Using Interactive White Boards in Language Teaching:
-Back to Teacher Centeredness or a Step Forward?

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Abstract
This essay examines the use of interactive white boards (IWBs) in English language teaching. The aim of the essay is to find out whether IWBs encourage a teacher-centred, transmission-based form of teaching. The project was carried out as a quantitative study of classroom observations, with the aim of counting teacher-initiated interactions in the classroom as a measure of teacher-centredness. Sinclair and Coulthard’s (1975) model of discourse analysis was used as a reference tool for counting the interaction in the classroom with the structure of Initiation, Response, Feedback (IRF). If IWBs encourage a transmission form of teaching, the number of IRF exchanges should be higher. The results of the study showed only a slightly higher average number of IRF exchanges during lessons where the IWB was use. The results also show several activities for which the IWB is used which involve a reduction in the number of IRF exchanges, and therefore providing the basis for the rejection of the hypothesis that IWBs encourage a transmission form of teaching. The essay comes to the conclusion that IWBs is a tool that can be used in a way that is suitable for today’s approaches to pedagogy.
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1. Introduction
The interactive whiteboard (henceforth IWB) is a device that has been introduced as a very useful and versatile tool for teaching. In recent years a great number of classrooms, in Sweden as well as internationally, have been equipped with IWBs (also commonly known in Sweden as smartboards). IWBs have been introduced in classrooms as a replacement for the traditional blackboard. The board is connected to a computer with a projector, allowing the teacher to show computer-based materials on the board. This could for example be helpful for working with electronic versions of textbooks and other internet-based resources for language learning.

Although IWBs have been praised by English language teachers and researchers for their many benefits in encouraging language learning and motivating learners, there are also IWB sceptics. One of the criticisms of the IWB is that it encourages a ‘transmission’ form of teaching, meaning that the teacher is at the centre of the lesson. There is a risk that when the lesson is centred round an IWB, it encourages a form of teaching where the teacher is up front using the board and the learners in the classroom become a passive audience. This would go against modern approaches to pedagogy, which are interactive and collaborative rather than transmission-based. This essay will investigate whether IWBs encourage a teacher-centred, transmission-based, form of teaching.

1.1 Aim and research questions
The aim of this essay is to investigate if the usage of an IWB in English teaching encourages a teacher-centred form of teaching. More specifically, what will be focused on is how English teachers use the IWB and how this usage influences the interaction in the classroom. The essay will move on to examine how the interaction is affected depending on the activities in the classroom, to determine to what extent IWBs might encourage a more traditional, less collaborative way of teaching. The other possibility would be that the IWB rather encourages a more collaborative form of teaching ie one that is learner-rather than teacher-oriented. The main research question to be examined therefore is whether or not IWBs encourage a transmission-based, teacher-centred form of teaching.
2. Theoretical background
This part will provide a review of previous research of Computer Assisted Language Learning (henceforth CALL) and Information and Communications Technology (henceforth ICT) in English teaching by giving a brief historical review of the developments of technologies in English language learning over the past decades. Following this discussion, research published on IWBs will be reviewed, focusing on the arguments against or for using interactive whiteboards.

2.1 Technology development in language teaching
The first significant developments in CALL can be found in the 1950s and 1960s. English Language teaching at this time was based largely on structuralist approaches to linguistics, behaviouristic approaches to learning and audiolingual teaching methods in the classroom. Teaching consisted on repetitive drills and exercises based on stimulus, response and reinforcement. This proved to be a good base for the development of CALL since these practices were well suited to early computer programs. The introduction of the language laboratory during the 1950s was one of the first developments in CALL (Levy 1997:14ff).

During the late 1970s and 1980s however, the approach to language learning had changed. It was now influenced by humanistic methods which focused on the individual learner. The goal of language learning/teaching was to develop communicative skills. Since the use of repetitive drills was no longer in focus, people questioned the relevance of CALL. However, the introduction of the microcomputer in the 1980s led to CALL developing even further. Since it was technically possible at the time for language teachers to do CALL programming themselves in a wider range, the technology could be developed to suit the more individualistic approaches to learning which were prevalent at the time (Levy ibid. 21ff).

Technological changes during the 1990s were of course highly influenced by the emergence of the internet, completely changing the way of working with computers, both in and outside the language classroom. The 1990s marked a shift in teaching with technology. Since this time, language teaching has been increasingly influenced by socio-constructivist theory, focusing on socialization in the language. Group activities are common ways of language learning, as well as project based learning (Cutrim Schmid & Whyte, 2014:3ff). The early web era made it possible to engage in activities influenced by this pedagogical stance, such as web quests, where the teacher creates tasks for the students to solve using the internet. The emergence of chat rooms and emails during this time also made it possible for language learners and teachers to connect internationally (Dudeney & Hockly, 2012:536).
The next major shift in technology was the emergence of what has been called the Web 2.0 era, beginning around 2003. What defines this era is that it is more creative and consumer-driven than before meaning that it is possible for computer users to produce their own resources, such as blogs and wiki spaces. Technology can be used for more creative and collaborative approaches in language teaching. The shift from Web 1.0 to Web 2.0 has led to the development of teaching tools that are more collaborative and interactive, such as the IWB. It is around this time that one starts to hear references to ICT, rather than CALL. According to Dudeney & Hockly (ibid) ICT has become a regular part of English Language Teaching, and the authors suspect that ICT tools will be an even more natural and integrated part of teaching before long.

