(RESEARCH ARTICLE)

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Learning devices in primary school classrooms

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Abstract

ICT offers a fertile ground for the renewal of teaching practices. The task-based approach, for its part, seems particularly well suited to taking advantage of it. A number of avenues can thus be explored. The present work revolves around the question of the insertion of the Interactive Whiteboard and the associated forum in French as a Foreign Language classes. It seeks to find a link between the use of the IWB, the change in teaching practices and the development of learning strategies. It is based on the concept of pedagogical alignment. The deepening of this theory in this research involves observation and interviews with children in learning situations and teachers at the French Institute of Morocco and in pilot public schools that have been working for several months with the Interactive Whiteboard.

1. Introduction

Information and communication technologies are one of the most important factors in contemporary society. Teaching and learning is one area that is not immune to this influence. As a result, the need to make room for ICT in Moroccan schools no longer seems to be a matter of debate. Instead, the debate is focused on the way in which ICT can add value to the classroom.

2. Problematic

In this perspective, several reflections revolve around the teaching-learning of foreign languages in the digital age. These reflections raise two distinct, though closely related, questions:

- What pedagogical approaches integrating ICT should the foreign language teacher adopt to better promote learning?
- What learning strategies should the Moroccan learner develop thanks to ICT in order to learn how to learn better?

Our research is situated at the crossroads of these two questions and focuses on the integration of the Interactive Whiteboard in the teaching-learning of french as a foreign language. However, is the IWB a relevant choice? This question allows us to define the basis of our study as well as the lines of research which follow from it.

Several Moroccan schools have recently equipped their classrooms with a IWB. However, it is not enough to equip a teacher with an IWB for this tool to have an effect on the way he/she stages and manages his/her lesson and therefore on the way his/her learners learn. In this sense, the best learning situation likely to favour the development of the competence: learning to learn remains linked to the pedagogical practice adopted and not to the technological tool used.

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Can we, then, find a link between the use of the IWB and teaching practices on the one hand and learning strategies on the other?

2.1. Hypotheses

The main thread of this research work follows three paths which we formulate here as hypotheses:

2.1.1. Hypothesis 1

If the IWB is a widely used tool in Moroccan schools, its impact on learning should be very noticeable.

2.1.2. Hypothesis 2

If the IWB is widely used in the French as a foreign language classroom, a particular pedagogy should be better adapted to its integration.

2.1.3. Hypothesis 3

If the IWB is widely used in the French as a foreign language classroom, specific learning strategies should be put forward by the Moroccan learner.

2.2. Approach adopted

In this research work, we focus our interest on the insertion of the IWB in the classes of French as a foreign language, more particularly in the classes of 6th year of the primary cycle corresponding to level A2 of the Common European Framework of Reference for Languages (CEFR).

The challenge is to motivate learners, to teach them the foreign language and culture, to create moments of interaction and to prepare them for an increasingly digital society.

The design and implementation of multimedia and interactive learning devices is a necessary step. However, this passage must be preceded by a definition of an appropriate learning context and an outline of uses likely to bring added value to the teaching-learning of french as a foreign language.

To do so, we relied on the concept of alignment, proposed by J. Biggs (1995) and recently revisited by A. Ibrahimi et all (2014). The pedagogical alignment results here from the choice of a pedagogical scenario in adequacy with the functionalities of the interactive multimedia environment which fits with a disciplinary content: proposed school program.

In this research, the theory of the use of the IWB is deepened through the observation of learners in learning situations at the French Institute of Morocco and in pilot public schools. The teachers involved have been working with this instrument for several months.

3. Experimentation

3.1. Context

After the installation in 2012 of Interactive Digital Boards in the French Institute in Morocco and also in pilot schools (public and private) throughout the kingdom; this study was carried out in order to evaluate the impact of the proposed techno-pedagogical device on the intrinsic motivation of the learners on the one hand, and on the other hand the representation of the teachers on the impact of the device.

3.2. Methodology

Given the importance of the expected results, different methods were used:

3.2.1. Questionnaire for teachers using the IWB and the associated forum

The questionnaire intended for teachers who use the IWB and the associated forum in the French as a foreign language classroom enabled us to determine their perception of the impact of this device. This questionnaire considers five major dimensions: motivation, accessibility, quality of teaching, degree of satisfaction and integration of the device in the teaching of French as a foreign language.

