2 Technology use in nursery and primary education in two different settings

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Abstract

This article studies which and how Information and Communications Technologies (ICTs) are used by nursery and primary education in-service teachers as reported by their pre-service teacher trainees after observations in their practicum in two provinces in Spain, Alcalá de Henares-Guadalajara and Navarre. Results indicate that in-service teachers tend to use traditional technological tools (audio files, video files, multimedia, games, Microsoft Word, interactive whiteboards) more than social networking (Facebook, blogs or wikis) both for teaching and for organisational purposes. Thus, more training in recent applications seems necessary to get ICT social applications into education.

Keywords: ICT, teachers, pre-service, pre-school, social networking.

1. Introduction

The great investment carried out to introduce ICTs in schools and the fact that young people seem to be technologically savvy has resulted in the assumption that the use of computers and technological tools has increased in education. However, research has started to point out that ICTs are not used as extensively as assumed (Almerich, Suárez, Jornet, & Orellana, 2011), and this lack of usage

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should be further explored as technological tools can improve students' learning experience, and pre-service teachers need to be provided in their training period with knowledge on how to use technology effectively.

In order to do so, this paper compares the use of ICT in the schools of two provinces in Spain (Navarre and Madrid) to describe which applications and programmes are used in nursery and primary education and their frequency of use, and to report any divergence in usage between these two provinces.

2. Literature review

The use of ICT tools has been shown to have many educational benefits (García-Valcárcel, Basilotta, & López, 2014), and thus research has investigated students' and teachers' ICT use in different contexts and settings to report frequency of use and perceived advantages and disadvantages associated to such usage.

Students' preferences and perceived benefits regarding the use of computers and ICT tools have been documented at university (Conole, 2008; Steel & Levy, 2013) and secondary levels (Purcell, Heaps, Buchanan, & Friedrich, 2013). Students' perceptions of ICT integration and use have also been compared to their teachers' showing some divergence between what teachers think is effective and what learners consider to be so (Wiebe & Kabata, 2010).

Teachers' usage of ICT has also been reported both at university and secondary school levels, but mostly based on self-reports (Georgina & Olson, 2008) and case studies (Romero, Cervera, & Farran, 2009). This research may offer a limited view as the former may be biased by what is considered appropriate and thus report subjectively on perceived usage, and the latter are mostly based on observations of voluntaries with a good knowledge base and attitude towards ICT, which may not be representative of the general population of in-service teachers.

Research on ICT use and level of integration into the curriculum has stressed the importance of pre-service training in Computer-Assisted Language Learning (CALL) (Yunus, 2007) to increase trainees' awareness of the affordances and constraints of technological tools, and to raise teachers' self-confidence to improve and increase technological tools usage (Dooly, 2009; Georgina & Olson, 2008).

Despite all the research regarding the technological tools currently used in education, there is a lack of studies about ICT usage in nursery and primary education, and no report based on third party observations of in-service teachers' actual use in the classroom. Our project tries to fill this gap in research by exploring the technological tools used in these levels in two different settings in Spain. The usage reported is based on pre-service teacher trainees' observations of their tutors' (in-service teachers) ICT use for teaching and for managerial purposes.

3. Method

Our research project was carried out in two provinces in Spain: Madrid and Navarre. The schools where the participants did their practicum provided immersion programs in two languages (44.6% of the schools in Madrid; 51% in Navarre), or monolingual Spanish programs with English as a foreign language (44.6% in Madrid; 21% in Navarre). Most schools were state schools (79.6 % in Madrid; 87.8% in Navarre) located both in the city and suburbs around the city (38.8%), or outside the city (42.7%) in the first setting, and in the city and in the suburbs around the city (90%) in the second setting.

The participants were 142 pre-service primary and nursery teachers (103 from Madrid; 39 from Navarre), who answered a survey after their practicum period (ranging from seven to eight weeks) in the afore-mentioned schools. The students in Madrid answered the survey in a paper-based format in class, while the students in Navarre answered the survey on-line in a class equipped with computers.

The survey consisted of 9 questions:

- Three closed questions to select the type of programme (bilingual, English as a subject only, etc.), the type of school (state vs. semi-private or private), and location of the school they had done their internship in.

