers to this problem, this research focuses on the way in which digital technologies are used in the final primary teaching practicum. This analysis makes possible to characterize the ways in which ICTs are incorporated regarding innovation, both in its pedagogical aspects for teachers and students' interactions; as well as in technological perspectives concerning learning tools. Methodologically, we used a multiple case research design in instrumental modality and interpretative elaboration, with a systematic follow-up of the practices carried out by 8 pre-teachers throughout a learning unit; For this purpose, the lessons were recorded using audios of the teacher's speech and non-participant observation records. The evidence was systematized and analysed due to elaborated dense descriptions of the classes, based on the relation between speech-observation. The results show, on one side, that activities with ICT promoted by teachers in pre-service programmes contribute to the development of cognitive levels concerning remembering, understanding and applying. On the other, the abilities developed by the students when using them are related with reminding, identifying, searching, presenting or representing information. Finally, a new aspect came out related to different ICT uses which clearly go quite beyond the pre-service teachers' own expectations.

Keywords: ICT, Pre service teachers, Innovation.

1 INTRODUCTION

Incorporating ICT into the classroom is an example of innovative tension. On one hand, it is expected that their incorporation will allow the development of higher order skills necessary to interact with leadership, creativity, innovation, critical thinking, problem solving, communication and collaboration ([1], [2], [3]). On the other hand, they are a new kind of learning that teachers must develop and incorporate in their habitual teaching practice; However, their impact as an educational innovation is scarce and occasional ([4]). Understanding this requires recognizing that teacher training is a permanent and continuous process, through which necessary skills are developed needed in order to achieve teaching challenges regarding learning in and for a knowledge-based society ([5], [6]).

Innovating with ICT in pedagogical practices is a process that begins with the decision to use them and integrate them into the usual work and ends when they reorganize new ways of interaction and development of knowledge in the classroom ([7]). Innovating with technologies is, therefore, a recursive process between the teacher, its students, objects of knowledge and digital media, which is reflected in four levels of appropriation: Access, Adoption, Adaptation and Innovation, thus creating a process of digital maturity ([8], [9]). In the development of this maturity, ICT uses in classrooms are manifested in six types: i) Instructional Use, where they support the traditional teacher’s role; (ii) Informational Uses, in which they provide multiple sources of information; (iii) Recreational Instrumental Uses, where they make possible play activities; (iv) Creative-Expressive Uses, which allow to create or share information; (V) Communicative and Interaction Uses, where people interact in pursuit of common goals; And (vi) Expansive Uses, where they expand information treatment and interaction and its transformation into knowledge ([10]). In the case of teachers working in primary education, ICTs are mainly incorporated for informative, instructional and recreational purposes; For their part, secondary school teachers do it mainly for Creative / Expressive and Communicative uses ([10], [11], [12]). Finally, the most commonly used digital resources are word processors, web page navigation, the use of digital presentations with images or graphics, and the search for information and
materials to be used in classes, mainly as printed material ([11], [13], [14]). These uses tend to reinforce the traditional, expository and teacher-centered role, and the student's role as an observer ([10], [11], [13] [15]).

The development of teacher's life trajectory recognizes the initial teaching training (ITT) as the access threshold to the profession, being the key for the acquisition of skills that allow to move from the school experience, to the understanding of the profession [16]). During this stage, the practicum axis is important as an intersection between the university world (theoretical) and the professional world (reality-practice), in which the becoming teacher takes part, making possible his professional insertion and his identity transition (17), [18], [19], [20], [21], [22], [23], [24]). Is at this stage, in which the first professional performance repertoires are developed ([23]), or performing modes in professional settings as well as the product of experiences' reflective analysis, school context and the knowledge involved, including the way in which these are integrated into the school system. Faced with this, the evidence indicates that there is an asymmetry in the ITT between the abundant ICT social uses registered, its widespread presence in the school system and the little impact registered on the training processes of those who study a Pedagogy career ([25], [26]). This raises the question about the real way in which pedagogy students incorporate ICT in their repertoires of professional performance.

In order to offer answers to this problem, this research analyses the way in which digital technologies are used in the final practicum of the Primary Education career. This analysis seeks to characterize the ways in which ICTs are incorporated as a means of innovation, both in its pedagogical and technological aspects. Methodologically, a research design of multi-case study in instrumental and interpretive elaboration was used, with a systematic follow-up to the practices carried out by 8 preservice teachers throughout a learning unit. For this, the teacher's discourse (audios) and the interactions produced during the sessions were recorded (non-participant observation). These evidences were systematized and analysed based on the relation between what was said and what was observed, and with this, dense descriptions of what happened were elaborated.

The results among analysed practices show that ICT uses are related with Instructional and Informational type, in which the preservice teachers develop cognitive levels like to remember, to understand and to apply; While students mobilize the skills to recall, identify, search, present and represent information.

