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Powerful knowledge, transposition/transformation and ICT: an empirical study across school subjects in primary education

Elena Ramírez, Jorge Martín-Domínguez, Inés Rodríguez, Alicia Pérez González and Inmaculada Martín-Sánchez

University of Salamanca, Salamanca, Spain

ABSTRACT

This article presents a study that analyses the types of activity used to teach the curriculum in primary education, and the use made accordingly of digital and analogue resources. The research's purpose was to discover whether there are any differentiated patterns of activity in the teaching of these subjects, and whether they are linked to the use of ICT/non-ICT resources. A multiple case study was conducted with 10 primary teachers, with three schooldays being recorded over the 2018–2019 school year, which provided 132 hours of recordings. The research design involved the use of mixed methods. The results reveal a differentiated use of patterns of activity linked to the subjects that make up the curriculum in primary education, as well as a differentiated use of ICT and non-ICT resources when teaching these subjects. The study includes the need to investigate the process of transforming/transposing the academic content into effective classroom teaching practices.

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Primary Education; School subjects; Classroom practices; ICT; Subject-didactics

Introduction

Curricular reforms have been a recurring theme across countries, being justified in recent times by a global discourse that links educational resources and economic prosperity (Hordern, 2021). These circumstances have given rise to the resurgence of issues related to the purpose of the curriculum, the role and nature of knowledge, and who should be involved in deciding upon the content of syllabuses. In this sense, notions on the 'Powerful Knowledge' construct (Young & Muller, 2013) have prompted a debate on the relationship between teachers and subjects, as well as how academic knowledge is transformed into something that can be taught and which is meaningful to pupils (Gericke et al., 2018). Our study extends the debate on subjects, academic content and classroom knowledge by addressing the role that ICTs may play in the transformation of academic content into classroom knowledge, as an added feature that may qualify the transformation process.

CONTACT Elena Ramírez ero@usal.es Facultad de Educación, University of Salamanca, Paseo de Canalejas, 169, Salamanca 37008, Spain

This article has been informed by two R&D projects involving studies of a varied nature, such as classroom observation, interviews, case studies and surveys designed to explore the patterns of activity used for teaching the different subjects within the curriculum for primary education in Spain. In addition, links are sought between these patterns of activity and the incorporation of the use of ICT resources within the classroom in real contexts. This study presents a selection of the results forthcoming, specifically those on how teachers tackle the subjects in their classes, and whether these are linked to the introduction of technologies, prompted by the following questions:

- Are there differences in the type of activities in the classroom practices associated with the various curricular subjects in primary education?
- Can patterns be found for the didactic use of ICTs in the subjects being taught?

Academic content vs. classroom content

The manner in which knowledge is conveyed in the classroom depends largely on a clearly defined setting. Schools involve numerous actions designed to disseminate the different bodies of knowledge through classroom practices involving teachers and pupils (Chevallard, 2007). Curricular knowledge may need to be reorganised and transformed for teaching purposes (Deng, 2020), and such a recontextualisation is one of the crucial aspects of teachers' professional duties (Gericke et al., 2018). Part of the work in the classroom involves transforming academic content into understandable and recognisable structures, as well as selecting and building those knowledge units to ensure they can be worked on in significant experiences from an educational perspective. Ultimately, teaching in direct practices involves adapting or changing knowledge according to the interactive processes undertaken in situ and to specific interactions with pupils. An important role in this transformation corresponds to issues related to the nature of the knowledge conveyed in each case. This means that criteria such as the value that a scientific understanding of the world may have for pupils could play a dominant role in the teaching of subjects such as Biology or Physics. Yet other subjects may be influenced by criteria such as social relevance (Technologies), creativity (Music, Handicraft . . .), their vehicular nature (Language), direct experience of one's own body (Physical Education), the existence of familiar historical cultures (History), etc. (Vollmer, 2021). Moreover, the transmission of classroom knowledge is affected by factors closely linked to its target pupils: issues about the nature of the structure of the content that could be more appealing and/or stimulating. Yet there are also others involving whether or not the content is meaningful for them, and the possibility that the content will have a significant impact on their personal development (Hudson, 2002), amongst others. There are therefore empirical results that reflect different didactic approaches to the different subjects (Stengel, 1997) and experts that make teachers responsible for the bulk of the decisions to be made in classroom practices in terms of subjects and content (Klafki, 2000; Shulman, 1987). Such decisions include the strategies that teachers use (or should use) to help pupils from any background to see the power of knowledge to enrich their immediate experience and fully participate in society (Hordern,

2018). There are also more specific decisions that teachers may make on materials; for example, how their understanding of the pupils' capabilities, their prior knowledge, will enable them to give the material meaning and awaken their interest when using it in specific classroom circumstances (Hordern, 2021b). The teacher's role is to introduce different pathways through experiences that provide opportunities for understanding the content in the learning process, and therefore permit pupils to interpret them in several different ways (Hordern, 2021a). In particular, and regarding the use of ICTs, a teacher may significantly improve the understanding of online resources through a teacher–pupil relationship that helps and guides the children as they negotiate the digital labyrinth (Reiss, 2018). In sum, a large part of teachers' work on content, on subjects in their teaching practices, involves the concept of recontextualisation (transposition according to Gericke et al., 2018). This recontextualisation is a key aspect of the process of teaching the curriculum as teachers transform the content of academic subjects into classroom content.

One of the features of teaching practices involves the use of different kinds of materials and resources to support actual classroom content and tasks. The decisions teachers make regarding the use of resources in their particular teaching conditions may be linked to, among other aspects, the subject being taught. Indeed, teaching different subjects calls for different practices and resources (Cohen, 2018). A study by Hennessy et al. (2005) already concludes that teaching practices linked to the use of ICTs are associated with the teaching traditions corresponding to each different disciplinary field. The most popular technologies (word processors, Google apps, browsers and so on) are fairly flexible and cater for mainstream use, whereby they can be used for a wide range of teaching objectives, although there are also others (Moodle, Plickers, Snappet and others) that are designed for very specific teaching goals (Howard et al., 2015; Kucirkova, 2017; Wollscheid et al., 2016). Certain technologies also have a more persuasive power for their widespread use in the classroom. As Ruggiero and Mong (2015) report in their study, primary school teachers with an Interactive Whiteboard (IWB) in their classroom used them throughout the day, and not just for one subject.

The findings of the research into the use of technologies are increasingly stressing that their impact depends on how they are used, for what purposes and under what conditions (Voogt et al., 2018). It has furthermore been noted that their integration is an ongoing process that involves a complex series of objectives, based on an action plan that is tweaked as it is applied. It is therefore a dynamic process rather than a linear one (Kirschner & Kester, 2016; Pettersson, 2018).