2.2 Teaching with ICT
One of the main reasons for being interested in ICT in English teaching is that children today grow up in a world were technology is a normal part of their everyday life. What needs to be kept in mind is that younger generations are different to older groups of learners, especially when it comes to the field of technologies (Prensky, 2001:3). The younger generation, the pupils of today, have grown up using computers and other devices their whole lives. This affects them not only in the way that they are used to working very naturally with technologies, but has also influenced their way of thinking. Prensky calls this generation digital natives, comparing their knowledge of technologies to a language which they speak fluently. Older generations that are not brought up with the same technologies can be described as digital immigrants, and even though they may learn to speak the language, the younger generations will always have an advantage in this (Prensky ibid:1).

Seeing as most teachers today are digital immigrants while pupils are digital natives, it seems vital that teachers learn how to bring technology into the classroom. This action will make teaching more effective, and is the only way to keep up with the pace of technological development. One cannot expect technology to stop developing, and one must also have in mind that tomorrow’s teachers will consist of today’s pupils, in other words the digital natives. (Prensky, 2001:3ff). For this reason technology should be brought into the language classroom to be a part of teaching as well, and not only exist in the world outside of school. It is reasonable to assume that technology will be a natural part of education in the future. It is also possible to see that technology is providing new opportunities, hence opening up new ways of teaching English. Technology offers new ways of practising different language skills,
and it is also a facilitative arena for communication that can be very important in practising language (Dudeney and Hockly, 2007:7ff).

Even though there seem to be many reasons for language teachers to be interested in using ICT in their classrooms, there are many teachers with a negative attitude, as Dudeney and Hockly (2007:9) have discovered. They believe this attitude to be coming from insecurity and a lack of knowledge in the area. Teachers may not have sufficient opportunities for preparation and practice to be able to implement technologies as part of their teaching. What this means is that even though the technologies are present in the classroom, they will not serve as helpful tools if the teacher does not know how to use them properly. In order for ICT tools to live up to their full potential, teachers need to be given time for practice and preparation. Dudeney and Hockly (ibid) claim that it is a lack of training and opportunities that leads to teachers having a negative attitude towards ICT.

Although one may ask why, and even if, teachers need to be updated in technology, if the pupils will inevitably learn it growing up in either case? This could be explained by the term digital literacy (Dudeney, Hockly and Pegrum, 2013). What this means is that learners acquire technical skills that they need together with knowledge of a subject area. Naturally, teachers should find it useful to take an interest in new technology in order to find new helpful resources that they can use in teaching. One must also keep in mind that, even though the generation of so called digital natives are familiar with the new technologies, they might not know how to use them as part of their learning or teaching. Recent research in the area of ICT shows us that using technology in teaching is essential for students to learn certain skill sets, such as individual digital literacies, because these will be needed by them for their future work opportunities and even further education. Seeing as technologies are rapidly developing in most areas of society, knowledge and skills in using technologies are extremely important for future generations, and should therefore naturally be implemented in teaching as part of their everyday life. There are many different ways of using ICT in the classroom, and there are extensive numbers of tools that could be used, one of them being the IWB. The devices that young people use are most often used in their spare time, outside of school. They might not be aware of the fact that they could actually be used for educational purposes, or how to do that. There is a difference in knowing how to use computers to, for example, play online games or communicate with friends, and how to use it as a resource for schoolwork. For this reason, teachers need to know what resources there are to use, and teach their students how to go about incorporating this usage into their daily routine. In this way one might be able to
integrate technology as a regular part of people’s educational life as well as in their spare time (Dudeney et al. ibid:2ff).

One of the skills that pupils need to learn, according to Dudeney et al. (2013:2ff) is how to participate in different variants of forums on the internet themselves. This is something they may not learn on their own, and is therefore important to use in teaching. An example of one such skill is being able to determine how reliable information from sources found on the internet is. Dudeney, Hockly and Pegrum(ibid:198) suggests an activity which they call the tree octopus. The aim of the activity is to teach the students how to tell if the information contained on a website is accurate or not. The students get to learn from a fake website (zapatopi.net/treeoctopus) about an animal called the tree octopus. They will then discuss how they could tell that the website was not real.

Digital Literacies (Dudeney, Hockly and Pegrum, 2013) contains many more of this kind of activities that teachers can use. The aim is not only to integrate technology in teaching, but to teach students very important skills, such as source criticism, that they would not necessarily learn even though they use technology every day outside of school. This is a way to teach students very important skills that they will need for the future.

As mentioned above, the recent developments of technology are sure to have had an impact on the teaching of English. Dudeney and Hockly(2012) conclude that the materials used in teaching are in fact affected by the change in technology. The development of ICT has gone
through different stages, each one of them having effect on ELT. One such change is that there has been an increase of computer-based course books that have become popular to use in English language classrooms. The stage of normalization is when a technology becomes a normal, integrated part of the everyday life (Bax, 2003). This means that the device would be a natural part of the English language classroom, in exactly the way as one would expect a pen or a book to be a part of traditional teaching.