2 METHODOLOGY

The research design used corresponds to a multiple case study in instrumental modality and of interpretative elaboration ([27], [28], [29]), which examines deeply 8 cases constituted by students of Primary Teaching career, in their finally practicum. The phases, stages implemented were as follows

- **Preactive Phase.** Informant’s selection upon the analysis unit. It corresponds to preservice primary teachers of the Pontificia Universidad Católica de Valparaíso, during the first half of 2016 (N = 59). At this stage, a questionnaire was applied on beliefs, dispositions and practices concerning ICT uses upon primary teaching students ([30]); And a planning exercise to incorporate digital technologies into a curricular learning case. Based on their results, we identified 8 students with greater disposition and level of innovation, for ICT use.

- **Interactive Phase:** Corresponding to the systematic follow-up of the practices carried out by 8 preservice teachers throughout a learning unit; Recording the lessons through audios of the teacher's speech and non-participant observation records. The evidences were systematized and analyzed to elaborate dense descriptions of the lessons.

From the triangulation of the results, the activities with ICT were characterized as well as the type of cognitive development promoted by the teachers.

3 RESULTS

The results regarding the pedagogical uses with digital technology declared by 8 becoming primary teachers show that All of them are using ICT in some way during their teaching lessons, either to prepare them (before), when teaching or assessing (while) or to practice, reinforce concepts, skills, strategies or communicate with students (after) This activities are related, as shown in figure nº1 with create, remember, understand, analyze or evaluate and among them many others that constitute activities in which this purpose is done or can be done within the learning process. In this way there is
a huge diversity of digital ways, resources and activities to make this possible, resources and activities to make nowadays this possible in a various innovative ways.

On one hand, it is important to notice that the results show differences in the moment of use and its purpose. In this perspective, pre service teachers use ICT to prepare their lessons (before) either to search for information, materials, videos, examples, printed resources or to prepare them using word processor: lesson plans, worksheets, tests. On the other hand, to implement their lessons in order to example, inform, practice, assess (while they teach, during the class) or to reinforce, work, applied, communicate or collaborate (during or after the class)

Although, in this particular case study, concerning the final disciplinary practicum and based on the Bloom and Anderson digital wheel we will focus on ICT uses and resources during the lessons to contrast differences among the 8 pre service primary teachers we taped and studied. The main differences, mainly in the teaching activities during the lesson, the ICT pedagogical uses are related to their specific disciplinary area, as shown in the following table.

Table 1. Pedagogical ICT uses and resources (tools).

<table>
<thead>
<tr>
<th>Disciplinary area</th>
<th>Lesson Unit</th>
<th>Resource/tools</th>
<th>Purpose/ who</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Argumentative texts</td>
<td>Power point</td>
<td>Give instructions /teacher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Word processor</td>
<td>Write the text /students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Google</td>
<td>Collaborative work (in groups)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Check the spelling</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>To search/ students</td>
</tr>
<tr>
<td>Mathematics</td>
<td>Algebra</td>
<td>Youtube</td>
<td>To inform /teacher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Videos tutorial</td>
<td>To example/ teacher</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>To exercise/ teacher</td>
</tr>
<tr>
<td>History, Geography and Social Studies</td>
<td>Relief</td>
<td>Power point Youtube</td>
<td>To inform/ teacher</td>
</tr>
<tr>
<td></td>
<td>Weather</td>
<td>Infography</td>
<td>To give instructions/teacher</td>
</tr>
<tr>
<td></td>
<td>Landscapes</td>
<td>Google</td>
<td>To show, illustrate/ students</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>To search/ students</td>
</tr>
<tr>
<td>Science</td>
<td>Digestive system</td>
<td>Power point</td>
<td>To assess- contest/ students</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Youtube</td>
<td>To inform, show/ teacher</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pixtoome</td>
<td>To communicate</td>
</tr>
</tbody>
</table>
4 CONCLUSIONS

The results regarding the pedagogical uses with digital technology declared by 8 becoming teachers are quite similar to other results in national and international research concerning ICT pedagogical uses within primary teachers ([12], [31], [32]). The results show that ICT resources are aligned with disciplinary aspects and characteristics but their application continues to be teacher-centered, in independent activities, to make teacher’s activities easier in mainly informative and instructional (power point), supporting lectures. It’s relevant to make notice that most potential ICT resources, those encouraging high skills (levels 5 or 6: interactive and expansive uses) are mentioned by the teacher as a free suggestion to the students to be done at home (google earth, tutorials, exercising). In other words, there is just a little innovation from the constructivism perspective ([15]).

Finally, on the one hand, from the teaching approach, the activities that teachers promote in their lessons are remember, understand and apply. On the other hand, in terms of student’s activities, these are: remember, identify, seek information and represent. All of them are part of innovation level one and two. However, the evidence is this preservice teachers are willing to explore the most potential ICT innovative uses, but this is left to student’s decision whether to do it or not.

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REFERENCES


