Researching interactive whiteboard (IWB) use from primary school to university settings across Europe: an analytical framework for foreign language teaching

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ABSTRACT

This paper reports on the development of an analytical framework for the observation and analysis of interactive whiteboard (IWB) use in the foreign language (FL) classroom. Developed from existing classifications of IWB activity in generic educational contexts (e.g., Armstrong et al. 2005; Bennett and Lockyer 2008; Hennessy et al. 2007), the instrument constitutes a new tool for analysing IWB use specifically in FL teaching and learning. It is based on empirical data collected during a large-scale collaborative project on the IWB in second language teaching and learning, which followed 44 teachers of six languages in seven countries to obtain class video recordings and participant commentary for a website supporting language teachers in integrating the IWB in communicative teaching practice. The paper outlines the process of developing the coding instrument to analyse three main aspects of IWB use: participant configuration, IWB tools and features, and language teaching objectives, providing definitions and examples of each item. The instrument is then applied to the dataset of over 250 video clips of FL teaching with the IWB, providing a detailed overview of teachers' use of this technology across educational contexts in Europe. The classification system adopted in the study thus

offers a new framework for the analysis of IWB use in language teaching, which adds to the existing body of literature on the use of interactive technologies in general education, and constitutes a tool for language teachers, trainers and researchers to investigate classroom practice in other contexts.

Introduction

This study describes the development of a research instrument for the observation and analysis of interactive whiteboard (IWB) use in the foreign language (FL) classroom. It uses data collected during a large-scale collaborative project on the IWB in second language teaching and learning in different languages, proficiency levels and educational contexts. The paper outlines the process of developing the coding instrument with three main rubrics of IWB use: participant configuration, IWB tools and features, and language teaching objectives, providing definitions and examples of each item.

The IWB in Educational Settings

The interactive whiteboard offers a large projected display linked to a computer, which can be controlled by touching the IWB with a pen or fingers. The quality of the display makes it especially suitable for whole class teaching (BECTA 2004), but it can also be used by groups or even individuals. After an 'exponential increase' (Mercer, Hennessy and Warwick 2010, p. 196) in the use of the IWB in the UK, it has gradually spread to many other countries. Much of the early research literature reflects this initial UK use (e.g., Glover and Miller 2001; Levy 2002; Ball 2003; Knight et al. 2004; Beauchamp and Parkinson 2005), but international perspectives appear in more recent work (e.g. Bennett and Lockyer 2008; Holmes 2009; López 2010; Jang 2010; Serow and Callingham 2011; Celik 2012; Harrison 2013).

These international studies show that the IWB:

• provides clear visibility (Somekh et al. 2007);

- motivates learners of all ages (Beeland 2002; Wall et al. 2005; Hall and Higgins 2005; Mathews-Aydinli and Elaziz 2010; Türel and Johnson 2012);
- can facilitate the use of multimodal resources (Higgins, Beauchamp and Miller 2007; Twiner et al. 2010; Maher 2011);
- increases pace and interaction in lessons (Jewitt, Moss and Cardini 2007; Gillen, Staarman, Littleton, Mercer and Twiner 2007);
- can promote participation (Hennessy, Deaney, Ruthven and Winterbottom 2007) and allow the orchestration of classroom dialogue (Mercer et al. 2010);
- is perceived as easy to use (Süleyman and Ugur 2012)
- constitutes a springboard for the development of other ICT practices (Avvisati, Hennessy, Kozma and Vincent-Lancrin 2013).

The presence of the IWB does not, however, necessarily lead to either changes to teaching or improvements in learning, and teachers remain 'critical agents' (Armstrong, Barnes, Sutherland, Curran, Mills and Thompson 2007) in mediating its use. Furthermore, as Kennewell and Beauchamp (2007, p. 240) point out, if IWBs are to meet expectations of policy makers and practitioners, there is need for a 'new wave of professional development in ICT which takes account of the extended list of ICT's features and the need to embed them in teachers' pedagogical knowledge and reasoning'. This dual need to develop technical skills and pedagogic knowledge is reflected in a range of transition frameworks which map teachers' use of the IWB as they move from treating it as a 'blackboard substitute' to more 'synergistic' integration by both teachers and learners (Beauchamp 2004) with the IWB functioning as a 'digital hub' or dashboard (Cutrim Schmid and van Hazebrouck 2010).