2.3 Interactive white boards
The interactive white boards are one of the more recent tools that are now used in many English learning classrooms. IWBs work well together with the new types of course books and seem to be built to have a significant impact on English language teaching. One aspect that Dudeney et al. (2013:538) suggest in their article is that IWBs are likely to help ICT become a normal, integrated part of English teaching. What this means is that ICT tools will be used every day in a very natural way, in exactly the way as one might expect the teaching to include a pen or a book. Having a white board that is interactive, for example allowing the teacher to use internet as a regular part of their teaching, is a step on the way of reaching this stage of normalization. Exactly what effects IWBs have had on learning have, however, not yet been stated. Seeing as the phenomenon is still fairly new, its effects still need to be assessed in order to determine whether it really does have such a great impact. (Dudeney et al. ibid:539)

In an article from 2013, Hockly discusses the advantages and disadvantages of IWBs. The author states that for IWBs to be of any effect in language teaching, it is of great importance that the teacher is trained in using the board. This means that simply using a classroom equipped with an IWB does not have a direct effect on students’ learning. However, research does point to the fact that IWBs can help improve student motivation and sustain interest in teaching, but this is related to things as how the board is used. A lack of training in IWBs can mean that the board does not have any significant impact. When it comes to the advantages and disadvantages of IWBs, Hockly states that one of the greatest advantages is that the IWB can be shown to improve commitment to the learning process. The disadvantages on the other hand, include considerations such as the high costs, technical challenges and, importantly as previously stated, lack of support and training (Hockly, 2013). Another point Hockly refers to in her article, is the fact that the IWB could support a teacher-centred transmission form of teaching. There is a risk that the teacher uses and controls the board without inviting the learners to use it as well.
Dudeney (2006) is one researcher that has been sharply critical of the IWBs. Although he admits that he firmly believes that IWBs have potential to be a really outstanding tool in teaching, he claims that there is a quite slim possibility that they will live up to this potential in all classrooms, in accordance with expectations. His criticism centres around two factors: teaching material and financial considerations. When it comes to material, Dudeney questions what IWBs are really used for and points out that many of these things could be done just as effectively without the actual board. He also comments on the fact that this may lead to a teacher-centred form of teaching, as pupils are often not invited to use the board themselves. To prevent this, a teacher needs training that is of good quality, and enough of this, which unfortunately can be hindered by lack of time and money. Because IWBs are very expensive and require a considerable amount of teacher training they put a constraint on school budgets. As a consequence, Dudeney (2006) says that one cannot expect that all classrooms will be equipped with an IWB, and that therefore, it may be unnecessary to focus so much time on discussing IWBs (Dudeney, 2006). Bax (2006), on the other hand, disagrees with Dudeney on the idea that IWBs will fail in their purpose and become irrelevant. Although he does acknowledge the fact that Dudeney’s criticism points to some very real factors, he argues against them. Bax’s point is that if enough teachers see the use in IWBs and more classrooms are equipped with them, all the problems that Dudeney refers to might be reduced. If enough are sold, prices can go down, as with other technological devices. More material can come to be produced, and with teachers making increasing use IWB’s the level of usage competences will rise (Bax, 2006).

There are different kinds of activities for which the IWB, as well as other ICT tools, can be used. Comparing technology to other common tools, one can see that it can serve different purposes, depending on the way the teacher chooses to use them. IWBs could either act as substitutes for existing tools, or they can be used in completely new ways. In the case of the IWB, it is possible to see that these tools could be used in either way. A teacher could choose to use the IWB as an ordinary white board, using it for writing down notes for the class. Furthermore, the IWB could also be used for a number of activities, including doing exercises (as for example from a course book) to practise language (Hockly, 2012).

Some research shows that the IWBs are dominantly used for presentations or as a textbook, rather than as a learning tool by itself. For the IWB to be effective, it should be used by students themselves. IWBs will only be successful (in enhancing student attainment) if teachers are willing to change their approach to more interactive teaching. Miller and Glover
(2010:1ff), state that for the interactive whiteboard to have any effect, one will need to make a change in pedagogy from a teacher-centred to a more interactive environment. A risk otherwise is that the board is used merely as a visual aid, diminishing its whole purpose. This is a common criticism against using IWB, an issue raised by Gavin Dudeney among others. His argument is that the IWB is a far too expensive tool, seeing as one could instead use a regular projector. After a webinar concerning the use of IWBs in 2013 Dudeney posted that there is nothing interesting about the IWB, and that it definitely encourages a transmission form of teaching. His opponent Pete Sharma on the other hand stated that the IWB is a tool that can be used in different ways and cannot be blamed for the teacher’s approaches (IWB for language teachers [www]).

One of the key aspects to look at when researching the IWBs effects is in other words how the teacher chooses to use the board. A study by Reedy examines how ICT tools and resources, in particular the IWBs, were used in a specific school (Reedy 2008). He concluded that the way in which teachers used the IWB was very similar to an ordinary white board. Except for being used as a writing board, the IWB was mostly used for display of (PowerPoint) presentations. In other words, the interactivity features of the board were hardly used by the teachers in Reedy’s study. In fact, Reedy comes to the conclusion that compared to an ordinary white board the IWBs presented more problems and limitations, even more often leading to a teacher-centred teaching. Even though the tool had the potential to be used very effectively, which was shown in some lessons, most teachers unfortunately felt the problems were greater than the advantages. One reason for this could be the lack of training that the teacher had prior to the installation of the IWBs. (Reedy, 2008).

Cutrim Schmid and Whyte (2014:16) describe different levels of interactivity in the classroom. The form of interactivity depends on how the board is used, which Cutrim Schmid and Whyte connect to how familiar the teacher is with using the board. They differentiate between technical interactivity and conceptual or enhanced interactivity. The former is when the IWB is used mostly as a presentational tool and occasionally allowing the students to come up to the board to solve a problem, usually by moving visual elements around. They associate this type of interactivity with teachers who are unexperienced in using IWBs. A teacher that has more experience in using IWBs may use it in a way that creates what Cutrim Schmid & Whyte call an enhanced type of interactivity. This is when all participants in the classroom can use the board effectively, for example in connecting to the board with their individual smartphones or tablet. Cutrim Schmid & Whyte (2014) examine different activities
for which the board can be used, in order to provide unexperienced teachers with an idea of how to move from technical to enhanced interactivity around the board.