The reiterative issue in more recent studies is not just a question of teachers using technologies in the classroom, but how they do so. The aspects that most influence teachers' decisions on whether or not to use technologies in the classroom is more closely related to whether they feel comfortable with the tool, whether they think their pupils will be able to use it, and whether they feel confident working with it (McCulloch et al., 2018). In fact, an increase in the amount of technology used in classrooms does not appear to be enough to change teachers' practices with ICTs unless they are accompanied by a modification of the teachers' overall teaching practices. The topic of this study is whether there is a link between the ICT resources teachers use and the subjects taught with them. This also includes whether the types of activities that the classes are based on can be associated with their particular subject.

Classroom practices, ICT, curricular subjects and primary education

Primary education in Spain is a compulsory stage of schooling in which pupils aged between 6 and 12 develop a whole raft of skills by working on different content and subjects. This means that the subjects in primary tend to be of an instrumental nature, and especially so in the subjects of Mathematics and Spanish Language, which have been joined by a second language and all the content related to digital knowledge and competencies. The subjects with the most substantial content may be Social and Natural Sciences, where application is made of much of the instrumental information pertaining to the subjects mentioned in first place. Nonetheless, the very nature of primary schooling means that the knowledge areas at this stage follow a more mainstream path that is not as fragmented as in secondary, among other reasons because with the exception of certain subjects such as Music, Physical Education or a Second Language, primary teachers specialise in the stage and not so much in a specific discipline or subject. Their level of specialisation in the subjects corresponds to what they need to use or have to teach each year at this stage. This does not therefore correspond to the specialised knowledge of, for example, a mathematician or a linguist. In fact, pupils in primary spend almost the whole of the school day with the same teacher or tutor.

Moreover, primary education, at least in Spain, has undergone different ICT implementation plans, the latest of which, Escuela/School 2.0, involved a one-to-one model for the implementation of technologies in classrooms (Area-Moreira et al., 2016). These plans were positively assessed by the teachers in this stage as regards the policy on the provision of resources, although not so much in terms of the information received, training plans, the production of materials and support for teaching staff (Area-Moreira et al., 2019; Colás Bravo et al., 2018).

Concerning the most common classroom practices, according to Jiménez Sánchez (2010) there seems to be a prevalence of direct teaching methods: explaining topics, asking questions on an individual and group basis, doing exercises in the different subjects for their subsequent correction … with major support from the textbook as an instrument of general use. The evolution of textbooks towards digital formats does not appear to have altered their approaches to cultural transmission (Sanabria Mesa et al., 2017). At the same time, the primary curriculum is based on a corkscrew-shaped arrangement that should favour the development of skills according to the pupils' prior knowledge. Nonetheless, we should expect to find as many classroom practices as there are teachers.

Materials and methods

The research design applied here uses mixed analysis methods that combine qualitative approaches through a multiple case study model that includes real classroom practices with ICTs and quantitative analysis with statistical studies of the variables that emerge when applying tried and tested procedures for classifying what occurs in such practices. In keeping with the research questions introduced at the beginning of this text, the following objectives were considered:

(1) Ascertain whether the subjects taught can be linked to the use of ICTs.
(2) Identify the patterns of activity in which ICTs are used, as well as the patterns of activity for teaching curricular subjects in primary education.

Table 1. Participants and classes.

	Sex	Years of experience	Year in primary	No. pupils	Sessions recorded	School	Classroom technologies	Classroom apps
Teacher 1	Male	12	1	23	3	A	IWB/WiFi	Google Images, Digital textbook, YouTube
Teacher 2	Female	29	3	25	3	A	IWB/Tablets/ WiFi	Snappet, YouTube
Teacher 3	Male	37	5	25	3	A	IWB/Tablets/ WiFi	Google Search, Digital textbook, Web resource, Interactive maps-Web resource
Teacher 4	Male	16	2	25	3	B	IWB/WiFi	Google Maps, Google Search, Digital textbook, YouTube
Teacher 5	Female	16	5	26	3	B	IWB/Mini-laptops/ Tablets/WiFi	Google Search, Plickers, Popplet. PowerPoint, Thinglink
Teacher 6	Male	16	5	26	3	B	IWB/Mini-laptops/ Tablets/WiFi	Google Search, Digital textbook, Web resource, Interactive maps-Web resource, Kahoot, Plickers
Teacher 7	Female	25	6	22	3	C	IWB/WiFi	Blog, Canva, E-mail Google Images, Google Search, Digital textbook, Plickers, Podcast, Popplet, PowerPoint, YouTube
Teacher 8	Female	25	3	20	3	C	IWB/WiFi	Bouncy Balls, Google Images, Google Search, Digital textbook, Online dictionary, Video-Digital textbook, Video-Eduteka, YouTube
Teacher 9	Female	9	6º	28	3	D	Projector-screen/WiFi	Audio-Digital textbook, Google Images, Video-Digital textbook
Teacher 10	Male	23	4º	29	3	D	IWB/WiFi	Web resource, Digital textbook

Participants and sample

The study involved the classroom practices of 10 teachers at urban primary schools. Three recordings were made of each teacher over the 2018–2019 school year, providing 132 hours of recordings (Table 1). The equipment used consisted of a digital video camera focused on the entire classroom. The camera was hidden to make it difficult to see. There was also a digital recorder that was worn by the actual teacher. No member of the research team was present during the recordings.

Informed consent was obtained from all those participating in the study. The recordings of the pupils were authorised by their parents and by each teacher, who also consented to the recording of their classes. The authorisation guaranteed the participants' anonymity and the use of the recordings solely for research purposes. Furthermore, the study was cleared with the Department of Education of the Autonomous Government of Castilla y León, which also encouraged the schools to take part.

Instrument of analysis: system of categories for analysing teaching practice

The audio and video recordings have been transcribed for analysing the practices by means of the corresponding method for classroom interactions described below (Ramírez et al., 2016, 2019).

Firstly, each class is divided into Typical Classroom Activities (TCAs), which refer to all those activities that are undertaken during the class with a well-defined teaching purpose. The following are some examples of TCAs: content explanation; task performance; homework; planning and organisation; organising breaktime; and content revision. TCAs provide a general snapshot of the classes and what goes on in them, also indicating the subject they are used in.

Secondly, the teacher's instructive actions are classified into five categories: Identify; Plan; Explain; Revise; and Supervise. These five actions are performed on curricular aspects – Objectives, Content, Tasks, ICT resources and non-ICT resources – which may appear as the action's main focus (primary features) or as an auxiliary one (secondary features).

Our analysis of the teachers' classroom practices, together with a study of the curriculum's primary and secondary components, provides a profile of how teachers manage classroom environments. This profile informs us about the features used to organise the teaching activity in each practice (more details Appendix 1).