Although some studies have investigated use of the IWB in specific school subjects (e.g., Kershner, Mercer, Warwick and Staarman 2010 for primary school science; Serow and Callingham 2011, for primary school mathematics in Australia; Hennessy et al. 2007, for secondary school science), less research has focused on its use in teaching languages, despite its potential for promoting communicative language teaching (which focuses on meaning rather than grammar).

IWB Use in Language Teaching

These studies look at secondary education (e.g., Gray, Hagger-Vaughan, Pilkington and Tomkins 2005; Glover, Miller, Averis and Door 2007; Cutrim Schmid and Schimmack 2010) and higher education (Cutrim Schmid 2006; Mathews-Aydinli and Elaziz 2010), with very few studies (e.g., Coyle, Yañez andVerdú 2010) examining primary school settings. This work generally supports the findings discussed above: the IWB can, for example, facilitate the exploitation of new media (Cutrim Schmid 2007; Gray et al. 2005; Miller and Glover 2009), meet the needs of pupils with differing learning styles (Cutrim Schmid 2008) and increase levels of pupil motivation (Mathews-Aydinli and Elaziz 2010). Studies also show that the IWB can encourage interactivity in communicative language teaching by 'building language proficiency through meaningful use of language in authentic contexts' (Cutrim Schmid and Schimmack 2010, p. 199).

Whilst a potentially harmonious relationship between current models of language teaching and learning and IWB exploitation seems quite conceivable, some researchers have expressed concerns that integrating the IWB into language classrooms could encourage a more traditional, teacher-centred approach (Cutrim Schmid 2009; Gray, Hagger-Vaughan, Pilkington and Tomkins 2007). Tentative reasons for this include the teacher's preoccupation with controlling the second language content of the lesson (Gray et al. 2007), as well as insufficient technical and material development training (Mathews-Aydinli and Elaziz 2010). Hence there is 'considerable variety' in both how the IWB is exploited pedagogically by teachers, and how much they change their teaching practice (Cutrim Schmid and Whyte 2012, p. 83).

This review of IWB research highlights its potential for second language teaching, supported by research in a variety of contexts in Germany (Cutrim Schmid 2008; 2009; 2010), Turkey (Mathews-Aydinli and Elaziz 2010) and the UK (Gray et al. 2005; 2007). It also reveals a gap between this potential and actual implementation, suggesting a need for research into IWB-mediated activities in the language classroom and ways of codifying how different tools and features are exploited for particular teaching objectives. The objective of the present paper, therefore, is to propose an analytical framework to inform research in IWB-supported second language teaching by identifying both broad dimensions and detailed aspects of IWB use in language classrooms.

Context

Data for the present study were collected in the course of a 28-month European lifelong learning project on Interactive Technologies in Language Teaching (iTILT). The project involved 44 language teachers of Dutch, English, French, Spanish, Turkish and Welsh in Belgium, France, Germany, the Netherlands, Spain, Turkey and Wales, and included learners aged from 4 years old to adults, with proficiency levels ranging from A1 to C2 (Council of Europe 2001).[1] Its goal was to promote communicate language teaching (CLT) with the IWB by developing teacher training materials, documenting teaching practice and eliciting teacher and learner perspectives. These were used to create a website presenting edited excerpts of class videos and participant commentary, synthesised in multimedia IWB practice reports for use by other language teachers and teacher educators. The project teachers were first trained to use the IWB for CLT and provided with a manual and appropriate sample teaching materials (Whyte, Cutrim Schmid and van Hazebrouck 2011). Researchers video-recorded two language lessons for each teacher, and elicited participant views via semi-structured interviews using video stimulated reflective dialogue (VSRD) as 'a stimulus to promote dialogue between the teacher and the observer' (Jones, Tanner, Kennewell, Parkinson, Denny, Anthony, Beauchamp, Jones, Lewis and Loughran 2009, p. 66). A questionnaire on teachers' attitudes to the IWB and to ICT in general was also administered before and after data collection. Findings from the questionnaires and interviews are reported elsewhere (Hillier, Beauchamp and Whyte 2013; Whyte, Beauchamp and Hillier 2012; Whyte, Cutrim Schmid, van Hazebrouck and Oberhofer 2013); this paper reports on the analysis of the classroom videos.

