A study of self-efficacy in the use of interactive whiteboards across educational settings: a European perspective from the iTILT project

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Abstract

This paper reports on the preliminary findings of an EU-funded project called Interactive Technologies in Language Teaching (iTILT). The project aims to produce a range of training materials and resources to support teachers using the interactive whiteboard (IWB) in foreign language (FL) teaching. The project involves 7 European countries (Belgium, Netherlands, Germany, France, Spain, Wales and Turkey) with teachers at differing levels of IWB implementation and proficiency, and encompasses a wide range of educational sectors from primary through to higher education. During the initial stages of data collection, teachers involved in the project completed a likert-scale questionnaire relating to their self-efficacy with both general ICT skills and using a range of IWB features/tools. Despite the differing educational sectors and IWB experience amongst the teachers within the project, there was very little variation in responses between the different countries. Overall, teachers reported high levels of general ICT self-efficacy but low levels of self-efficacy with particular features and tools of the IWB. Nevertheless teachers stated that they allowed pupils to use the IWB and remained positive about the potential benefit of using IWBs to increase pupil participation, engagement and motivation. The findings are considered in the context of existing IWB transitional frameworks and implications for teaching in a variety of classroom contexts are discussed.

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Introduction

A large body of research on the use of interactive whiteboards (IWBs), in particular the potential impact on learning and teaching exists in the United Kingdom (UK) and many other European countries. The UK government paved the way for the implementation of IWBs in its schools (Armstrong et al, 2005), which led to "an exponential increase in their numbers in UK schools" (Mercer, Hennessy, & Warwick, 2010:196). Although less marked, there has also been increasing interest in the use of the IWB in other countries, with a growing corpus of research (for example in Germany, (Cutrim Schmid, 2010), Belgium (Van Laer, Beauchamp and Colpaert, in press), Turkey (Turel, 2011), USA (López, 2010) and particularly Australia (Bennett & Lockyer, 2008; Holmes, 2009; Serow & Callingham, 2011).

Whilst one of the main rationales for funding and promoting the introduction of IWBs in educational settings was to encourage interactive whole class teaching and learning (BECTA, 2004), research has found that the IWB does not always foster such interactivity (Beauchamp and Kennewell, 2010; Kennewell 2004; Levy 2002). This can lead in some cases to the IWB becoming a 'teacher-centric' tool (Wall, Higgins , Beauchamp & Smith, 2005), leading to teachers teaching 'from the front' (Smith, 2001) rather than involving learners in using the IWB. In addition, as noted by Glover and Miller (2001) and Beauchamp and Parkinson (2005), the IWB can occasionally provide more of a novelty factor (a 'wow' factor') rather than acting as a tool for learning, especially when first introduced into the educational setting. Therefore it is important to ensure that teachers and learners look beyond the superficial features presented by the IWB and perceive the range of affordances it offers.

Affordances of the IWB

An affordance in this case refers to "the perceived and actual properties of a thing, primarily those functional properties that determine just how the thing could possibly be used." (Pea, 1993, p. 51) These affordances, however, may not always be seen or recognised for their true worth, even though "the affordance is there, it has always been there, but it needs to be perceived to be realised." (Hammond, 2010: 206). The challenge for teachers is to recognise the potential affordances of the IWB for teaching and learning offered both by its own integral software as well as the accessibility it provides to other software and resources. At perhaps its most basic level, the IWB provides an improved presentational tool (Somekh et al, 2007). But, more significantly in pedagogic terms, it can also become a 'digital hub', offering many multimedia and multimodal resources which can inspire interactivity (Cutrim Schmid and van Hazebrouck, 2010). Other benefits reported include increased lesson pace, the ability to save work and re-use for subsequent lessons, to model concepts and ideas in a variety of different ways, to cater for different learning styles and to allow the creation of

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resource banks for colleagues to share ideas (Higgins , Beauchamp & Miller et al 2007). One of the advantages for classroom management is that the IWB can increase learners' attention, motivation and participation during lessons across all ages (Higgins , Beaucham et al, 2007; BECTA, 2003; Beeland, 2002), from primary (Wall, Higgins , Beauchamp & Miller & Smith, 2005) and secondary education (Turel and Johnson, 2012) through to higher education (Mathews-Aydinli and Elaziz, 2010). In contrast, it has also been noted that whilst pupil motivation increases during the initial stages of IWB implementation, such high levels of motivation often fade over time (Moss et al, 2007). Therefore it is important to recognise that the IWB's positive impact may be short-lived.