As the research has shown, not knowing how to use the board is one of the main reasons that teachers and researches are negative towards the IWB. Many teachers do not have the right training and knowledge of how to integrate an interactive white board as an everyday part of their teaching, in addition to merely using it as a projector or as an ordinary white board. Cutrim Schmid and Whyte (2014) show in their book a number of case studies where the IWB is used with positive effect, to give other teachers inspiration. Another helpful resource in this area is the iTILT website (iTILT [www]). iTILT is a project where teachers post examples of how to use the IWB interactively in language teaching, as to show the possibilities that this tool provides. Shown below are screenshots from the website, showing an activity using the IWB as a part of station work in the classroom. The class is divided into groups, working with the state of Georgia. One group at a time got to work with the board while the other groups work in other stations. The pictures below show one group of students discussing and writing the bordering states of Georgia. Using a “magic box” they can check their answers by dragging the box over the map. This is a way for students to work independently with the IWB, giving the teacher time to focus on other students in the classroom.
Activity "Georgia – station work" by Sanderin van Hazebrouck on iTILT (www.)
3. Methodology

3.1 Method
The investigation at the centre of this essay was carried out as a quantitative study of classroom observations. The aim of this essay has been to research how the IWBs are used in English teaching and whether this encourages a teacher centred form of teaching. This was done through classroom observations. A number of English lessons held by different teachers were observed, both in a school where IWBs are used and a school where they are not, in order to provide a reference for comparison. The lessons were merely observed by the author; there was no active author participation in the lesson. An advantage of performing observations as an “outsider” in the classroom is that it gives an opportunity to study details that the teachers may not be aware of themselves. The observations were done in order to calculate the interaction in lessons using the IWB, then comparing this number to lessons where the board is not used. The tool that was used for counting interaction in the classroom was Sinclair and Coulthard’s (1975; 1992) model for discourse analysis, explained below. By using this model it is possible to arrive at an actual number to the interaction, in order to be able to either support or discard the hypothesis.

3.2 Tool for observation: The Sinclair and Coulthard model
As explained above, classroom observations were done to determine whether the IWB encourages a teacher-centred learning environment or not. During the observations the interaction between teacher and students was recorded through note-taking. This way one can determine if the interaction is mostly teacher or learner-initiated and come to a conclusion about whether the IWB encourages a teacher or learner-oriented classroom environment. As a way of counting the interaction in the classroom the model for analysing the structure of a lesson made by Sinclair and Coulthard (1975 ; 1992) was used as a tool. The model was the result of a close analysis of classroom discourse patterns, originating from a project during the 1970s. However, this model is concerned with discourse analysis itself rather than as a tool for the study of teacher-centredness in lessons. Instead, the model has been used as a base for counting the interaction in the classroom.

Sinclair and Coulthard explain the structure of classroom discourse as consisting of structurally-related units. They use a rank scale to structure these units, the highest ranked unit of classroom discourse being the lesson. After lesson comes transaction, followed by
exchange. Transaction is what marks changes in activity, topic or subject within a lesson. A lesson usually contains a number of transactions, which then in turn is broken down into a number of exchanges, between teacher and student(s). Within each unit there is an element of structure. In the case of exchange this structure is: Initiation (I), Response (R) and Feedback (F) (henceforth IRF exchanges). A transaction of exchange is always led by some form of initiation, usually by the teacher. It could then be followed by a response by the pupil and then feedback, but this does not need to be the case. Initiation could be informative, directive or of elicitation. In the case of elicitation, it needs to be followed by both a response and feedback. (Sinclair and Coulthard 1992). The table below show an example of an IRF exchange, as shown by Sinclair and Coulthard (ibid:33)

<table>
<thead>
<tr>
<th>Initiation (Teacher)</th>
<th>Response (Student)</th>
<th>Feedback (Teacher)</th>
</tr>
</thead>
</table>

*Table 3.1 IRF exchange*

The study in this essay has focused on the interaction according to Sinclair and Coulthard’s structure of Initiation (I), Response (R) and Feedback(F). The number of IRF exchanges when the IWB is used was counted and if the number of teacher initiated exchanges is very high, the hypothesis could then be supported that IWBs encourage a transmission form of teaching. However, even if the number of IRF exchanges in the classroom is high this does not necessarily prove that it is the IWB that encourages this form of teaching. Therefore, observations were made of lessons by different teachers, and also in schools where they do not use the IWB. These observations have been made in the same way by noting IRF interaction. The lessons where the IWB was used were then compared to the lessons where there was no IWB in the classroom. That way one might be able to come to a conclusion about whether the IWB has anything to do with the way teacher and pupils interact in the classroom.

**3.3 Material**

The observations were done in English in Year 5-9 in two different schools. A total of six classes were observed, three with an IWB and three without. The classes were held by four different teachers, two from each school. The lessons with the IWB were observed at a school where all classrooms were equipped with IWB and where the boards are used to some extent in every lesson in English. The teachers that were observed both had fairly highly developed skills relating to the IWB, and both the teachers and students were used to using the board on an everyday basis. The lessons without the IWB were observed at a different school. The
classrooms at this school were also all equipped with IWBs, but they are never or rarely used actively in English teaching. It could have been interesting to observe lessons by the same teacher both with and without an IWB, but unfortunately it was not possible to find a teacher who was comfortable with this. The observations were recorded through note-taking as the schools could not allow any video or audio recordings.