Coding Framework

The coding of videos was developed during data collection and stemmed from the need for 'tags' to allow website users to search for specific content. Initial codings were undertaken separately in each country using tags determined collaboratively by the research team to reflect:

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[1] The Common European Reference Framework for Languages defines 6 levels of language proficiency: A1 and A2 correspond to beginning levels, B1 and B2 intermediate, and C1 and C2 advanced.

- research on teaching practice and teacher education with the IWB;
- keywords and structure of existing repositories and resources for IWB and ICT-supported teaching;
- partners' experience in professional development with the IWB for language teachers.

As more video was added to the project website, codings were refined and checked across teams to ensure inter-rater reliability. The process was not without problems as

> Unlike other research projects where analytical categories can be refined once the full data set is available, in the present case, the volume of data, disparity of teaching contexts, and ongoing, overlapping processes of filming, interviewing, and editing data made it impossible to tailor search tags to correspond exactly to the final data set ...These issues formed the basis of extensive discussion during online and face-to-face sessions in order to refine the coding system ... (Whyte et al. 2013, pp. 15–18)

The result was a coding framework which aimed to capture pedagogically relevant uses of the IWB in terms of

a) participant access to the IWB (Table 1 below)
b) use of specific IWB tools and features (Table 3 below)
c) language teaching objectives (Table 5 below).

Each rubric will be examined in detail in what follows to explain and exemplify the relevant codes before presenting a comprehensive overview of the framework (Table 7 below).

Participant Access to the IWB

A first indicator of IWB use concerns which participants have access to the IWB: the teacher and/or learners? Table 1 shows the rubrics defined to identify different configurations of teacher and learners observed in IWB-oriented language sessions. The list includes three types of 'teacher-centric' activities (Wall et al. 2005), with teachers teaching 'from the front' (Smith 2001), and three kinds of learner activity, further subdivided according to the role of the IWB in each. Each clip was coded according to the pre-dominant use of the IWB: where no learner was visible at the IWB, one

type of whole-class activity was selected and, if learners came one by one to the IWB, this was coded as individual learner activity. The tag 'plenary' was included as an additional refinement to whichever whole-class activity was also selected; since this category involved information about the session not necessarily discernible from the clip itself, only the local researcher assigned this code. Similarly, for learner-based activities, a supplementary 'station work' or 'carousel work' tag and another for 'role-play' were used in addition to the six main activity types – again in addition to, rather than as a substitute for, another activity type and assigned primarily by the local researcher who had observed the entire class session.

Table 1: Participant configuration rubric

Type of Activity	Definition	Example
Teacher-centred organisation		
Whole-class instruction	teacher gives instructions to whole group, no learner activity at IWB	launching group or pair work; explaining an activity or a language point
Whole-class discussion	teacher invites learner contributions; no learner activity at IWB	reviewing an activity; accommodating learner comments or questions
Whole-class questioning	teacher asks questions, learners volunteer answers; no learner activity at IWB	asking display questions about content of activity; eliciting guesses or opinions
Plenary (reflection)	whole-class instruction, discussion or questioning conducted at end of session	playing game with whole class to review main session objectives
Learner-centred organisation		
Individual learner activity	learners work independently at their places; no direct IWB use	completing worksheets with task support displayed on IWB
Individual learner activity at IWB	one learner works at IWB; other learners observe	dragging objects in revealing or matching activities
Pair work	learners work in pairs at their places; no direct IWB use	interviewing or speaking activities with task support displayed on IWB
Pair work at IWB	two learners work together at IWB; other learners observe	cooperating in activity on webpage or interactive exercise