Data analysis

The application of the system for analysing the classes allows counting the rate of use in each category. This rate provides the sample used to work on the data presented in the results. The different analyses deliver further information on the types of activity that give the classes their structure and their relative weight during the time spent on each session. Results are also presented on the relationship between subjects and both ICT and non-ICT (analogue) resources and the relationship between these and teaching practices.

The data obtained in the classification are inserted into a matrix in the SPSS Statistics 26 program, where descriptive analyses are conducted together with cross-tabling to determine the following:

(1) Whether there are significant differences between the variables analysed. This has involved the use of Pearson's chi-squared test ($\chi 2$) which, due to the high number of rates reported by the category system ($n = 14{,}373$), needs to be complemented by an analysis of dependence between the variables via Cramér's V statistic to avoid sample size causing an error in the interpretation of Pearson's $\chi 2$.
(2) As regards those variables in which a significant difference is detected, an analysis is made of the adjusted standardised residuals that appear in each one of the variable's categories. This issue is crucial for a more accurate and coherent interpretation because of the complex nature of the study variables. Consider, for example, the TCA variable that has 32 different categories or the Teacher variable with 10 categories.

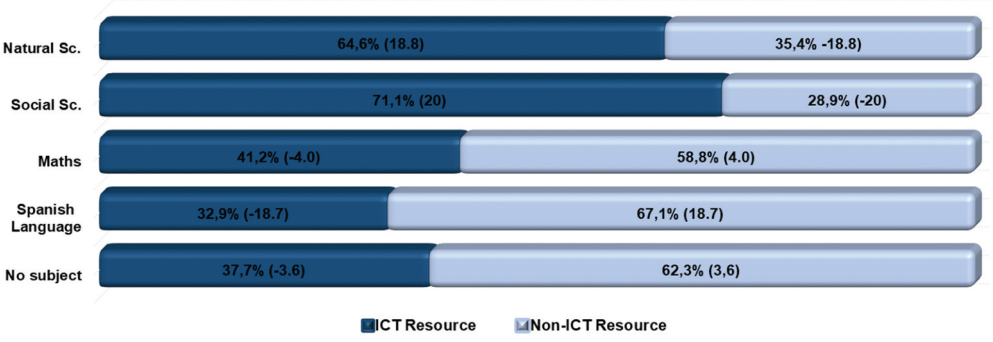

Figure 1. Distribution of the percentages for the use of ICT and non-ICT resources by subject (1). ($\chi 4 = 923{,}062$, $p < .005$.Cramer's $V = 0{,}259$)
Note. (1) The data in brackets correspond to adjusted standardised residuals with a 95% confidence level.

Results

Objective 1: this was formulated to discover whether the materials being taught can be linked to the use of ICTs. The corresponding results are provided in Figure 1, which shows the percentages for the use of ICT and non-ICT resources in the subjects featured in the recordings. The results we are presenting record the subjects taught by the teachers/tutors responsible for each year, discarding those subjects taught by specialist staff (Physical Education, Art, Music, Second Language and Religion).

As a preliminary consideration related to all the data here, we should point out that the resources (both ICT and non-ICT) appear in the majority of actions our teachers undertake as secondary aspects of the curriculum (ICT resource 42.3%/non-ICT resource 56.0%). This means that the teachers rely on these aspects when teaching content or organising tasks. They are the media that allow working on this content or these tasks, and only very rarely are they the main focus of the teacher's actions.

It should be clarified that the category 'no subject' refers to those classroom moments when no specific subject or topic is being taught. They normally refer to the time spent planning transitions, such as going out for break and then coming back, home-time, the changeovers between subjects or rollcall.

In this case, the chi-squared test is significant, whereby we may affirm that the relationship between variables is not due to chance, although it is true that Cramer's V statistic records a weak-moderate association, which means we should consider the data with caution. As regards the distribution of the variables' categories, the standardised resources higher than 1.96 indicate that they do not fit a normal distribution. All the variables are distributed in such a way that they do not fit normality, with the ones with a positive sign indicating that this resource is used in a significant manner, although a study needs to be made in each category to identify the significant trends in the use of resources.

The data in Figure 1 highlight the prevalent use of non-ICT resources in the total of registers analysed, although there is no such prevalence in the subjects of Social Sciences and Natural Sciences, where the standardised residuals confirm a significant relationship in favour of ICT resources. By contrast, the subjects of Spanish Language

and Maths (which are allocated more classroom time) record a significant change in this relationship in favour of non-ICT resources, especially in the case of Spanish Language. When no subject is being taught (data for the No Subject variable), significantly greater use is made of non-ICT resources than of ICT ones. This means that the subjects of Spanish Language and Maths continue to use traditional resources in the classroom, while the subjects of Natural and Social Sciences are making a much more committed move towards the use of ICT resources, even though they are still continuing to use traditional ones. When the aim is to organise, plan or use other actions that are not so closely associated with the teaching of content, but rather the classroom management of daily routines, this continues to involve more traditional resources.

These data therefore suggest that those components with a more instrumental component, such as Maths or Spanish Language, continue to see the prevalent use of analogue resources, although the counterbalance between analogue and digital resources is different in each case, with Maths recording a smaller difference between these two kinds of resources. This suggests that in the cases analysed, teaching in these subjects continues to involve ('paper and pencil' tasks), and ICTs are used much less often.

Elsewhere, the subjects with more descriptive net content, such as Social and Natural Sciences, are the ones that account for the most ICT resources. There may be several reasons for this: ICT resources are used more in classroom tasks with pupils, although their content is much easier to introduce through digital resources that include visual and audiovisual media, and graphics, amongst others.

Objective 2: In response to this objective, which involves studying the patterns of activities in which ICTs are used and the approaches chosen for teaching the curricular subjects in primary education, there follows a list of TCAs that have appeared in the recordings made, with the percentage that each one's duration accounts for out of all the activities undertaken, as well as the distribution each one makes of ICT and non-ICT resources (Table 2). Table 3, in turn, provides the results for the relationship between TCAs and the curricular subject in primary education.

According to the results shown in Table 2, the most common TCAs in the classes as a whole involve task performance (48.75%), with a variety of different kinds of tasks. This block should also include some of the TCAs related to assessment (15.87%), which are also linked to undertaking exercises and brief assignments. These are followed at some distance by TCAs related to explanation, either of tasks or of content, either as one-way communication or as a group. Finally, the TCAs for planning and organisation account for a lower percentage regarding their duration (11.68%), which should not diminish the significance of this figure in the overall management of teaching in these real contexts.