Underlying the research into the range of affordances offered by the IWB is the suggestion that the IWB can positively impact upon learning. A small body of research has explored this underlying assumption and found that it can have a positive affect on achievement levels once teachers have had prolonged experience of using the IWB (Clemes, Moore & Nelson, 2001; Weimer, 2001; Somekh et al, 2007). However, initial and continual support and training are essential to ensure the IWB software is selected and utilised in the most appropriate way to enable interactivity. Other research argues that it is important not to mistake higher levels of motivation and engagement for greater learning achievement and further research focusing on the potential for increased learning is vital (Beeland, 2002).

Technical versus Pedagogic Interactivity

Whilst the number of IWBs in educational contexts has increased through a range of policy initiatives (e.g. Moss et al, 2007), the implementation varies across different curriculum areas and according to individual teachers (Beauchamp and Parkinson, 2005). This has led to the exploration of how the use of IWB, and its technical interactivity, can potentially impact on pedagogical interactivity. The distinction between technical interactivity and pedagogical interactivity is discussed by Mercer, Henneessy & Warwick (2010) who highlight 'the distinction between what a piece of technology can do, and what it can be used to achieve educationally' (p.197).

Smith, Hardman & Higgins (2006) argue that the technical interactivity of the IWB does not deterministically lead to greater and more effective interaction between teacher and pupil(s) and between learners. In their study on the use of IWBs in primary British classrooms Gillen et al (2007) also found that teachers used technical interactivity to support their existing pedagogy, but often did not use the IWB's affordances to facilitate classroom dialogue and allow pedagogical interactivity. Cutrim Schmid (2006) adopted a socio-cultural approach to exploring the integration of IWBs into the social practices of the classroom environment, specifically within the context of teaching English as a second language. Her research identified a number of factors which impacted on how the IWB was embedded in the classroom: features of the IWB; teacher's own pedagogical beliefs; learners' understanding of the IWB's affordances and mediation between the teacher and learners regarding how the IWB should be pedagogically exploited (Cutrim Schmid, 2006).

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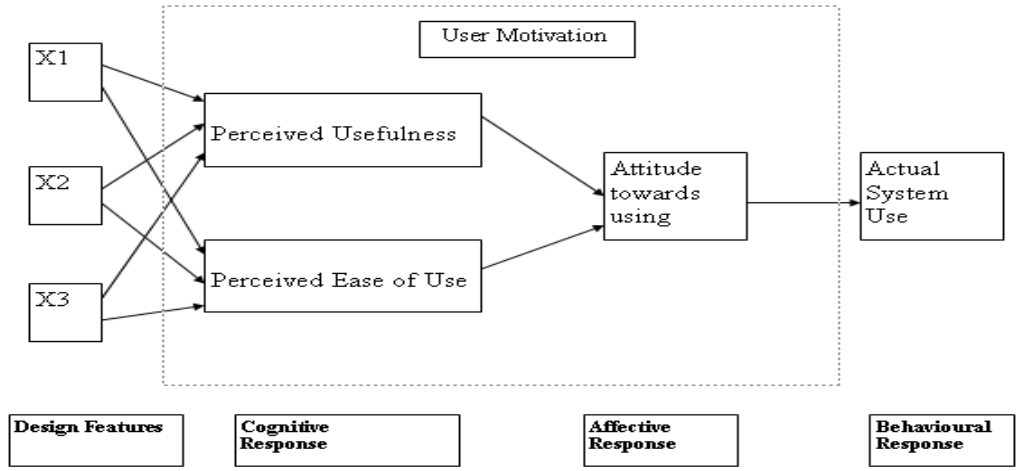
Self-efficacy

An important underlying factor which may affect such perceptions, and their decision to use new technologies such as the IWB, is self-efficacy. The term 'self-efficacy' is defined as a person's belief in their ability to complete a particular task (Bandura, 1986). This is a generic definition which can be applied to all situations, but it has also been used more specifically in variations of the influential Technology Acceptance Model (TAM), initially developed by Davis (1985) – see figure 1 below - but since modified to suit different technologies.