- Two Likert-scale questions about their schools tutors' frequency of use, in a scale from 1 ('never') to 4 ('often'), of some technological tools for teaching and for managerial duties during their internship.

And four open questions asking about the following:

- other technological tools which had been used at the school for teaching and/or managerial purposes;

- whether they had taught their tutor to use any technological tool and a report about their experience teaching the usage of it;

- whether ICTs had been used enough; and

- how teaching or management could be improved in those schools by using more technological tools.

Data were collected from the answers to the survey. Quantitative data were collected from the three closed questions, the two Likert-scale questions and the open questions. Percentages were obtained for all the students and for each cohort to analyse both general trends and possible divergences. Second, means of use were calculated and technologies were ordered from highest to lowest use. Finally, both cohorts' reported usage was compared.

Qualitative data were obtained from the open questions of the survey and organised into groups of common themes.

4. Results and discussion

4.1. Frequency of use of technologies for teaching purposes

Table 1. Mean Frequency for teaching: often > 2, rarely < 2

Technology	Mean >2	Technology	Mean < 2
Audio Files	3.52	Blogs	1.96
Video Files	3.33	Virtual Learning Platforms	1.92
Multimedia	3.24	Microsoft Excel	1.60
Games	2.99	Wiki	1.39
Browsers for Internet Search	2.72	Forum	1.39
Microsoft Word	2.52	Dropbox	1.38
Interactive Whiteboards	2.38	Surveys	1.30
Microsoft PPT	2.26	Facebook	1.28
		Skype	1.27
		Tuenti	1.13

As shown in Table 1, only three technological tools (audio files, video files and multimedia) had a mean higher than 3 and, thus, were used quite frequently for teaching purposes. Five other types of technology had means higher than 2 and thus, were usually employed: two affordances of Internet (games and browsers for Internet search), two software programmes (Microsoft Word and Power Point), and interactive whiteboards. The rest of the technologies had means lower than 2 and, consequently, were used rarely.

Our results point out to the limited use of many technological tools in the school context. Although the use of technologies related to improved ways of presenting information by providing dual-channel input (audio and video) can show an improvement in teaching methodologies and some of the tools may be used by students to create knowledge (Power Point), most of the technological tools used frequently seem to be related to the transmission of information. Consequently, technological tools could be perpetuating traditional teacher-

centred methodologies in which students are mere recipients of the knowledge transmitted by the teacher. This seems to be confirmed by the fact that no collaborating technological tools are used.

The tutors in both settings used most ICTs with similar frequency rates. The first five most frequently used technological tools were the same as in the general classification in both settings. However, browsers for searching the web had a mean lower than 3 in Madrid, and both games and browsers had a mean lower than 3 in Navarre.

Microsoft Word, Power Point and interactive whiteboards had means higher than 2 in both settings, though virtual learning platforms only for Madrid. Interactive whiteboards were used more frequently in Navarre (2.89 vs. 2.18) and Virtual learning platforms in Madrid (2.09 vs. 1.45). The rest of technological tools were used rarely or never in both settings and means were lower in Navarre than in Madrid. Social networks (Facebook and Tuenty, *M*=1.02), which are popular for students out of school, were almost 'never' used.

4.2. Frequency of use for organisational purposes

Table 2. Mean Frequency for organisational purposes: often > 2, rarely < 2

Technology	Mean > 2	Technology	Mean < 2
Microsoft Word	3.21	Dropbox	1.84
Browsers for Internet Search	2.95	Wiki	1.60
Audio Files	2.89	Forum	1.59
Multimedia	2.90	Surveys	1.42
Video Files	2.87	Facebook	1.29
Microsoft PPT	2.59	Skype	1.24
Microsoft Excel	2.51		
Games	2.30		
Interactive Whiteboards	2.20		
Virtual Learning Platforms	2.18		
Blogs	2.08		

As can be seen in Table 2, the only type of technological tool used very often (*M*=3.21) for organisational purposes was the software program Microsoft Word. However, ten more technological tools were usually employed for organisational purposes and thus, more technology seems to have been used frequently for organisational than for teaching purposes in the schools in both settings.