3.2.2. Observation grid for learners in learning situations

Observation is one of the determining factors in our research. To facilitate the collection of information, we propose an observation grid based on the tool designed by Parmentier and Paquay (2002) and proposed for teachers wishing to observe and analyse their teaching practices from the perspective of the construction of competences. This adapted grid will therefore enable teaching/learning situations to be observed from an exploratory perspective. It is structured around 7 axes. The first allows the learner to be observed in the face of new learning situations (ability to overcome the obstacles encountered and ability to formulate hypotheses). The second describes the learner's use of the teaching material (mobilisation of resources, appropriation of techniques, processing and sharing of information). The third and fourth axes focus on acting and interacting (degree of completion of the task, confrontation of points of view, interaction tools, degree of participation within the group). The fifth axis revolves around evaluation (self-assessment, co-assessment, metacognitive processes of analysis and regulation). The sixth axis takes as its point of observation the integration of knowledge by the learner (articulation of know-how, establishment of links between learning objects). The last axis allows us to observe the learner's degree of autonomy (temporal planning, choice of learning strategies, effective use of resources, request for help).

Using this grid, the teachers consulted were able to comment on the results and give their opinion on the learners' cognitive engagement, participation and persistence.

3.2.3. Group interviews with the class groups.

In order to determine the degree of integration of the device in the pedagogical practices in the French as a foreign language class, we proceeded, after each session, to interviews with the learners in a collective way, through a semi-directive questionnaire calling upon the affective and cognitive dimensions of the learner. These questions consider the dimensions of usefulness, usability and acceptability of the device from the learner's point of view.

Why a semi-directed collective interview?

In most cases, during individual interviews, the interviewer finds himself in an uncomfortable situation with children who are not very talkative or who are reluctant to express themselves. The child being interviewed remains silent or, in the best of cases, provides vague answers, while the interviewer asks for information without obtaining the desired result.

To overcome this difficulty, the collective interview technique was used because of its many advantages: "unblocking" of the speech, facilitation of exchanges, reassurance. In addition, in the case of children, other factors come into play: language skills, psycholinguistic skills, ability to pay attention and focus.

Subsequently, in order to obtain a relatively monotonous linear discourse, the interviewer must « inject the energy that feeds the talking machine » (Blanchet 1987). This is how we can guarantee to catalyse the language acts. The collective semi-directive interview is therefore essential and the data collected is thus qualitative in nature.

3.3. Sample

This survey on the use of the Interactive Whiteboard and the associated forum is based on qualitative data relating to a sample of 16 teachers, part of the temporary teachers of the Moroccan French Institute (MFI), spread over three academies in the Kingdom and on the observation of 16 classes with an average of 25 pupils per class, i.e. a total of 400 pupils.

Six teachers experimented with the system in five sites of the French Institute in Morocco (Tangiers, Tetouan, Casablanca, Marrakech, Al Jadida). While the other ten tested it in pilot schools spread over the regional academies of the kingdom (AREF Tangier-Tetouan-Al-Houceima, AREF Casablanca-Settat and AREF Marrakech-Asfi). They presented the proposed teaching unit following a pedagogical scenario integrating the IWB and the forum.

At the end of the experiment, the teachers should fill in the questionnaire intended for them and send it by e-mail together with the observations of the students in learning situations. In addition, the semi-directed interviews with the learners were intended for only three classes in the northern sites of the French Institute of Morocco.

It should be noted that the learners in the experimental classes, whose age range is between 9 and 11 years, have a CEFR A2 level equivalent to the 6th grade of Moroccan primary school. In addition, in order to guarantee the success of the experimentation, the experimental teachers were chosen from among the temporary teachers at the IFM who form the community of practice specialising in ICT and the teaching of French as a foreign language. They work together through

the Agora platform and are in fact led to constantly invent solutions to the problems encountered in their professional practices relating to the integration of ICT, in particular the IWB, in the teaching of French as a foreign language.

4. Results

The results of the study will be presented along the following dimensions:

- Impact of the device on motivation;
- Accessibility;
- Quality of education;
- Degree of satisfaction ;
- Integration of the device in the teaching of French as a foreign language.

The analysis of the information produced from the teachers' questionnaires will allow us to present some representational data concerning

- The impact on the teaching process;
- The level of difficulty concerning the installation and use of the device;
- The frequency of use of the IWB;
- The degree of satisfaction.

On the other hand, classroom observation of learning sessions will allow us to discuss the following:

- The relative duration of use of the IWB during a session
- Type of intervention by the teacher and the learner.

Finally, semi-directed interviews with learners will allow us to discuss the integration of the device in the teaching of French as a foreign language in Moroccan schools.