Figure 1: Technology Acceptance Model (TAM) Davis 1985



In Davis's original model, two key subjective concepts emerged as factors or determinants that can affect technology use: 'perceived usefulness' and 'perceived ease of use' (Davis 1989). Perceived usefulness refers to when 'people tend to use or not use an application to the extent they believe it will help them perform their job better' and perceived ease of use refers to 'the degree to which a person believes that using a particular system would be free of effort' (Davis 1989: 320). Whilst these two concepts have remained central to any variation of the TAM, researchers have developed new models which also include additional potential factors/determinants, such as various types of self-efficacy, to better understand the complexity of technology acceptance.

These new models suggest that high levels of computer self-efficacy can positively influence a person's acceptance of technology and uptake within a classroom (Delcourt and Kinzie, 1993). In the light of this, Venkatesh (2000) added and evaluated the impact of computer self-efficacy (CSE) (which relates to 'one's confidence in mastering new technology' (2011:347)) within TAM. Venkatesh (2000) argued that a person's pre-existing beliefs and perceptions of computers in general (i.e. CSE) can influence their perceptions of ease of use for other less familiar technology. Many other forms of self-efficacy have been explored such as 'e-learning self-efficacy' (Park, 2009), 'internet self-efficacy' (Lai, 2008) and 'technology self-efficacy' (Holden and Rada, 2011) in relation to

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how one's perceived confidence can either create barriers or indeed facilitate technology usage. Such research suggests that gaining an understanding of teacher's individual perceptions of technology use can provide a deeper, contextualised understanding of technology acceptance.

At present, however, there is no study examining the potential impact of self-efficacy on the adoption of the IWB. This paper uses data collected in the early stages of the iTILT (interactive technologies in language teaching) project funded by the European Union to begin to explore this issue, as well as looking at the impact of experience in using the IWB. The iTILT project aimed to promote 'good' use of the IWB within second language teaching through the development of a multi-lingual website (www.itilt.eu), with video clips of authentic second language lessons across 7 different countries, supplemented with comments and further teaching resources and materials. Other findings related to this project are reported elsewhere (for example, Cutrim Schmid and Whyte, 2012).

Method

Prior to project-based IWB training, a questionnaire was administered to the 42 teachers involved in the data collection stage of the project with the aim of collecting baseline data. The teachers involved seven partner countries (Belgium, Netherlands, France, Germany, Spain, Wales and Turkey) across all educational sectors from primary (4-11 years) through to higher education with differing IWB experience. The questionnaire was divided into three main sections: demographic details; perceived confidence levels in relation to specific IWB use; and perceived confidence levels in relation to general ICT skills used on a day-to-day basis. The second and third sections of the questionnaire aimed to understand teacher's confidence with both general ICT skills and IWB skills rather than ascertain actual use. Prior to data collection all teachers provided voluntary informed consent and were informed of their right to withdraw, anonymity and the use of their data for dissemination activities. Permission letters and consent forms were translated into the teachers' native language where English was not deemed appropriate to ensure understanding.

Findings

Demographic Data:

The first section of the questionnaire collected demographic details so the project team could ascertain the characteristics of the sample involved in the project. In terms of gender composition, there were a higher percentage of female teachers (76.2%) involved in the project than male respondents (23.8%). Tables 1 and 2 below provide a summary of the other characteristics.