Elsewhere, the distribution of ICT and non-ICT resources in the TCA variable is not due to chance, as the $\chi 2$ shows with significant differences between TCA and secondary curricular aspects, with a close association among the variables, as shown by Cramer's V. Likewise, a more detailed analysis reveals that the adjusted standardised residuals return values >1.96 in most of the categories of the TCA variable, revealing that the distribution of the use of the ICT and non-ICT resources is significant and, furthermore, highly consistent with the nature of the TCA itself within the class. This distribution has more TCAs featuring non-ICT resources, although it should be noted that there are eight cases (tasks with ICT + non-ICT, watching a film with an ICT resource, singing songs,

Table 2. Typical Classroom Activities (TCAs) recorded. Percentage use of ICT and non-ICT resources in TCAs and their duration.[1]

Function	TCA	Total duration	ICT resources	Non-ICT resources
Related to organisation and planning	Clearing up and home-time	0.99%	24.1% (−3.5)	75.9% (3.5)
12%	Homework	1.08%	18.5% (−5.7)	81.5% (5.7)
	Organising breaktime	0.97%	21.0% (−4.5)	79.0% (4.5)
	Organising returning from breaktime	0.96%	26.9% (−2.7)	73.1% (2.7)
	Rollcall[3]	0.03%	No data	No data
	Task planning-Organisation	7.59%	49.2% (3.6)	50.8% (−3.6)
	Allocation of handicraft	0.06%	8.3% (−2.4)	91.7% (2.4)
Related to explanations	Content explanation	12.48%	53.3% (8.6)	46.7% (−8.6)
23.5%	Task explanation	4.21%	73.0% (16)	27.0% (−16)
	Content revision	6.28%	38.3% (−2.4)	61.7% (2.4)
	Group problem-solving[2]	0.03%	0.0% (−1.2)	100.0% (1.2)
	Group content building	0.55%	42.3% (−0.1)	57.7% (0.1)
Related to task performance	Assembly	1.92%	23.7% (−2.4)	76.3% (2.4)
48.4%	Reading aloud	1.52%	2.7% (−14.2)	97.3% (14.2)
	Text comprehension task	5.71%	40.6% (−1.4)	59.4% (1.4)
	Reciting poetry[2]	0.04%	0.0% (−2.1)	100.0% (2.1)
	Dictation	0.42%	1.6% (−6.7)	98.4% (6.7)
	Date and weather[2]	0.08%	0.0% (−1.5)	100.0% (1.5)
	Task with ICT+non-ICT	25.68%	70.1% (43.7)	29.9% (−43.7)
	Task without ICT	12.38%	3.1% (−38.5)	96.9% (38.5)
	Watching a film with an ICT resource	0.25%	83.0% (5.5)	17.0% (−5.5)
	Singing songs	0.31%	84.1% (5.5)	15.9% (−5.5)
	Rest	0.06%	100.0% (2.3)	0.0% (−2.3)
	Task presentation	0.21%	100.0% (6.1)	0.0% (−6.1)
	Working with special-needs pupil	0.17%	0.0% (−5.1)	100.0% (5.1)
Related to assessment	Correcting work in class	11.76%	21.6% (−20.8)	78.4% (20.8)
16%	Disclosing exam results[2]	0.15%	50.0% (0.2)	50.0% (−0.2)
	Exams	3.69%	20.9% (−10.9)	79.1% (10.9)
	Return of corrected exams	0.24%	0.0% (−4.8))	100% (4.8)
	Task self-assessment[3]	0.03%	No data[c]	No[3] data[2]
Others	Conversation with SEN teacher of special-needs pupils[2][1]	0.02[2]%	0.0[1]% (−0.9)	100.0% (0.9)
0.1%	Problem-solving[2][2]	0.11%	0.0% (−1.5)	100.0% (1.5)
	Total[3]	100.00%		

($\chi 2$ 22 = 3888.650; $p < 0.005$; Cramer's V statistic = 0.521)
(1)The data in brackets correspond to adjusted standardised residuals with a 95% confidence level.
(2)Eliminated for the $\chi 2$ calculation for being less than 5.
(3)This TCA does not contain secondary curricular items, but does contain primary ones.

rest, task presentation by pupils, task explanation, content explanation and task planning), where ICT resources are used in a significantly different manner to non-ICT resources.

The chi-squared in Table 3 shows that there are significant differences in the distribution of the variables, which means they are not due to chance. What's more, Cramer's V shows there is a close association between the variables, which corroborates the chi-squared interpretation.

As regards the TCAs with standardised residuals above 1.96 related to the no subject variable, Table 3 shows that they are mostly related to planning and organisation, which do not involve specific subject content. All the other TCAs with standardised residuals above 1.96 linked to the no subject variable have been removed from the calculation because they are fewer than five, except for watching a film with an ICT resource.

Regarding the links between subjects and TCAs, there are certain points worth mentioning. Firstly, the subject of Spanish Language is closely correlated with the following TCAs: assembly; reading aloud; text comprehension task; reciting poetry; and dictation. This is its most salient feature compared to all the other subjects appearing in Table 3, as it provides highly revealing clues as to how this subject is taught in the practices we have recorded: they are TCAs that are almost exclusive to the subject of Spanish Language. This subject is also taught with other activity patterns, but in these cases the activities are shared with other subjects, such as the following: homework; task without ICT (normally 'pencil and paper' exercises); correcting work in class; and disclosing exam results (the latter on a circumstantial basis if the recordings coincided with assessment periods).

Secondly, and in relation to the subject of Mathematics, there is a significant correlation between this subject and the TCAs of task explanation, content revision, task with ICT+ non-ICT, task without ICT (normally 'pencil and paper' exercises), correcting work in class and exams (also on a circumstantial basis if the recordings coincided with assessment periods). This profile for the subject of Mathematics suggests the work focuses on task performance, exercises involving different media, and their subsequent correction, with revision of prior content and explanation of the procedures to be followed.

Thirdly, the subject of Social Sciences significantly correlates with the TCAs of content explanation, task explanation, group content building, task with ICT+non-ICT and task presentation (by pupils). The image we gain of this subject is one of a combination of strategies of presenting content and tasks (either by the teachers or by the pupils), together with activities more closely linked to exercises or tasks involving different media.

Finally, in fourth place, the subject of Natural Sciences is significantly correlated with the TCAs of homework, content explanation, task with ICT+non-ICT, task without ICT, watching a film with an ICT resource, singing songs, exams and return of corrected exams (the latter two on a circumstantial basis if the recordings coincided with assessment periods). Like Social Sciences, the subject of Natural Sciences combines presentation with the performance of tasks and exercises on different media. The TCA singing songs becomes meaningful in this subject within the recordings made in Year 1 (six-year-olds), when this activity pattern is used above all in a subject's bilingual version (Science in English).