3.4 Problems and Limitations
The study made for this essay has been restricted in the way that only a small number of lessons were observed. It is possible to make some generalizations from this study when comparing the number of IRF interactions between different lessons and different activities. However, to make an overall generalization of the usage of IWBs, the study would need to include a larger number of lessons, with several teachers and several different schools. Nevertheless, the numerical data from this study do provide some indication of how IWBs might affect the interaction of the classroom.

Another limitation is that it was not possible to record the lessons in any other way than through taking notes. The reason for this is that since the pupils in the classroom were all underage, recording them would require a permission form signed by a parent or guardian for each of the pupils that are participating in the research. Not only would this take up a large amount of time, but the schools were both reluctant to agree to this. This affects the study since the notes of the observations may not be considered as reliable as a video or audio recording would have been. A recording could have been watched several times to ensure that all IRF exchanges were counted accurately. The results from this study might in other words not be completely accurate.

One also needs to think of all of the aspects that might have an impact on the lesson. First and foremost, lesson planning and classroom management depends on the teacher. For this reason, several teachers have been observed in this study. It might also depend on what the lesson is about and what learning activities have been planned. All of the lessons observed for this study have had similar planning outlines, so that conclusion can be drawn from how the IWB impacts the teaching even during the same types of activities.
4. Results

4.1 Lessons with IWBs

4.1.1 Lesson 1
The lesson was divided into different parts, referred to the Sinclair and Coulthard (1975) framework as transactions. The number of IRF exchanges counted differs depending on the activity in focus. The table below shows the number of IRF exchanges within each transaction, followed by a description of each transaction.

<table>
<thead>
<tr>
<th>Nr of transactions</th>
<th>IRF exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>18</td>
</tr>
</tbody>
</table>

*Table 4.1*

Transaction 1

<table>
<thead>
<tr>
<th>Initiation (teacher)</th>
<th>Response (Student)</th>
<th>Feedback (Teacher)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Who is this guy?”</td>
<td>“Dracula”</td>
<td>“right”</td>
</tr>
<tr>
<td>“What can you see in the picture?”</td>
<td>“His teeth.”</td>
<td>“Okay, you can see his teeth.”</td>
</tr>
<tr>
<td>“What about his teeth?”</td>
<td>“They are not sharp.”</td>
<td>“No they don’t look very sharp, do they?”</td>
</tr>
</tbody>
</table>

During the first activity the teacher showed a picture of Dracula on the board. He asked questions about the picture, the opening question being ‘who is this guy?’. Pupils responded to the teacher’s questions and the teacher gave short feedback, like “good”, “right”, “okay”, leading to a number of IRF responses. The purpose of the activity was to get the pupils talking...
about the picture by using the words that they had had for homework that week. The table below shows example of the IRF exchanges noted during this transaction.

Table 4.2

Transaction 2

For the next activity the teacher asked the pupils to read out loud and then translate a text from their electronic course book. The text had been their homework. All the pupils had the text on their iPads and the teacher also showed the same text on the board. The interaction consisted more of directives from the teacher than of IRF-exchanges during this activity. However, some pupils raised their hands to ask something or to say something in relation to what the teacher was talking about. Most IRF responses were in other words pupil-initiated, and therefore not counted for this study.

Transaction 3

The pupils worked individually with their iPads. They asked questions to the teacher or to each other when needed. On the board, the same page as the students were working on was shown.

Transaction 4

This transaction was a whole class activity. There were words on the board, and when the teacher clicked on them, the word was read aloud by the computer. The pupils got to go up to the board and write the word. The teacher decided to try and see if it was possible to use the white board markers to write the word and then put it in the box. The pupils now got to choose if they wanted to use the marker or the key board to write the word. The IRF exchanges occurred when the teacher occasionally asked the same question as was shown on the board.

Transaction 5

This activity was not planned from the beginning. A pupil asked the teacher a question about one of the apps that they use called Glosboken (Glosboken [www]). This is a teaching resource where the pupils can practise words. Each week the teacher adds word exercises that the pupils can access and work on at home or in the classroom as their homework. When a pupil asked a question, the teacher decided to show the webpage on the board as a visual aid, and so that the whole class could take part of the information.
Transaction 6

The teacher wanted to show something called Smart Amp (Smart Amp [www.]. This is a service that enables students to write something directly on the IWB by using their iPad. In that way the teacher can ask the students to perform a task on the board, without them having to actually go up on the board and write the word down. Unfortunately, the app did not work this particular lesson. The IRF responses in this case all involved technical issues with the app, for example ‘Have you logged in?’ ‘yes’, ‘Write something please’ etc.

Transaction 7

The next transaction involved an activity called Kahoot! (Kahoot! [www]) On the board there were questions and answer alternatives. For the first round the quiz shows flags, and the pupils should answer what country they thought the flag belonged to. They were connected with their iPad, which only showed the answer alternatives. All of the pupils chose an alternative on their iPad and if they answered correctly they would win one point. The one who had the most points in the end won the game. There were no IRF exchanges, only directives during this activity, seeing as the pupils were all active the whole time during this part of the lesson.

4.1.2 Lesson 2

<table>
<thead>
<tr>
<th>Nr of transactions</th>
<th>IRF exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>27</td>
</tr>
</tbody>
</table>

Table 4.3

Transaction 1

For the first part of this lesson, they were practising grammar/spelling. The teacher showed words with the *do* periphrasis construction on the screen, and talked about the grammatical
rules concerning the *do* construction. Occasionally he asked the pupils questions about the words, and the pupils answered and were given feedback.