Table 1: Country

Country	Frequency (N)	Percentage (%)

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	Wales	9	21.4
	France	9	21.4
	Germany	6	14.3
	Spain	6	14.3
	Turkey	6	14.3
	Belgium	6	14.3
	Total	**42**	**100.0**

Table 2: Educational Sector

Educational Sector		Frequency (N)	Percentage (%)
	Primary	14	33.3
	Secondary	7	16.7
	Tertiary/College	8	19.0
	Vocational	3	7.1
	Higher Education	6	14.3
	Primary and Secondary	2	4.8
	All Sectors	1	2.4
	Total	41	97.6
Missing		1	2.4
Total		**42**	**100.0**

An additional objective of the project was to ensure that a range of educational sectors were included to show different examples of how the IWB can be/is used in different learning environments. Table 2 shows that not only were all educational sectors, from primary (majority response = 33.3%) through to higher education were involved, but also some teachers taught in multiple sectors. Only 1 respondent did not answer this question.

In terms of the respondents' ages, table 3 shows that the sample was relatively young with the majority of respondents either aged either between 20-30 years (40.5%) or 31-40 years (40.5%). As may be expected given the age of the teachers involved in the project, the majority of respondents had been teaching between 0-10 years (69%) as indicated below in the table. Whilst the majority of respondents had been teaching for a decade at most, there were respondents who had been teaching for up to 40 years, providing a cross-section of general teaching experience.

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Table 3: Age and teaching experience

Age (years)	Frequency (N)	Percentage (%)	*Length of time teaching (years)*	Frequency (N)	Percentage (%)
20-30	17	40.5	0-10	29	69.0
31-40	17	40.5	11-20	7	16.7
41-50	5	11.9	21-30	5	11.9
51-60	3	7.1	31-40	1	2.4
Total	**42**	**100.0**	**Total**	**42**	**100.0**

Length of Time Using IWB

The final question in this section of the questionnaire asked the number of years the respondents had been using the IWB. This was important as research suggests that that in the early stages of use the IWB is integrated into existing practice and only becomes embedded to produce pedagogical transformation over time (Moss et al, 2007). For example, Somekh et al (2007) suggest that the length of time using the IWB is critical in developing effective use of IWB tools and features and claim that the process can take place around 2 years before it impacts positively on learning.

As illustrated in the shaded areas in table 4, and as might be expected given the early adoption of the IWB in the UK, the respondents from Wales had been using the IWB for the greatest length of time compared to all the other countries. Whilst the majority of Welsh teachers had been using the IWB for 6-7 and 8+ years, the majority of other teachers from France and Turkey had only been using the IWB for 0-3 years. In view of the findings below, it is worth highlighting that the teachers from Turkey had all been using the IWB for less than a year.

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Table 4: Length of time using the IWB (years)

		Length of Time using IWB (years)					
		0-1	2-3	4-5	6-7	8+	**Total**
Country	Wales	0	2	1	2	4	9
	France	6	2	1	0	0	9
	Germany	3	1	2	0	0	6
	Spain	3	1	1	0	1	6
	Turkey	6	0	0	0	0	6
	Belgium	2	4	0	0	0	6
Total		**20**	**10**	**5**	**2**	**5**	**42**

The second section of the questionnaire related to respondents' perceived confidence in general ICT use. Whilst the project intended to specifically explore the use of the IWB in second language teaching, the reason for investigating general ICT skills on a day-to-day basis was to examine any relationship between their general ICT competencies and their confidence levels using IWBs. For example, as suggested in Beauchamp's (2004) IWB transitional framework, it could be argued that if the respondents had high levels of confidence using general ICT then they were partially equipped to apply their technical skills to the IWB. Conversely, if respondents did not indicate high levels of skills using general ICT, then it could be suggested that they would be less likely to develop high levels of skill as quickly when using the IWB.