Table 3. Percentage of use of TCAs by subject.(1)

Function	TCA	No subject	Spanish	Maths	Social Sci.	Natural Sci.
Related to organisation and planning (12.0%)	Clearing up and home-time	95.5% (43.8)	0.0% (−12.4)	4.5% (−8.8)	0.0% (−5.3)	0.0% (−6.7)
	Homework	0.0% (−5.7)	43.6% (2.5)	7.4% (−7.6)	0.0% (−5.2)	49.0% (16)
	Organising breaktime	100.0% (44.9)	0.0% (−12.1)	0.0% (−10.2)	0.0% (−5.2)	0.0% (−6.5)
	Organising return from breaktime	100.0% (47.1)	0.0% (−12.7)	0.0% (−10.6)	0.0% (−5.5)	0.0% (−6.9)
	Rollcall(2)	100.0% (7.9)	0.0% (−2.1)	0.0% (−1.8)	0.0% (−0.9)	0.0% (−1.2)
	Task planning-organisation	81.9% (105.2)	6.6% (−29)	2.5% (−27.3)	4.0% (−8.9)	5.0% (−12.5)
	Allocation of handicraft(2)	100.0% (11.6)	0.0% (−3.1)	0.0% (−2.6)	0.0% (−1.3)	0.0% (−1.7)
Related to explanations (23.5%)	Content explanation	0.7% (−20.8)	21.8% (−18.6)	21.9% (−9.2)	23.9% (30.2)	31.8% (31)
	Task explanation	4.6% (−7.1)	16.7% (−13.6)	59.0% (22.4)	11.8% (2.6)	7.9% (−6.1)
	Content revision	5.4% (−7.7)	34.2% (−1.7)	38.0% (8.4)	10.4% (1.2)	12.0% (−2.7)
	Group problem-solving(2)	0.0% (−1)	0.0% (−2.1)	0.0% (−1.8)	100.0% (8.7)	0.0% (−1.2)
	Group content building	0.0% (−4.3)	39.3% (0.8)	24.1% (−1.2)	36.6% (11.1)	0.0% (−4.9)
Related to task performance (48.4%)	Assembly	8.4% (−2.1)	91.6% (26.1)	0.0% (−14.3)	0.0% (−7.3)	0.0% (−9.2)
	Reading aloud	0.0% (−7.2)	100.0% (26.7)	0.0% (−12.7)	0.0% (−6.5)	0.0% (−8.2)
	Text comprehension task	0.0% (−14)	97.7% (50.3)	0.8% (−24.2)	1.4% (−10.8)	0.0% (−16)
	Reciting poetry	0.0% (−1.1)	100.0% (4.2)	0.0% (−2)	0.0% (−1)	0.0% (−1.3)
	Dictation	0.0% (−3.8)	100.0% (14)	0.0% (−6.7)	0.0% (−3.4)	0.0% (−4.3)
	Date and weather(2)	100.0% (12.5)	0.0% (−3.4)	0.0% (−2.8)	0.0% (−1.5)	0.0% (−1.8)
	Task with ICT+non-ICT	1.4% (−29.3)	29.9% (−12.4)	37.8% (18.8)	15.4% (18.8)	15.6% (3.4)
	Task without ICT	0.0% (−20.6)	48.8% (15.1)	40.3% (14.9)	1.7% (−15.3)	9.2% (−8.4)
	Watching a film with ICT resource	36.4% (6.4)	0.0% (−6.1)	0.0% (−5.2)	0.0% (−2.6)	63.6% (11.5)
	Singing songs	0.0% (−2.4)	0.0% (−5.1)	0.0% (−4.3)	0.0% (−2.2)	100.0% (16.6)
	Rest(2)	100.0% (11.6)	0.0% (−3.1)	0.0% (−2.6)	0.0% (−1.3)	0.0% (−1.7)
	Task presentation (by pupils)	0.0% (−2.7)	0.0% (−5.6)	0.0% (−4.7)	100.0% (23.1)	0.0% (−3.1)
	Working with special-needs pupil(2)	0.0% (−2.4)	100.0% (8.9)	0.0% (−4.3)	0.0% (−2.2)	0.0% (−2.7)
Related to assessment (16%)	Correcting work in class	0.0% (−20.5)	54.8% (22.2)	35.0% (8)	0.0% (−18.7)	10.3% (−6.6)
	Disclosing exam results	39.5% (5.5)	60.5% (3.1)	0.0% (−3.9)	0.0% (−2)	0.0% (−2.5)
	Exams	0.0% (−11.3)	5.4% (−20.3)	54.5% (18)	7.6% (−2.1)	32.6% (16.5)
	Return of corrected exams	0.0% (−4.2)	0.0% (−8.8)	25.5% (−0.8)	0.0% (−3.8)	74.5% (20.2)
	Task self-assessment(2)	100.0% (8.4)	0.0% (−2.3)	0.0% (−1.9)	0.0% (−1)	0.0% (−1.2)
Others (0.1%)	Conversation with SEN teacher of special-needs pupils(2)	100.0% (5.6)	0.0% (−1.5)	0.0% (−1.3)	0.0% (−0.6)	0.0% (−0.8)
	Problem-solving(2)	100.0% (13.2)	0.0% (−3.5)[1]	0.0% (−3)[2]	0.0% (−1.5)	0.0% (−1.9)

($\chi 2\ 88 = 27718.043$; $p < 0.005$; Cramér's $V = 0.528$)
(1)The data in brackets correspond to adjusted standardised residuals with a 95% confidence level.
(2)Eliminated for the $\chi 2$ calculation for being less than 5.

The data contained in Table 3 therefore enable us to summarise certain highlights: the teaching of Spanish Language involves certain practices that are highly specific to that subject; Mathematics involves a teaching management focused on explaining, doing and correcting tasks (exercises), and the Natural and Social Sciences involve a more or less balanced combination of activities for the presentation of content and the performance of tasks using different media. It may thus be affirmed that the profiles of the types of activity are fairly different between each other in Spanish Language and Mathematics and compared to other subjects. There is a greater similarity between the subjects of Social Sciences and Natural Sciences regarding the types of activity used in their teaching.

Discussion

We have found that the use of resources in the subjects taught is distributed in a clearly different way. The data reveal a trend that coincides with other studies (Hennessy et al., 2005; Howard et al., 2015) regarding the use of digital or analogue resources linked to subjects or topics of a different nature. As we have shown in the results, those subjects with a more descriptive and less instrumental content seemed to make greater use of ICT resources, while in those subjects of an instrumental nature, and although ICTs do feature, the ones that prevail are more traditional analogue resources. It would be adventurous in this study to interpret this tendency in terms of the subjects' didactic traditions, whereby the humanities subjects follow a bookish culture rooted in their historical development, while scientific subjects are more prone to a technological culture (Hennessy et al., 2005). This is a stage of schooling in which the weight of a subject's didactic tradition has less impact. Primary education does not set out to specialise pupils in the different fields of knowledge, but instead help them to attain the highest level of development in their intellectual and personal capabilities to enable them to understand the world around them and engage with it, which is why content is often addressed in a mainstream manner.