**Transaction 2**

The teacher gave directives for the students to work individually with the issues they have just talked about. The pupils worked quietly, occasionally asking the teacher questions about the text.

**Transaction 3**

The pupils got to work actively with the IWB. It was the same type of assignments as they had just worked with individually, but now they were to solve the problem on the board instead. The teacher gave feedback on the students’ work, but there were no IRF exchanges as the students were working with the board. After this the teacher asked them to read the answers aloud. He asked them to answer questions and then write them on the board. This resulted in an increase in the number of IRF exchanges during the activity.

**Transaction 4**

The students were once again asked to go up to the board to solve problems regarding another type of issue. As with the previous transaction there were no IRF exchanges when the students were working with the board.

**4.1.3 Lesson 3**

<table>
<thead>
<tr>
<th>Nr of transactions</th>
<th>IRF exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>13</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>38</strong></td>
</tr>
</tbody>
</table>

*Table 4.4*

**Transaction 1**

For the first section of the lesson, the teacher showed a website about a satellite called Fermi. This was an introduction to what they would talk about during a field trip to the university the following week. The teacher informed the class that what they were to talk about during this lesson was very difficult, as a way to demand their full attention. As well as showing the webpage with the satellite, he also held up a poster with the same information, and told them that he would hang it up in the classroom later so that the class can look at it. The teacher read
from the webpage shown on the board, and highlighted one sentence at a time as he read, using the IWB marker. After each sentence he stopped to ask the students to translate what he had just read. He also asked follow up questions. This resulted in a high number of IRF exchanges during this transaction.

<table>
<thead>
<tr>
<th>Initiation</th>
<th>Response</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>“What does orbiting mean?”</td>
<td>“I omlopps bana”</td>
<td>“Correct”.</td>
</tr>
<tr>
<td>“So what does something to when it is orbiting. Explain in English.”</td>
<td>“It goes around the planet”.</td>
<td>“Very good!”</td>
</tr>
<tr>
<td>“What else is orbiting except for a satellite?”</td>
<td>“The earth is orbiting around the sun”</td>
<td>“Exactly, and other planets as well”</td>
</tr>
</tbody>
</table>

Transaction 2

The next transaction was also an introduction to their field trip, but this time the teacher wanted to explain more specifically what they would be doing. He showed a document on the board that contained instructions on building a satellite in paper. He explained that this is what they would be doing at the university and how they would be doing it. He asked some of the students to read from the board, and then to translate the instructions. The IRF exchanges were the teacher asking the students questions on the language of the instructions. During this transaction there were also many questions from the students, regarding the instructions and practical questions about the field trip.

<table>
<thead>
<tr>
<th>Initiation</th>
<th>Response</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Can you please repeat what we have learned about our field trip?”</td>
<td>“We are going to build satellites in group.”</td>
<td>“That’s right, and I will tell your parents that you all need to bring scissors.”</td>
</tr>
</tbody>
</table>

Transaction 3

For the remaining of the lesson, the students played a game called the Minnits. The teacher started the last transaction by showing the game on the board and looking at the high score. Since the author (the observer) had never seen this game before the teacher also asked the
students to explain the game. There were some IRF exchanges taking place during the beginning of the transaction. After this the students played the game individually on their iPads, and therefore there were no more IRF exchanges.

<table>
<thead>
<tr>
<th>Initiation</th>
<th>Response</th>
<th>Feedback</th>
</tr>
</thead>
<tbody>
<tr>
<td>“Do you remember what I told you last week?”</td>
<td>“Marshall (school they have contacts with in US), is playing Minnits too!”</td>
<td>“That’s right. And they’re already on the high score list!”</td>
</tr>
<tr>
<td>Can someone explain what Minnits is to Jasmine?</td>
<td>“You are a green banana and you slay dragons”</td>
<td>“okay..”</td>
</tr>
<tr>
<td>“What else? What do you do in the game?”</td>
<td>“You learn English”</td>
<td>“good!”</td>
</tr>
</tbody>
</table>

4.2 Lessons without IWB

4.2.1 Lesson 4

<table>
<thead>
<tr>
<th>Nr of transactions</th>
<th>IRF exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 4.5

Transaction 1

For the first part of the lesson pupils worked in pairs, translating sentences. The teacher gave directives and answered questions when pupils ask, but there were no IRF exchanges.

Transaction 2

The teacher showed a news quiz using a regular projector (not an IWB). The teacher read the questions aloud and the students answered individually and in silence on an answer sheet. Then the teacher went through the right answers. She asked the pupils to answer each
question and gave feedback “right” or “wrong. She used an ordinary white board to write down the answer key.

Transaction 3

The teacher started writing on the board and the students copied what she wrote. She wrote down what they needed to study for the test that they were to have in a week’s time. Some of the pupils took pictures with their smart phones instead of copying the text by hand. The teacher only gave directives, but the students asked questions when needed. During this activity, someone was controlling the projector using his or her cellphone, turning it on and off and disrupting the teacher’s work on the board. Hence, the teacher decided collect all cellphones to give them back at the end of the lesson. There were no IRF exchanges during this activity.

Transaction 4

The teacher wrote sentences on the board to illustrate difference between adjectives and adverb. She asked students to translate. Then she gave direction to go on to work individually. They worked in their work books, on separate sheets or by using online exercises connected to their book.