Group work	learners work in groups away from IWB; no direct IWB use	playing a game with task support displayed on IWB
Group work at IWB	group of learners works at IWB; other learners perform different activity	playing a team game at the IWB; completing a task without teacher intervention; working with the teacher at the IWB
Station work or carousel work	IWB activity is one of several activities; learners rotate around different activities	working in groups a) individually on worksheets b) in pairs with audio players c) in a group at the IWB, and rotating around all activities
Roleplay	Activity involves learners taking on a particular role	pretending to be another person in an imaginary situation, e.g., a customer buying tickets, a hotel receptionist

After the process outlined above, Table 2 gives an overview of the distribution of participant access to the IWB for the 44 teachers in the project. Data are presented in columns by country in order of increasing educational level, with the percentage of clips showing teacher–centred or learner–centred configurations for each. The British (Welsh) classes were all in primary schools; in France, 4 of the 9 classes were primary; the Spanish data included one primary class and 5 secondary, while the German classes were lower and upper secondary plus one university class. The Belgian and Dutch data came from secondary schools and universities, while all the Turkish classes were university level.[2] The first row of the table shows the number of video clips produced in each country, then four types of teacher–centred activity and five kinds of learner–centred activity are shown with totals in a header row for each. Thus, in the British classes, 8/51 or 16% of the class video clips selected showed teacher–led activity at the IWB, as against 43/51 or 84% showing learners at the IWB. The

[2] Since coding was carried out first in each country irrespective of educational level, the results reported here do not permit a finer-grained view of IWB use by educational sector. Additional analysis of this variable for the French data suggests idiosyncratic use by different teachers rather than clear patterns by educational sector (Alexander 2013).

Table 2: Participant configuration results

	GB		FR		ES		DE		BE/NL		TK		TOTAL	
N	51	%	56	%	39	%	55	%	30	%	36	%	267	%
TEACHER	8	16%	10	18%	15	38%	12	22%	19	63%	2	6%	66	25%
Instruction	4	8%	6	11%	6	15%	1	2%	6	20%	0	0%	23	9%
Discussion	1	2%	2	4%	1	3%	4	7%	7	23%	2	6%	17	6%
Questioning	3	6%	2	4%	8	21%	7	13%	6	23%	0	0%	26	10%
Plenary	4	8%	2	4%	1	3%	1	2%	5	17%	0	0%	13	5%
LEARNER	43	84%	46	82%	24	62%	43	78%	11	37%	34	94%	201	75%
Individual	33	65%	40	71%	10	26%	33	60%	11	37%	33	92%	160	60%
Pairwork	6	12%	1	2%	9	23%	0	0%	0	0%	0	0%	16	6%
Groupwork	4	8%	5	9%	5	13%	10	18%	0	0%	1	3%	25	9%
Stationwork	0	0%	6	11%	10	26%	2	4%	0	0%	0	0%	18	7%
Roleplay	2	4%	4	7%	1	3%	5	9%	0	0%	0	0%	12	4%

remaining percentages show the proportion of the total number of clips featuring each type of activity.[3]

The table shows a strong overall preference among iTILT project participants for activities featuring learners (201/267 or 75%), rather than teachers at the IWB (66/267 or 25%). The most common participant configuration involved individual learners at the IWB, accounting for 60% of all examples, and almost four times as frequent as pairs or groups of learners at the IWB. Comparing patterns of IWB use across countries, the table shows the highest frequency of selection of clips involving learners at the IWB in Turkey. Otherwise, examples of learner-centred IWB activities are generally more frequent in classes with younger learners (84% and 82% in the UK and France) and teacher-centred examples more common at university level (63% in Belgium and the Netherlands). Country-specific patterns of type of learner-centred activity also emerged: station work, or carousel activities (where learners rotate around different activities during the same lesson) were generally confined to French primary or primary teacher training contexts and private secondary-level classes in Spain, while role-play occurred in the same French classes and in German secondary schools.