The results suggest that both the use of digital resources and their choice call for content-related decision-making that takes into account specific practices. This finding leads to the long-running debate on the relationship between occupations and subjects and how academic knowledge is transformed into something that can be taught and which is meaningful to pupils (Gericke et al., 2018). A large part of the work that teachers devote to content in their practices involves the notion of recontextualisation or transposition (Gericke et al., 2018). This refers to the task of transforming the content of academic disciplines into classroom content during the development process. The 'horses-for-courses' approach to the choice of resources has already been reported in other studies by indicating that teachers use ICTs when they consider them appropriate for teaching their subject (Attwell & Hughes, 2010).

The results also shed light on the different objectives pursued in the different types of activities. This involves organising and planning not only what is going to be done immediately during the course of the sessions (task planning and organisation), but also what is going to be worked on with the pupils over the following days (homework); not only times, resources and spaces linked to the actual classroom, but also the times, spaces and resources linked to other areas in the school (organising breaktime). These planning tasks are accompanied by others involving assessment, explanations or task

performance. One of the more salient findings is that a large part of the work revolves around the performance of tasks of a different nature in which the pupils also have a leading part to play, as do content explanation and tasks, albeit to a lesser extent but still significantly so. This classification of types of activity has been enlightening because it has been linked with the ICT and non-ICT resources that are used for achieving curricular goals. An initial point to be made here involves something that has already been reported in other studies (Area-Moreira et al., 2016) regarding the simultaneous use of analogue and digital resources in classrooms – in our case, with a greater part played by traditional resources. Our teachers plan their work with their pupils, teach Spanish Language and Maths, and assess them by prioritising traditional resources. They are steadily including ICT resources for activities linked to task performance and explanation. The recorded sessions reveal that explanation activities are supported by the use of an IWB connected to the internet. In activities linked to task performance, the IWB is supported by the use of tablets or laptops connected to Snappet or to applications such as Plickers, Kahoot, PowerPoint and others, as well as by other resources such as textbooks, workbooks, exercise books and handicraft materials. As we have seen in the results, ICTs make only a tentative appearance in other activities closely linked to the teaching process, such as assessment or the organisation and planning of teaching actions within the classroom. All this means that ICTs are not meaningful in all teaching tasks, which include some of major import, such as assessment.

In turn, the nature of the content being taught in the subjects seems to have a role to play in light of the results obtained. The patterns of activity linked to the different subjects analysed have revealed fairly different profiles. This is especially true in the case of the subject Spanish Language, where we have identified types of activity that are restricted exclusively to it. In the case of Maths, too, the profile reflects a subject of an instrumental nature in which the performance of tasks (exercises) and their explanation are particularly prevalent. Natural and Social Sciences have much more descriptive content due to their very nature, and they have similar profiles, where the explanation and performance of tasks combine to different degrees. This is important, as one of a teacher's duties involves the curricular building of classroom practices that involve their pupils in their learning process (Deng, 2021; Gericke et al., 2018; Lambert, 2018), and our teachers at least appear to create different classroom practices depending on the subject they are teaching.

Conclusions

This study contends mainly that the use of both digital and analogue resources in real classroom practices is linked to particular activity patterns (TCAs) and to specific subjects and topics. There are significant differences in the use of digital resources in the subjects of Natural Sciences and Social Sciences, where these activities are used in TCAs that involve content explanation and the performance of classroom tasks. In turn, significant differences have been found in the use of analogue resources in TCAs specifically linked to the teaching of Spanish Language. Such differences have also been identified in the use of analogue

resources in the subject of Mathematics, with TCAs for explaining and performing classroom tasks.

These results should be used as an opportunity to reflect upon the reasons that teachers pursue different teaching practices regarding the use of resources in the different subjects. They also provide a chance to study whether this is due to a change in content that stems from a reflection on what is specific to each subject in each teaching process, whether it responds to the development of didactic traditions linked to the teaching history of each classroom content, whether it seeks the assimilation and comprehension of school subjects by pupils, or whether, in short, it is the accumulation of all these aspects.

Statements relating ethics and integrity policies

Informed consent was obtained from all those participating in the study. The recordings of the pupils were authorised by their parents and by each teacher, who also gave their permission for the classes to be recorded. The authorisation guaranteed the participants' anonymity and the use of the recordings solely for research purposes. The study was also authorised by the Regional Government's Department of Education, which encouraged the schools to take part in the research. All model authorisations are available for consultation.

The audio-visual data collected cannot be consulted, but the authors can give access to the written transcripts as they are absolutely anonymous.

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ORCID

Elena Ramírez http://orcid.org/0000-0003-2903-0070
Jorge Martín-Domínguez http://orcid.org/0000-0003-3439-3319
Inés Rodríguez http://orcid.org/0000-0002-9476-0347
Alicia Pérez González http://orcid.org/0000-0002-4186-795X
Inmaculada Martín-Sánchez http://orcid.org/0000-0002-4918-4459

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APPENDIX 1

Data classification: Class analysis system

The classroom practices have been studied by applying a category-based analysis that permits breaking down what happens in the classes, establishing study categories on the practice that tell us about the **types of activity** that are framed within the teachers' actions, **the role of the different curricular elements** in the configuration of the practices, and **the parts the teachers most frequently play**. The types of activity (called TCAs in our analysis) refer to a series of actions that allow managing the learning environment in the classroom, creating generic patterns of exchange between teachers and pupils, and between the pupils themselves. Some examples of this are 'Task planning-Organisation', 'Text comprehension task', 'Task explanation', and 'Organising break time'. Within each type of activity, the system for analysing the practice provides information on the teachers' role through the instructive actions the teacher undertakes in the sessions classifying those actions into five categories: identify, plan, explain, recapitulate, and supervise-assess (Table A1). In addition, the teachers focus their actions on five curricular elements: objectives, task, content, ICT resources, and non-ICT resources (Table A1).

The system for analysing the practice distinguishes between primary and secondary curricular elements. This distinction arose in the definition of the analysis system when observing how the teachers actually performed in class. The teachers often worked with the pupils on aspects of the tasks or on curricular content, with application made accordingly of the materials used as the platform for the tasks or for presenting the content. They explained, supervised, and planned tasks and content on the basis of the presentation medium. This second level of curricular elements is not explicitly featured in all the teachers' actions; nevertheless, we deemed it particularly expedient to capture those mechanisms of the teachers' activity, as our aim was to study the role of ICTs in classroom practices. Along similar lines, albeit in relation to the use teachers make of the textbooks, Sosniak & Stodolsky (1993, p. 271) stress the functional approach teachers adopt towards their materials as professional teaching tools. If we look at the transcribed fragment of a class in Table A3 below, we may distinguish between primary and secondary curricular elements in our system of categories. In this brief fragment, the teacher tries to make students understand a natural science text. The performance of some of these tasks relies on the use of the ICT resource, while others, do not require the use of any kind of resource or require the use of the non-ICT resource. This means there are elements of the primary curriculum, such as tasks to be performed, and others from the secondary curriculum, such as the ICT resources required to perform these tasks.