In this section of the questionnaire, the teachers were given a series of positive statements beginning 'I am very confident using….' and were asked to state their level of agreement with each statement using a 5-point Likert scale (1= ''strongly agree'' and 5 = ''strongly disagree'') – or perhaps more accurately, "Likert response format[s]" (Carifio and Perla, 2007, p.110). The Likert scale format was chosen as it helps to "build in a degree of sensitivity and differentiation of response while still generating numbers" (Cohen, Manion and Morrison, 2007, p. 325). In addition, Oppenheim (1992, p.200) suggests that 'reliability of Likert scales tends to be good, …[they] effectively separate people within the same group … [and] … tend to perform particularly well when it comes to a reliable, rough ordering of people with regard to a particular attitude'.

In this context, however, it is important to acknowledge that despite the positive features of Likert scales, there are also potential problems which need to be considered. For instance, it is impossible to know if the respondents are telling the truth, they cannot add other comments, and, perhaps most important, there is no assumption of equal intervals between to responses – it is "not possible to infer that the intensity of feeling in the Likert scale between 'strongly agree' and 'disagree' somehow matches the intensity of

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feeling between 'strongly disagree' and 'agree'. (Cohen, Manion & Morrison, 2007, p.327) Nevertheless, with the above caveats in mind, the use of the Likert response format enabled the analysis of individual Likert items to gain an understanding of the range of attitudes of teachers.

Although Likert originally intended the scores for each item to be added together for each respondent (giving a 'summated' score), this is "rarely done … [and] the responses to individual statements are of more interest in determining the specific aspects of attitude" (Brace, 2008, p.74). In addition, the use of an item-by-item analysis also facilitates a 'profile analysis' (Malhotra, 1993, p.275) which was helpful in studying the attitudes of teachers. The resultant scores are ordinal data (Norman, 2010) and "methodological and statistical texts are clear that for ordinal data one should employ the median or mode". (Jamieson, 2004, p. 1217) Thus, the results reported below use the mean response, for individual Likert items, which also helped to identify the "central tendency of the data". (Edmunson, 2005, p.129)

Whilst the statements relating to general ICT skills and the later section on IWB features and tools included the term 'confidence' in the questionnaire, this is acting as a measurement of self-efficacy as discussed above. Using Bandura's (1986) definition mentioned above, the questionnaire required the teachers to express their own perceived capability that is, their belief (measured in their confidence) in their ability to succeed in using different IWB tools / features such as the pen tool. For example if a teacher rated themselves as agreeing very strongly that they were confident in using a particular tool or feature, this would suggest high levels of self-efficacy, and the opposite for a low level of agreement. This is important because, as Bandura (1993, p119) suggests, "personal accomplishments [in this case using IWB tools and features] require not only skills but self-beliefs of efficacy to use them well". In addition, high levels of self-efficacy can lead to someone setting "higher goals, be less afraid of failure and find new strategies when old ones fail." (Woolfolk, Hughes and Walkup, 2008, p402) In the context of motivation to use the IWB, it is suggested that all of these are important in mastering new skills and tools.

The data was stored and analysed on the statistical software SPSS, using the mean response (1.0 = most positive level of agreement; 3.0 = neutral response; 5.0 = least positive level of agreement) according to the country, which was used as the independent variable. Table 5 shows that all respondents from each country rated themselves as confident users of the different elements of ICT (no mean was higher than 3), showing some variance but no major differences between the different countries. Overall, respondents were most confident using email (mean = 1.22) and least confident using various systems (such as favourites) to track relevant web pages (mean= 1.66) and social networking (mean=1.65) – although is still a positive response. Therefore this data suggests that all the respondents within the project are confident general ICT users across all countries.

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Table 5: General ICT Use

Country		Internet for own purposes	Systems to track relevant WebPages	Email for own use	Social networking sites for own use	Microsoft Office or Open Office for own use
Wales	Mean	1.22	1.67	1.22	2.11	1.33
	N	9	9	9	9	9
France	Mean	1.13	1.25	1.00	1.63	1.50
	N	8	8	8	8	8
Germany	Mean	1.33	1.83	1.17	1.50	1.67
	N	6	6	6	6	6
Spain	Mean	1.67	2.00	1.33	1.20	1.33
	N	6	6	6	5	6
Turkey	Mean	1.67	1.83	1.50	1.33	1.67
	N	6	6	6	6	6
Belgium	Mean	1.17	1.50	1.17	1.83	1.33
	N	6	6	6	6	6
Total	**Mean**	**1.34**	**1.66**	**1.22**	**1.65**	**1.46**
	N	**41**	**41**	**41**	**40**	**41**