4.2.2 Lesson 5

<table>
<thead>
<tr>
<th>Nr of transactions</th>
<th>IRF exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>20</td>
</tr>
<tr>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL</td>
<td>37</td>
</tr>
</tbody>
</table>

Table 4.6

Transaction 1

The first transaction was a homework check where the students worked individually on separate sheets. The teacher began the lesson by asking the students if they remember what they talked about during the last lesson, which was what they had had for homework. The teacher helped, two of the students that needed extra help, the others worked in silence. When they had finished the test, the teacher gave them directive of what to do next. There were three IRF exchanges during the beginning the transaction; the rest of the interactions were
directives. However, the teacher did help two students individually and there were IRF exchanges during this, so there were seven in total during this transaction.

Transaction 2

The teacher asked the students to switch papers with each other and to use their textbook as an aid for correcting their partner’s test. The teacher walked around in the classroom making sure that the students knew how to correct the answers properly. Whenever a student got every answer correct in their homework, the teacher drew a “smiley face” on their paper. There were no IRF exchanges here during this transaction as the students work individually.

Transaction 3

During this transaction the students were discussing and correcting the sentences that they had worked with during previous transaction. The students read out loud and the teacher wrote the correct answer on the board. For each example, the teacher also asked the students to explain why the sentence should be in a certain way. Seeing as the teacher asked questions on each example, there were a large number of IRF exchanges during this transaction.

Transaction 4

By writing page numbers up on the board, the teacher gave directives for the students to work with a text on Christopher Columbus from their text book. The teacher read the text out loud and the students followed in their books. Sometimes the teacher stopped reading to ask a question on the text, either to ask the students to translate the word or to explain something. As this occurred quite often during the reading, there were a large number of IRF exchanges during this activity as well.

4.2.3 Lesson 6

<table>
<thead>
<tr>
<th>Nr of transactions</th>
<th>IRF exchanges</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>5</strong></td>
</tr>
</tbody>
</table>

*Table 4.7*
**Transaction 1**

The teacher told everyone to open their textbooks and copy what she was writing on the board. They were working with the passive form of the verb and the teacher wrote examples and rules for passive form on the board. There were only a few IRFs when she asked the students to explain something, but mostly the teacher wrote and the students copied, and then she explained what she had written.

**Transaction 2**

The teacher informed the students about the National Test that they would be taking the following week. She explained the different parts of the test and made sure to explain carefully so that everybody understood what was expected of them. However, there was no actual ‘teaching’ during this transaction and the teacher does not ask any questions so there were no IRF exchanges.

**Transaction 3**

The students worked individually with exercises on verbs. The head teacher left the classroom for a while during this transaction, but there was another teacher still in the room, helping students when they needed it. When a student had finished an exercise they got an answer key and corrected the exercise themselves.

**4.3 Summary of lessons**

The results of this study showed that there was a slightly higher number of IRF exchanges during lessons using the IWB than when an IWB was not used. The first table below shows the average number of IRF exchanges during the lessons, followed by a table showing the number of IRF exchanges during each lesson.

<table>
<thead>
<tr>
<th></th>
<th>Without IWB</th>
<th>With IWB</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20.6</td>
<td>26.3</td>
</tr>
</tbody>
</table>

*Table 4.8 Average number of IRF exchanges*

<table>
<thead>
<tr>
<th>Lesson</th>
<th>Without IWB</th>
<th>With IWB</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>14</td>
</tr>
<tr>
<td>2</td>
<td>37</td>
<td>27</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>38</td>
</tr>
<tr>
<td>TOTAL</td>
<td>62</td>
<td>79</td>
</tr>
</tbody>
</table>

*Table 4.9*
The study showed that activities were the students work individually had a lower number of IRF exchanges. During the lessons where the IWB was used, these activities could include the white board as well. The highest number of IRF exchanges occurred when the teacher was at the front of the classroom, typically using the white board, either regular or interactive. All lessons included several activities, and within each lesson there could be transaction with a high as well as a low number of IRF exchanges.
5. Discussion
The aim of this essay was to examine whether IWBs encourage a transmission-based form of teaching. To do this, the Sinclair and Coulthard model for discourse analysis was used as a reference tool to count the interaction in the classroom. If IWBs encourage a teacher-centred form of teaching the number of teacher initiated interaction, IRF exchanges, would be higher in classrooms where an IWB is used compared to non-IWB equipped classrooms. The results of this study show a slightly higher average number of IRF exchanges during lessons where the IWB was used. However, this difference is not enough to prove that IWBs encourage a transmission form of teaching. Seeing as the number of IRF exchanges varied with each lesson one needs to examine the contents of each lesson and compare them to the number of IRF exchanges. By doing this one would find out what types of activities lead to teacher-centeredness and how, or if, the IWB affects this.

Each lesson consisted of a number of transactions, which included different activities and sometimes different subject areas. In the case of this study the number of transactions within one lesson varied from three to seven. The number of IRF exchanges varies with each transaction. The highest number of IRF exchanges within one transaction is the same both for when the IWB is used and when it is not, proving that transmission based activities occurs in classrooms without an IWB as well. There are also transactions in both groups where there are no IRF exchanges at all, also proving that the IWB can be used for activities that aren’t teacher centred. Looking at the different activities during the lessons one can see that whether in an IWB equipped classroom or not, the highest number of IRF exchanges occurred when the teacher was standing in front of the white board. The most common types of exercise during these transmission based activities were grammar or vocabulary exercises, like translating words or sentences. Teachers used the board for demonstrating grammatical structures and writing examples of difficult words. Non-transmission based activities included the students working individually with a book, a sheet of paper or an iPad. In IWB equipped classrooms there were also student centred activities that were focused round the board. Judging from these results, one can come to the conclusion that the IWB is not to blame for teacher-centeredness in the classroom.