Table A2 below provides a list of each one of the TCAs detected through the application of the analysis system.

In addition, Table A3 below provides a fragment from a class transcribed and categorised to illustrate the system of analysis. Nevertheless, note should be taken of the loss of information that occurs in this case, as the transcription cannot be accompanied by the corresponding video recording. This fragment is part of the TCA 'Text comprehension task', where teacher explains content related to blood circulation. The teacher's instructive actions range from identify the task of pupils to explaining specific content related to blood circulation. These instructive actions are performed sometimes on the primary curricular element 'Task' others on the 'Content'; and, in turn, these tasks are based on a secondary curricular element, namely, the ICT resource or non-ICT resource, that serve to support tasks and explanations being undertaken.

This analytical procedure is based on the transcription of the class session recordings. The system allows using successive levels of precision to identify what is happening in the actual classroom practice. The three steps in the application of the analysis system are as follows:

(1) Division of the class into TCAs, that is, into the mainstream activities that provide the structure for the class. And assignment of the curriculum subject being worked on in each TCA.
(2) Segmentation of the TCAs, identifying the instructive actions the teacher carries out. By inter-judge agreement, the criterion for defining the segmentation of the actions involved a change in the teacher's action in the content of the action (from planning

Table A1. Explanation and examples of instructive actions and curricular elements.

INSTRUCTIVE ACTION		CURRICULAR ELEMENTS	
IDENTIFY	Statements used to refer in an indicative or explanatory manner to the elements in question. For example: "Please sit down here and listen", "Right, the story is now beginning"	AIMS	This refers to the purpose of the teaching-learning process, the reason for that process. Example: "Because he will be able to put the tractor's keys here" (referring to a handicraft task the children were doing for Father's Day) (identify-aim)
PLAN	Statements used to organise aspects related to the means and goals pursued. For example: "Let's see, we're all going to work with the computer, start finishing up, stick everything down", "And you lot, while all the rest of you leave your work on the table, start getting ready to see the story of the kings and queens, the camels and the prisons"	CONTENTS	This refers to the knowledge to be acquired in the teaching-learning process. Example: "Let's see, Javier will help you, what's the first letter of that word?" (supervise-contents), "let's see if we can find it . . . there it is . . . oh no, this is a C, we can't find the G, there isn't a G" (identify-content)
EXPLAIN	Statements that describe or clarify to a greater or lesser extent the elements in question. For example: "Why don't you first paint all this part in yellow and then you can paint the purple better . . . Right, otherwise it's all going to get too muddled up", "You're in charge, but the teacher's the only one who can tell people to be quiet"	TASKS	These are identified with the specific actions teachers and pupils have to perform in keeping with the curriculum. Example: "Let's finish it then, leave the phrase there to do later and first finish that, otherwise we won't have enough time" (plan-task), "How are you getting on? Which one are you doing Jorge? Oh, so you've started off on that side" (supervise-task)
RECAPITULATE	Statements used to remember, repeat and/or revise the elements in question. For example: "Look Lucía, I've already told you three times this morning that you mustn't raise your voice when you're talking", "We've said we're going to make them all big"	ICT RESOURCES	They are related to the digital media used for the task and for presenting the contents. Example: "look this is the one that deletes (the key), this one and now with the arrow we can move forward and now we can separate them if we want" (explain-ICT resource), (to the pupils on the computer) "Now we're going to change game. We're going to play the mouse game". (plan-ICT resource)
SUPERVISE-ASSESS	Statement designed to control the achievement and/or development of the elements in question. For example: "Have you already finished them all? Let's see if you've got them all right: ant, farm, worm, scissors, glove, flute, seal and egg. Well done! You've earned a star", "Let's see, Iván, what colour are you going to paint Dad's car?"	NON-ICT RESOURCE	This refers to the analogue media used to perform the tasks and present the contents. Example: "So you know we've said that the books that teach us things are in the upper part. The stories and tales are in the lower part, and we said those were the ones lying over there . . . This one is about stories too, and this one is also about stories, so all these have to be put there" (explain-non-ICT resource), "Miguel, look for that picture of the vases, come on. Let's see, let's see what's happened to the flowers . . . " (identify-non-ICT resource)

Table A2. Typical classroom activities featured in the study.

Function	TCA
Related to organisation and planning	Clearing up and home-time
	Homework
	Organising breaktime
	Organising returning from breaktime
	Rollcall
	Task planning-Organisation
	Allocation of handicraft
Related to explanations	Content explanation
	Task explanation
	Content revision
	Group problem-solving
	Group content building
Related to task performance	Assembly
	Reading aloud
	Text comprehension task
	Reciting poetry
	Dictation
	Date and weather
	Task with ICT+non-ICT
	Task without ICT
	Watching a film with an ICT resource
	Singing songs
	Rest
	Task presentation
	Working with special-needs pupil
Related to assessment	Correcting work in class
	Disclosing exam results
	Exams
	Return of corrected exams
	Task self-assessment
Others	Conversation with SEN teacher of special-needs pupils
	Problem-solving

to explaining ...), or in the primary curricular element involved in the action (from content to tasks ...), or in the teacher's focus (from the group to a pupil, from one pupil to another ...).

(3) Identification of the primary and secondary curricular elements upon which the instructive actions are based.

The sequence developed for applying the analysis system to the transcribed class sessions was as follows:

(a) A class session is categorised simultaneously by three members of the research team trained in the system, in order to reach agreement regarding the contents of the categorisation.
(b) The six members of the research team work in pairs to categorise another of the class sessions involved in the study.
(c) The six members of the research team work individually to categorise the rest of the class sessions.
(d) A review is made of the degree of agreement in the categorisation of the classes analysed, and whenever necessary agreements are reached regarding the discrepancies that may arise, until a univocal categorisation is attained. This stage began with an agreement rate surpassing 84.2% for individual categorisations, and ended with 100% in the final joint categorisation.

Table A3. Example of the categorisation of a transcribed fragment.