Comparing both groups of trainees reported frequency of use for organisational purposes; it was observed that there were more differences than for teaching. More tools had a mean higher than 2 in Madrid than in Navarre (three tool means higher than 3 and eight higher than 2 vs. one tool mean higher than 3 and eight higher than 2). The divergences were mostly due to the fact that technological tools typically used for teaching purposes, such as audio files (3.09 Madrid vs. 2.27 Navarre), video files (2.98 vs. 2.52), multimedia (3.08 vs. 2.39), Microsoft Power Point (2.68 vs. 2.29), and games (2.55 vs. 1.58) had higher means, and thus, seemed to have been used more frequently in Madrid than in Navarre for organisational/managerial purposes. On the contrary, technological tools typically used for managerial duties such as Microsoft Word (3.04 Madrid vs. 3. 71 Navarre), Microsoft Excel (2. 43 vs. 2.76) and Virtual Learning Platforms (2.15 vs. 2.27) were reported as having been used more frequently in Navarre.

4.3. Use of ICT and ways ICT could improve teaching

Regarding whether students considered the use of technological tools as sufficient during their internship, only 40 students (28.1%) considered ICT use as enough, while 99 trainees (69.7%) judged it as not enough, although some of these students (5) recognised it was being introduced little by little in schools. However, it must be pointed out that these research results confirm previous findings regarding a lower than expected use of technological tools in education (Almerich et al., 2011).

Suggested ways of improving teaching in the school where they had carried out their practicum by using ICTs more included:

- better learning, better activities and interactivity by more use of interactive whiteboards (28 students);
- more playful learning with interactive games and activities (19);
- more multimedia for content introduction (12);
- using blogs (7) and wikis (3) for collaborative learning;
- using more videos for listening (6);
- using Survey monkey as an evaluation tool (4);
- using Skype to interact with other speakers (6); and
- using virtual learning platforms for real material, and for homework (4).

The answers of students to how to improve teaching with technological tools indicated that first, some students are quite conscious of the benefits of using technology as they signalled more interactivity, more playful learning, collaborative learning, etc. as possible improvements.

Second, it showed that few students seem conscious of some of the possible usages of certain tools, for example, real interaction with other speakers by using Skype was only mentioned by six students and, thus, more teacher training in CALL seems to be a priority to extend techno-pedagogical knowledge of the possible affordances of ICT.

5. Conclusions

ICT mostly used for teaching purposes are audio files, video files, multimedia, games, browsers to search the web, Microsoft Word, interactive whiteboards and

Microsoft Power Point, and only the first four are utilised very often with slight differences between both settings analysed.

Technological tools used frequently are mostly traditional programmes and audio and video files downloaded from the Internet. This usage of CALL for teaching seems to be related to traditional transmission of knowledge teaching-centred methodologies. Interactive whiteboards are becoming popular and their use is increasing in both settings.

Technologies mostly used for organisational purposes are Microsoft Word, Internet browsers for searching the web, audio files, video files, multimedia, Microsoft Power Point and Excel, games, interactive whiteboards, virtual learning platforms and blogs, but only the first five very often. Differences are greater between both settings in ICT use for organisational purposes than for teaching purposes.

Most trainees considered the use of ICT as quite limited in the schools where they had been doing the practicum. This finding has also been reported in secondary education contexts (García Laborda, Bejarano, & Simons, 2012), and is probably a more accurate perspective of real usage than the one previously reported by the teachers themselves, who might try to justify what they consider their expected use of technological tools and not their real usage. Given the considerable investment that has been carried out to equip schools with technological tools, this low usage should be further researched to try and find its cause and possible solutions.

Training pre-service teachers in ICT affordances will probably increase ICT use in primary and nursery schools as these students will train their tutors and give them first-hand experience (Dooly, 2009). Furthermore, even though younger students seem to be more technologically savvy and thus should be more conscious of the affordances of technological tools to improve knowledge, personal usage is not apparently so easy to transpose into academic or educative contexts, and CALL training appears to be necessary to make students aware

of the affordances and constraints of technological tools (Bueno Alastuey & Kleban, 2016).

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