When comparing the results from this study, there are a number of factors which one needs to take into account that might have affected the results. As different teachers have different teaching styles, this will affect the number of IRF exchanges. Depending on the teachers taking part in the study, the results might differ slightly. In this study, four different teachers
were observed, and these teachers all had different ways of teaching and structuring their lessons. Nevertheless, as well as there were differences in the number of IRF exchanges between the teachers, the numbers also differed between lessons with the same teacher. Interestingly, the lessons with the highest and the lowest number of IRF exchanges in each group were held by the same teachers. This proves that it is up to the teacher to determine whether activities during a lesson will be transmission-based or not.

The hypothesis that IWBs encourage a transmission-based form of teaching is partly based on the criticism stated by Gavin Dudeney (2006). The results of the study made in this essay show that transmission based teaching is not more common in IWB-equipped classrooms than others. However, another argument of Dudeney’s (ibid) is that the IWB is an overly expensive tool, especially if it is mostly used as a projector. This leads on to the question of whether IWBs are worth investing in, and why? During the classroom observations described in this essay, the teachers and students engaged in a number of different activities using the IWB, several of which were proved to be student centred as opposed to teacher centred. The board was not used merely as a projector, as seemed to be Dudeney’s fear, but was used interactively, in many cases connected to an iPad. The IWB was used during all of the lessons instead of a regular white board. The way the teachers in this study used the IWB, and Dudeney’s argument can be connected to Cutrim Schmid & Whyte’s (2014) discussion about different levels of interactivity. Gavin Dudeney’s criticism is aimed at what Cutrim Schmid & Whyte would call technical interactivity, associated with teachers who are not experienced in using the board, leading to the board simply being used for occasional activities or as a projector. The highest level of interactivity, Cutrim Schmid and Whyte call enhanced interactivity. This is when the board is used in ways that allows the students to work together with the board. The teachers in this study worked with the board in an enhanced way. They also show that there are ways to use the board that allows the students to work together, known as enhanced interactivity. The two teachers working with IWBs in this essay used the IWB in an enhanced way. Especially seeing as the school uses iPads in their teaching, they have good opportunities to reach the enhanced level of interactivity. During the observed lessons, they were engaged in activities that allowed the students to connect with the IWB and in that way all the students could effectively use the board simultaneously. An example of this is the activity called Kahoot!, where the IWB and the iPads where used together in a quiz. This activity could be used for example for practicing homework. Another example is the app called Minnits, which is a game played on the iPad where the students learn English by
performing different tasks. These and other activities shown on the iTilt website are all very good examples of how to use IWB in an enhanced way, all of them suitable for modern approaches to pedagogy.

A great issue surrounding IWBs is that teachers do not know how to use the IWB in an enhanced way. One reason for this could be that teachers do not have sufficient training in how to use the board. Some teachers also tend to have a negative attitude towards teaching with ICT tools, as explained by Dudeney, Hockly & Pegrum (2013). This could be either because they do not see the point in learning or because they are afraid of trying. Websites such as iTilt are useful resources to help teachers learn how to use the IWB. This is a way for teachers to learn from each other, and is a good introduction to start using an IWB. Apart from not knowing how to use the IWB, teachers may argue that they simply do not have time to learn. However, there are reasons to believe that IWBs are tools worth investing both time and money in. As can be seen from the historical background in this essay, language teaching with technology has been developing for the past decades, and this development keeps moving forward. The students today have grown up with using technology their whole life; they are digital natives. Teaching to digital natives means that there is a need for integrating technology in the classroom. This means that ICT tools are not only useful, they are necessary. The interactive white board has potential of becoming a tool that reaches the stage of normalization in the classroom. This could be compared to personal computers which today are common in most Swedish classrooms. Computers have become a regular and given part of teaching, which was not the case just a few years ago. Seeing as the IWB can be used in several interactive ways, serving as a help for language learning (and other subjects as well), there are reasons to believe that an IWB could become a natural part of classrooms as well. Going back to the discussion about digital natives, teachers that themselves are digital immigrants could feel discouraged to use ICT tools, but they need to be aware of the fact that they are teaching to digital natives which requires an investment in time to keep up with the technology.

I would argue that, judging from the results of this study, IWBs seem to be an investment worth making for the future. Contrary to some belief, there are ways in which to use the IWBs that encourage a collaborative, modern, form of teaching. This essay has shown ways for which the IWB can be used that is suitable for today’s approaches to pedagogy. Furthermore, I would also argue that an IWB seem to be a device suitable for the modern classroom. Many schools today invest in personal computers or tablets for their students. They are used for
writing, researching as well as reading. Teachers use different media in their teaching, such as blogs, email and social media that can connect students to other parts of the world outside of the classroom. The IWB allows teachers and students to connect these devices and media. Investing money in an interactive white board, and investing time for teachers to learn collaborative ways of using it, could mean investing in a device that can become a natural centre of today’s classrooms.
6. Conclusion
The conclusion of this study is that interactive white boards do not encourage a transmission form of teaching, at least not any more than having a regular white board in the classroom does. The study shows that there are ways to use the IWB in an enhanced way that does not encourage a teacher-centred classroom environment, but allows the students to work interactively. One problem seem to be that teachers do not know how to use the IWB in an enhanced way. To further decide whether or not IWBs are in fact encouraging a transmission form of teaching, one could conduct a bigger study researching how different teachers actually use the board. The point of this would be to find out if there are more teachers that use the IWB as a standard white board than there are using it in an enhanced way. If that is the case, that could support the hypothesis that IWBs encourage a transmission form of teaching, seeing as it is not actually used in the way it is intended to.
7. References


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