Issues arising during the development of participant configuration codes concerned the frequency of their occurrence in the data set and the assignment of codes, when either the planning or execution of activities seemed to involve more than one category. First, because of the iTILT project's focus on actual IWB use, no examples of learner-centred activities away from the IWB were selected for the website; these categories may, however, be useful in researching other contexts where the IWB is only one element of the classroom ecology. Second, since teachers and researchers tended to select video excerpts corresponding to a complete teaching activity, some videos show more than one type of participant configuration. In cases where the IWB was controlled alternately by the teacher and learners, preference was given to the learner-centred tag due to the project goal of encouraging communicative rather than lecture-style activities. Finally, a small number of videos showed activities which the

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[3] Within the superordinate categories 'Teacher' and 'Learner,' the number of examples of each category is expressed as a raw score and a percentage of the total number of examples for each country. Totals may be greater than 100% in cases where the supplementary tags 'plenary', 'stationwork', and 'role-play' are applied, as described above.

teacher had planned for individual learners, but then nominated a second learner to help the first. These videos were also coded as individual activities to distinguish them from activities conceived as pair work; coding therefore followed 'task–as–plan' rather than 'task–in–progress', to use Breen's (1987) terminology. Other researchers may wish to reconsider this priority, or code such instances separately.

Use of IWB Tools and Features

The second rubric investigated the design of the IWB files used in the activities, and their exploitation in each video clip. Our coding system distinguishes *objects* embedded in IWB files prior to class such as images or videos, and *actions* undertaken during the session, such as highlighting text or moving objects. Brief definitions and examples are given in Table 3, which is organised like Table 1.

Table 3: IWB Tool/Feature rubric

IWB Tool or Feature	Definition	Example
Object		
image	photo or clipart embedded in IWB file page	images comprising a vocabulary set (weather symbols, wild animals)
sound	audio file embedded in IWB file page	target language audio recording; audio feedback (e.g., error beep or applause)
interactive object	Flash animation in proprietary IWB software; website	name sorter; ready-made game; link to online language learning activity or target-language website
video	video file embedded in IWB file page	target-language song or documentary; teacher or learner-created movies
navigation	embedded links to other IWB file pages	link to answer key or hint
Action		
writing/pen tool	using pen to write words or phrases; includes using finger to write, and handwriting recognition	noting vocabulary; brainstorming

ad-hoc annotation	using pen to draw or circle in spontaneous or unsystematic fashion	marking page to direct attention
content marking	highlighting, underlining, marking, or writing using a colour code	highlighting discourse markers in text; writing nouns of different genders in different colours
concept map	drawing diagrams or map	recording brainstorming activity
drag and drop	moving an object from one area of the IWB page to another	matching label to picture; ordering turns in a dialogue; moving words to fill blanks in a text
hide and reveal (curtain, spotlight)	moving a curtain, spotlight, or other movable object to conceal or display a particular element	using a magic box with layered objects to reveal hidden picture or words, or to classify them
record and playback	using proprietary software to record IWB activity	record IWB actions during a presentation to replay later for review/revision
response system content	using voting hardware	clickers, multiple choice hardware
other	tool or feature not listed above	additional pen features

Only the tools and features that occurred in the 267–clip iTILT corpus are shown in Table 4. The first row shows the total number of instances of object use and actions conducted in class, and columns display the break-down in raw numbers and percentages per country, also totalled by the categories object and action for ease of comparison.

Table 4 shows an overall balance between embedded objects and actions, with only the German and Turkish teachers performing many more actions in proportion to embedded objects. The most popular object overall (and everywhere except Belgium and the Netherlands) was the embedded image, which proved at least twice as common as the next most popular object in all the remaining countries with the exception of Spain and France, where embedded audio was also favoured. The most frequently used object in Belgium and the Netherlands was the interactive object, generally a website featuring Flash or other animation. Regarding actions, the project teachers showed a more even distribution of tools with similar frequency of use of the pen tool, drag/drop and hide/reveal actions (some-times used in combination, where an object was dragged aside to reveal an image or word underneath).