Fragment 1: Text comprehension task Natural Sciences 6th (years 11–12)	Instructive action	Primary curricular elements	Secondary curricular elements
192 Teacher: Ainhoa please, can you read? Pupil Ainhoa: (Reading from the book) Blood vessels. There are three types of blood vessels, arteries, carry blood from the heart to capillaries . . . in the rest of . . . of. . . this blood is oxygenated.	192 Identify	192 Task	192 Non-ICTRes.
193 Teacher: Very important! Arteries. . . you need to know this, they carry blood (points to the Interactive Whiteboard) from the heart. . . to the rest of the body, they leave the heart with clean blood, okay? Arteries, they go from the heart (points to the Interactive Whiteboard) to the rest of the body, okay. . . right! Pupil Sergio: Then the blood used. . .	193 Explain	193 Content	193 ICTRes.
194 Teacher: Wait a second! Stand by, step by step Sergio. . .	194 Identify	194 Task	
195 Teacher: (Points to the Interactive Whiteboard) This blood is oxygenated, which means, it has a lot of oxygen, ok? Let's see the next. . . Capillaries. . . Pupil Sergio: But then, all that has to happen there in a very short time, doesn't it?	195 Explain	195 Content	195 ICTRes
196 Teacher: Of course Pupil Sergio: Of course . . .	196 Identify	196 Content	
197 Teacher: (Points to the Interactive Whiteboard) Capillaries are tiny blood vessels, can you see?	197 Identify	197 Content	197 ICTRes
198 Teacher: It's like branches coming out of the veins and arteries, and they come together, ok? (Points to the image on the Interactive Whiteboard). Can you see? They are very small. . . they are tiny (gesticulates) and they have very. . . thin walls, ok? In the fingers we have capillaries, in our hands. . . Pupil Sergio: Do we have 5 capillaries?	198 Explain	198 Content	198 ICTRes
198 Teacher: No! Many! Millions! Okay? We have millions of capillaries!	198 Identify	198 Content	

Data on the analysis system

The application of the system for analysing the classes allows counting the frequencies in each one of the categories. This count provides the sample used to collate the data presented in the results section, and which appear in Table A4 below. It is very important to understand the two types of data shown in Table A4. The first set of data refers to the number of TCAs identified in the 30 sessions analysed, while the second set corresponds to the number of instructive actions used in those TCAs. The number of TCAs provides information on the activity patterns that structure the classes, while the number of instructive actions performed in the TCAs reports on the relative weighting of the TCAs over the duration of the sessions.

References

Sosniak, L.A., & Stodolsky, S. (1993). Materials use in four fourth-grade classrooms. *The Elementary School Journal*, 93 (3), 249–275. https://doi.org/10.1086/461725

Table A4. Sampling data. Frequencies of the system analysis categories.

				Instructive actions n (26158)					Primary curricular elements n (26158)					Secondary curricular elements n (14372)				
Function	TCA	Frequency of TCA	Instructive actions of TCA	Identify	Explain	Plan	Recapitulate	Supervise	Objetive	Contents	Tasks	ICT Resource	Non-ICT Resour.	Objetive	Contents	Tasks	ICT Resource	Non-ICT Resour.
Related to organisation and planning	Clearing up and home-time	22	259	135	13	36	0	75	0	40	200	7	12	0	0	0	20	63
	Homework	16	283	112	44	32	4	91	0	99	164	1	19	0	0	4	24	106
	Organising breaktime	21	254	133	13	23	0	85	0	39	192	5	18	0	0	0	21	79
	Organising returning from breaktime	19	250	106	20	38	0	86	1	65	165	5	14	0	0	1	18	49
	Rollcall	1	8	8	0	0	0	0	0	6	2	0	0	0				
	Task planning-Organisation	102	1985	940	147	225	2	671	1	467	1335	101	81	0	4	18	381	393
	Allocation of handicraft	1	17	9	2	1	0	5	0	9	4	0	4	0	0	0	1	11
Related to explanations	Content explanation	52	3265	1201	624	90	32	1318	1	2278	882	59	45	0	10	14	826	724
	Task explanation	33	1100	393	205	38	4	460	0	400	644	45	11	0	0	7	487	180
	Content revision	34	1644	612	195	33	24	780	2	1106	517	4	15	0	1	1	228	367
	Group problem-solving	1	8	2	1	1	0	4	0	3	5	0	0	0	0	0	0	2
	Group content building	4	145	58	29	8	1	49	0	105	39	0	1	0	0	0	11	15
Related to task performance	Assembly	6	502	220	50	15	2	215	0	291	197	3	11	0	2	3	9	29
	Reading aloud	11	397	238	29	10	1	119	0	132	263	0	2	0	1	2	8	288
	Text comprehension task	24	1494	620	179	28	1	666	0	927	544	5	18	0	3	19	334	488
	Reciting poetry	1	10	4	1	1	0	4	0	5	5	0	0	0	0	0	0	6
	Dictation	3	111	55	14	5	0	37	0	19	87	1	4	0	0	0	1	62
	Date and weather	1	20	10	2	1	1	6	0	6	13	0	1	0	0	0	0	3
	Task with ICT+non-ICT	43	3693	1496	361	119	20	1697	1	1534	2036	65	57	0	4	48	1235	1088
	Task with ICT	48	3024	1183	335	97	7	1402	0	1031	1794	187	12	0	0	35	1866	233
	Task without ICT	51	3239	1459	408	110	7	1255	1	1125	1955	20	138	0	2	21	62	1909
	Watching a film with an ICT resource	4	66	28	11	4	0	23	0	27	34	2	3	0	0	0	39	8
	Singing songs	3	82	36	7	4	0	35	0	56	26	0	0	0	0	0	37	7
	Rest	2	17	7	1	1	1	7	0	3	13	0	1	0	0	0	4	0
	Task presentation	1	56	18	10	1	0	27	0	28	27	1	0	0	0	0	28	0
	Working with special-needs pupil	1	45	22	2	0	0	21	0	12	32	0	1	0	0	0	0	34

(*Continued*)

Table A4. (Continued).

				Instructive actions n (26158)					Primary curricular elements n (26158)					Secondary curricular elements n (14372)				
Function	TCA	Frequency of TCA	Instructive actions of TCA	Identify	Explain	Plan	Recapitulate	Superviise	Objetive	Contents	Tasks	ICT Resource	Non-ICT Resour.	Objetive	Contents	Tasks	ICT Resource	Non-ICT Resour.
Related to assessment	Correcting work in class	45	3077	1295	306	53	7	1416	0	1444	1556	45	32	0	8	12	428	1555
	Disclosing exam results	2	38	17	5	6	0	10	0	14	21	1	2	0	0	11	1	1
	Exams	8	964	431	98	19	0	416	0	298	625	21	20	0	3	8	119	451
	Return of corrected exams	2	62	26	10	1	0	25	0	29	28	1	4	0	0	0	0	30
	Task self-assessment	1	9	2	1	0	0	6	0	0	9	0	0	0				
Others	Conversation with SEN teacher of special-needs pupils	1	4	3	1	0	0	0	0	0	3	1	0	0	0	0	1	1
	Problem-solving	3	30	6	9	2	0	13	0	19	11	0	0	0	0	0	0	3