IWB Features and Tools

Having ascertained respondents' levels of general ICT self-efficacy, the final section of the questionnaire investigated self-efficacy in specific uses of the IWB and its particular tools and features. The respondents were again required to state their level of agreement with statements beginning 'I am very confident using…' on the same Likert scale (1-5) as above. The features included in the statements were associated with various generic features of different types of IWB software to ensure programme specific features were avoided. These features ranged from basic tools similar to many ICT programs, such as the use of the pen or eraser, to more complicated elements, such as peripheral hardware devices such as tablets or visualisers, specific to the IWB.

The results are shown in table 6. A particularly striking finding from the data indicated that the respondents from Turkey were the least confident (mean=5) for every tool and feature listed on the questionnaire. As the respondents from Turkey had been using the IWB for the shortest length of time (0-1 years), it is perhaps not unexpected that their levels of self-efficacy with IWB tools and features were the lowest of all the different

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countries. We need to treat these findings with caution, however, as the teachers in Wales (who had been using the IWB for the longest period of time) were not always the most confident users of all IWB features. These results suggest that while time and experience are undoubtedly necessary conditions for pedagogical transformation, we should not assume that greater experience of using the IWB leads to greater levels of self-efficacy in its use.

Table 6: Confidence using IWB Features and Tool

Country		pen	eraser	hand recognition	split screen	Highlighter	Spotlight	hide and reveal	drag and drop text and/or images	playing audio files on IWB	insert images or diagrams	Save students' work	additional IWB devices
Wales	Mean	1.67	1.56	3.57	3.71	1.89	3.38	2.56	3.00	2.89	2.56	2.44	4.00
	N	9	9	7	7	9	8	9	9	9	9	9	7
France	Mean	2.22	2.25	3.38	3.57	2.25	2.83	2.71	2.38	2.50	2.43	3.00	4.00
	N	9	8	8	7	8	6	7	8	8	7	7	6
Germany	Mean	1.50	1.67	3.00	3.20	1.67	1.60	2.00	2.40	3.20	1.80	1.20	4.75
	N	6	6	6	5	6	5	5	5	5	5	5	4
Spain	Mean	2.33	1.83	3.40	3.00	1.60	1.50	1.60	1.75	2.00	2.33	2.50	4.33
	N	6	6	5	2	5	4	5	4	5	6	6	3
Turkey	Mean	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	N	6	6	6	6	6	6	6	6	6	6	6	6
Belgium	Mean	1.83	2.00	2.33	3.33	2.17	3.00	2.20	2.17	1.50	2.67	2.50	3.80
	N	6	6	6	3	6	5	5	6	6	6	6	5
Total	**Mean**	**2.36**	**2.32**	**3.45**	**3.77**	**2.40**	**3.03**	**2.73**	**2.84**	**2.85**	**2.79**	**2.79**	**4.29**
	N	42	41	38	30	40	34	37	38	39	39	39	31

In terms of the remaining countries, the results do not present any major differences in levels of self-efficacy with the IWB features listed in the questionnaire. Tools which countries felt most confident using (mean of ≤ 3) included basic black/whiteboard features such as the pen tool (mean = 2.36) and eraser tool (mean = 2.32) alongside additional features such as the highlighter tool, hide and reveal tool and inserting images or diagrams (mean = 2.79). This perhaps reflects their high levels of self-efficacy with generic ICT skills discussed above, where tools such as these are also found in common software packages, such as Paint, which is included in basic software

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bundled with many computers. These findings suggest that teachers are using the IWB as a Blackboard substitute (Beauchamp, 2004), where the IWB is used largely as a projected screen to present information such as text. They are also consonant with other transition frameworks which attempt to map progress in using the IWB (for example Glover et al, 2007; Lewin, Somekh, and Steadman, 2008; Jones and Vincent, 2010), where the early stages of IWB integration include the dominance of use by the teacher, focus on only a small range of available features, and adaptation of the new technology to established pedagogies (as opposed to transformative uses).