Table 4: IWB tool/feature results

	GB		FR		ES		DE		BE/NL		TK		TOTAL	
	114	%	126	%	56	%	132	%	49	%	53	%	530	%
OBJECTS	66	58%	61	48%	27	48%	48	36%	25	50%	15	28%	242	46%
Image	33	29%	35	28%	9	16%	36	27%	5	10%	13	25%	131	25%
Audio	14	12%	19	15%	8	14%	4	3%	1	2%	1	2%	47	9%
Interactive object	15	13%	5	4%	5	9%	6	5%	16	33%	1	2%	48	9%
Other	4	4%	2	2%	5	9%	2	2%	3	6%	0	0%	16	3%
ACTIONS	48	42%	65	52%	29	52%	84	64%	24	50%	38	72%	288	54%
Hide/reveal	9	8%	13	10%	9	16%	24	18%	10	20%	4	8%	69	13%
Drag/drop	12	11%	17	13%	11	20%	26	20%	6	12%	24	45%	96	18%
Pen	19	17%	30	24%	7	13%	26	20%	8	16%	10	19%	100	19%
Other	8	7%	5	4%	2	4%	8	6%	0	0%	0	0%	23	4%

Language Teaching Objectives

The third rubric of IWB-supported teaching examined in the video clips involved the language skills or areas that were selected by teachers as second language teaching objectives. Table 5 outlines these and provides classroom examples.

As with the preceding rubrics, different tags were grouped into different sub-categories involving (a) the traditional four skills common in language teacher education and school textbooks, (b) narrower areas of focus such as grammar and vocabulary, and (c) broader learning objectives such as literature, culture or learning strategies. As in the previous rubrics, again, questions of planning versus implementation arose: in coding activities aimed at the acquisition of a grammar rule via a communicative game, some researchers selected the 'grammar' tag, following the teacher's explicitly formulated goal, while others chose 'speaking' and 'reading' tags to reflect learners' actual language use. After discussion, it was agreed to code the implementation rather than the teacher's objective, in order to distinguish communicative activities with an implicit grammatical objective from non-communicative, explicit grammar instruction in the iTILT data set. Similarly, coding sometimes reflected observed activity rather than planned objectives, such that during training sessions using the website, users expressed surprise that a video tagged for 'pronunciation', for example, would not show an activity expressly designed to teach this sub-skill, but rather simply feature attention to pronunciation during an activity with a different goal.

The results of the analysis of language areas addressed in the activities selected by teachers in the 267 clips are shown in Table 6.

Table 6 shows an overall balance in focus on the four skills on the one hand, and sub-skills and supralinguistic considerations such as culture on the other. There also appears to be a greater focus on listening, speaking, reading and writing (but also vocabulary) with younger learners in Wales, France and Spain, as opposed to more attention to sub-skills and culture with older, university learners (grammar and culture in Belgium and the Netherlands, and grammar and vocabulary in Turkish universities).

An overview of the complete analytical framework is shown in Table 7. This presentation includes one main column for each of the three rubrics: participant configuration, IWB tools and features, and language teaching objectives. It then shows all the sub-categories described above, and the full list of tags used to analyse IWB-mediated language teaching.

Table 5: Language teaching objective rubric

Type of Language Skill	Definition	Example
Language Competence		
Listening	hearing spoken language in order to understand and respond	listening comprehension with audio recording
Listening/Viewing	hearing spoken language with visual support in order to understand and respond	listening comprehension with video or animation in addition to audio
Speaking	producing oral language	answering a question, saying a word in a meaningful context
Reading	understanding written language	reading labels, dialogues or texts
Writing	producing written language	labeling pictures, filling blanks in text, writing words
Subskill		
Pronunciation	repeating or analysing oral language	repeating a sound, word or expression; teaching pronunciation explicitly (e.g., articulation, word stress)
Spelling	focusing on orthography	putting letters in order; teaching spelling rules
Vocabulary	memorising lexical items, often in sets	naming pictures, working with lexical sets (weather terms, pets)
Grammar	directing learner attention to linguistic structure rather than meaning in explicit, sustained manner	focusing directly on grammar rules (e.g., morphological contrasts)
Other		
Literature	interpreting written text(s)	discussing form and content of literary texts
Life and culture	focusing on aspects of target language culture	discussing geography, history or other aspects of countries where target language is spoken
Strategies	focusing on how to learn language	discussing ways to participate in classroom activities; giving opportunities for learning outside class
Other	focusing on objectives not listed above	classroom management, organisation of activities, e.g., launching an activity

Table 6: Language teaching objective results

LANGUAGE AREAS	UK		FR		ES		DE		BE/NL		TK		TOTAL	
	112		147		68		88		30		39		483	
4 SKILLS	72	64%	76	52%	38	56%	35	40%	9	30%	11	28%	241	50%
listening	23	21%	28	19%	9	13%	4	5%	1	3%	1	3%	66	14%
speaking	16	14%	26	18%	16	24%	30	34%	5	17%	5	13%	98	20%
reading	27	24%	10	7%	10	15%	1	1%	3	10%	3	8%	54	11%
writing	6	5%	12	8%	3	4%	0	0%	0	0%	2	5%	23	5%
SUBSKILLS	40	36%	71	48%	30	44%	53	60%	21	70%	28	72%	242	50%
pronunciation	6	5%	17	12%	6	9%	2	2%	0	0%	0	0%	31	6%
vocabulary	28	25%	38	26%	9	13%	11	13%	4	13%	9	23%	99	20%
grammar	2	2%	7	5%	7	10%	14	16%	8	27%	19	49%	57	12%
spelling	4	4%	7	5%	0	0%	1	1%	1	3%	0	0%	13	3%
other	0	0%	2	1%	8	12%	25	28%	8	27%	0	0%	42	9%

Table 7: Framework for analysing IWB-mediated language teaching

PARTICIPANT CONFIGURATION			*IWB TOOLS & FEATURES*		*LANGUAGE TEACHING OBJECTIVES*		
TEACHER	*LEARNER*		*OBJECT*	*ACTION*	*SKILL*	*SUBSKILL*	*OTHER*
whole-class instruction	individual learner activity	individual learner activity at IWB	image	writing (pen, ad-hoc annotation, content marking)	listening	vocabulary	literature
whole-class discussion	pair work	pair work at IWB	sound	drag & drop	listening/ viewing	grammar	life and culture
whole-class questioning	group work	group work at IWB	interactive object	hide & reveal	speaking	spelling	
		station work (carousel)	video	concept map	reading		learning strategies
	plenary			record & playback		pronunciation	
		role-play	navigation	response system content	writing		
				other			

Conclusion

This research instrument thus offers a principled and cogent framework for the analysis of IWB-mediated teaching in the second-language classroom. It takes a rigorous approach to the observation and analysis of IWB implementation in the language classroom with respect to three central questions: who has access to the IWB; for the use of which tools and features; and to what pedagogical ends? Using an iterative process to define, exemplify, refine and harmonise tags across a number of researchers and a wide variety of classroom contexts, the development of the framework raised a number of practical and pedagogical issues. One concerns the granularity of coding categories: there were instances of fine-grained distinctions which turned out to have marginal importance for our data set. A second issue involves the planning versus implementation of particular teaching activities: in the participant configuration rubric, for example, coding gave priority to the teachers' plans whereas with teaching objectives, the focus was implementation. This issue is related to the iTILT project's explicit goal of promoting communicative language use, and may have important implications for further research where a more congruent approach may be advisable, as well as for teacher education, where pedagogical considerations are likely to take precedence. Finally, the study offers a snapshot of IWB-mediated language instruction in a wide range of educational contexts across Europe, serving as a test-bed for the new framework and of relevance to the field in its own right.

The resultant framework not only adds to the existing body of literature on the use of interactive technologies in general education, but perhaps more importantly provides a starting point for the analysis of IWB-mediated interactions in foreign language classrooms. It is hoped that this analytical tool will be useful not only to the research community, but also to language teachers and teacher trainers in reflecting on their own practice.

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