Tools and features of the IWB that respondents were generally less confident with (mean of ≥ 3) included the spotlight tool (mean = 3.03), handwriting recognition tool (mean = 3.45), split screen tool (mean = 3.77), and additional IWB devices (mean = 4.29). As these tools and features are specific to IWB software, this suggests that, although they are aware of the tools, teachers have yet to master them. It could be argued that as they incorporate the IWB more into their classroom pedagogy, they will perceive more of the affordances offered by these features and hence develop their levels of self-efficacy. As above, we should be cautious in interpreting these results and not try to generalise these findings to the wider population of teachers. Nonetheless, given the international nature of the study, and the range of educational settings covered, the results provide a useful baseline for further study. They also highlight how teacher self-efficacy levels can potentially act as a barrier to the use of the full range of features offered by the IWB, even for confident generic ICT users.

Learner Use of the IWB

As teachers become more technically proficient in using the IWB, research suggests that learners are more likely to gain access to the board (Beauchamp, 2004; Serow & Callingham, 2011). In the context of a constructivist view of learning, and the discourses around dialogic teaching (Alexander, 2008), this is important as it allows learners to become co-constructors of knowledge. Most research to date suggest this is desirable, and Glover et al (2007, p17) go so far as to assert that “good practitioners ensure that all learners have access to the board”. Such views are supported by Hennessy et al (2007, p284) who suggest that pupil use of the IWB “may offer new opportunities for publicly expressing their ideas, not only verbally, but using graphical and other representations.” This can only occur, however, if the notion of pupil access to the board matches teachers’ pedagogic beliefs.

To help assess teacher’s attitudes towards learners’ use of the IWB, the questionnaire included a series of statements below, again with 5 point Likert scales, relating to pupil use and potential benefits identified in the literature:

- I frequently allow my learners to use the IWB
- I feel that using the IWB increases pupil engagement and participation
- I feel that using the IWB increases pupil motivation
- I feel that the IWB caters for all abilities and needs

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The results are shown in table 7 below. As with the questions relating to IWB tools and features, Turkey were again the least positive in all areas but it could be argued that this is a reflection of them being in the early stages of IWB implementation (that is the Blackboard/whiteboard substitute stage) where the teacher generally remains in control of the IWB with little, if any, pupil use (Beauchamp, 2004).

Table 7: Pupil Use of the IWB

Country		Frequently allow learners to use IWB	Using the IWB increases pupil engagement and participation	Using the IWB increases pupil motivation	Feel using IWB caters for all abilities and needs
Wales	Mean	2.11	1.44	1.33	1.44
	N	9	9	9	9
France	Mean	2.38	1.50	1.25	1.88
	N	8	8	8	8
Germany	Mean	2.25	1.67	1.83	2.67
	N	4	6	6	6
Spain	Mean	2.33	1.50	2.00	2.33
	N	6	6	6	6
Turkey	Mean	5.00	4.67	4.83	4.83
	N	6	6	6	6
Belgium	Mean	2.50	1.83	1.67	2.83
	N	6	6	6	6
Total	**Mean**	**2.72**	**2.02**	**2.05**	**2.54**
	N	39	41	41	41
Total without Turkey	**Mean**	**2.30**	**1.57**	**1.57**	**2.14**
	N	33	35	35	35

The respondents from the other countries, however, were particularly positive about the potential benefits of the IWB for learners, despite uneven self-efficacy levels across different IWB tools and features. The respondents from Wales claimed they were more likely to frequently allow the learners to use the IWB (mean = 2.11), but all the teachers in other countries besides Turkey agreed (means = 2.25 - 2.50) that they frequently allowed learners to use the IWB. This is important as the learners would also be developing IWB skills (or even in some cases helping the teachers!) to move towards

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more synergistic interaction in the classroom in which "the ability of all learners, and the teacher, to use this tool to contribute ideas (which can be explored, stored, reviewed, and even undone in sequence) on equal terms is central". (Beauchamp and Kennewell, 2010, p764) We should note that the teachers are self-reporting pupil use of the IWB, but evidence from lessons later in the study did show extensive use of the IWB by pupils, which suggests the results may reflect their actual practice.

Teachers in all countries except Turkey also agreed (in accordance with other research such as Higgins , Beauchamp et al, 2007; BECTA, 2003; Beeland, 2002) that the IWB increases pupil motivation (mean = 2.05) and engagement and participation (mean = 2.02). Without the Turkish scores, teachers' views are even more positive with a mean level of agreement of 1.57. Teachers were less definite, although still mainly positive, in their agreement with the suggestion that the IWB caters for all abilities and needs. The country with the most experience (Wales) was the most positive and it may be that this greater use of the IWB with a wider range of learners over a period of years allows them to make a more informed judgement.

The results, however, indicate a discrepancy between relatively low teacher self-efficacy in using the IWB themselves, and their positive perception of learner use of the IWB. Whilst some transition frameworks do not address pupil use, others describe a linear process whereby the teacher develops their skills with IWB tools, which then leads to greater pupil use (Beauchamp, 2004; Jones and Vincent, 2010; Serow and Callingham, 2011). In the present survey, however, in spite of varying levels of self-efficacy with many IWB features, a large proportion of teachers nonetheless reported that they allowed pupils to use the IWB and thought this important. This finding underlines the importance of taking both teacher and learner views into account and suggests that lack of self-efficacy with the various IWB tools does not necessarily affect teachers' appreciation of the opportunities for interactivity offered by the IWB, or prevent learner use of it.

Discussion

Although, as might be expected, there was variation in responses to both teacher and pupil use of the IWB and ICT between project countries, there were also some overarching themes. The findings suggest that all the teachers in the study had high levels of self-efficacy in relation to their general ICT skills across all the different countries. However, overall they indicated lower levels of self-efficacy, with particular features and tools of the IWB, despite the varied levels of experience across the different countries. In terms of Beauchamp's (2004) transitional framework one could argue that many of the teachers were between the first two stages of IWB use (blackboard/whiteboard substitute/apprentice user). This indicates that whilst experience of using the IWB could be a factor affecting their differing exploitation of the wide ranges of tools and features afforded by the IWB, it is not a good measure of IWB self-efficacy.

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Despite low levels of IWB self-efficacy, the teachers indicated that they still allowed their learners to use the IWB. This suggests that a perceived lack of self-efficacy in IWB technical skills does not necessarily prevent them from conceptualising the importance of the IWB for teaching and learning, or deter them from allowing learners to use the IWB. Therefore, rather than a linear transition of technical skill development by the teacher leading to gradual learner use over a certain period of time, the results suggest that teachers can see the potential of the IWB for learners at the early stages of implementation and they are prepared to let learners develop their own skills as a parallel process.

Conclusion

This paper reports on a study including teachers from seven countries teaching within a variety of educational sectors (primary to higher education) with varying levels of IWB experience. Nevertheless the data was fairly consistent with little country-specific variation. Teachers in the study generally had relatively high levels of self-efficacy in their general ICT skills, but their self-efficacy levels were considerably lower in relation to their use of various IWB features regardless of their IWB experience. Nevertheless, teachers overall were positive about the potential benefit of using IWBs to increase pupil participation, engagement and motivation.

As this study used teachers from seven countries who taught from primary school to higher education, it suggests that low levels of self-efficacy in using the IWB will not prevent its use in a wide variety of classrooms. It is hoped that this positive attitude will encourage teachers to transfer their generic ICT skills to the particular features of the IWB as they perceive the affordances it offers. If this is combined with increased pupil use and development of their skills, the IWB can change from a substitute for the traditional black/whiteboard towards an ‘active tool’ (Beauchamp, 2011) allowing the co-construction of knowledge between teacher and learners in classrooms across Europe.

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