5. Discussion

5.1. Dimension 1: Motivation

Concerning this first dimension, the results obtained were clear-cut in relation to the first question (Q1): the impact of the device on learners' motivation. Nearly 90% of the teachers stated that they had observed a clear increase in the motivation of the learners when carrying out the learning tasks.
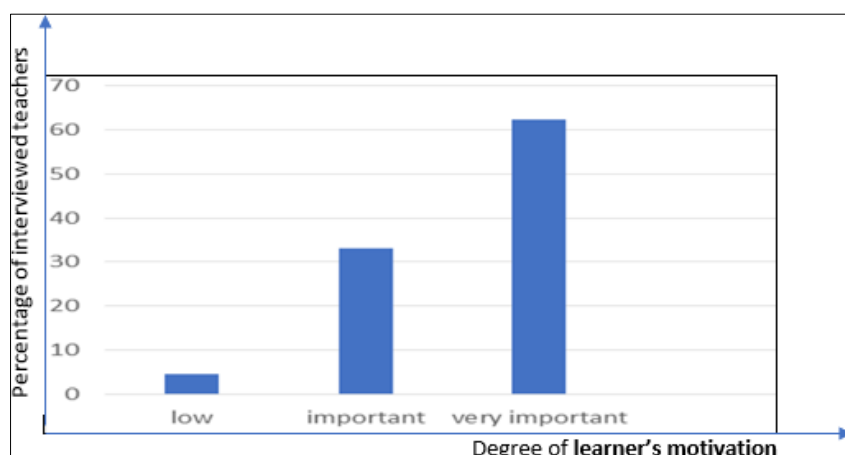

Figure 1 Impact on learner's motivation

The proposed teaching-learning device facilitates the learners' entry into a more attractive and playful learning process, which explains the increase in motivation shown in the graph above.
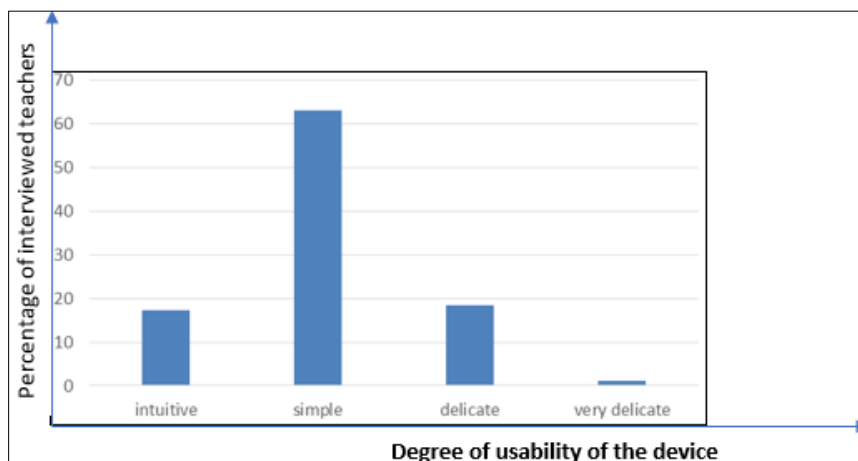
5.2. Dimension 2: Accessibility

The degree of accessibility of the device is measured through several questions: Q3 and Q4 respectively address aspects related to the degree of difficulty of installing the equipment and the need for technical assistance.
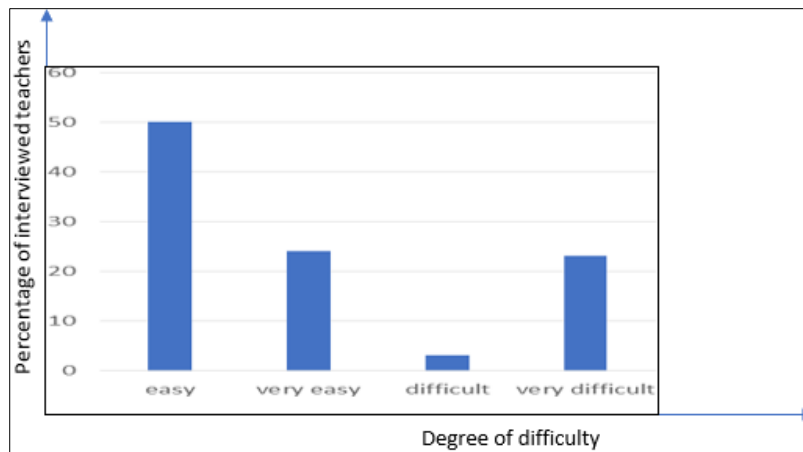
Figure 2 Hardware and software installation
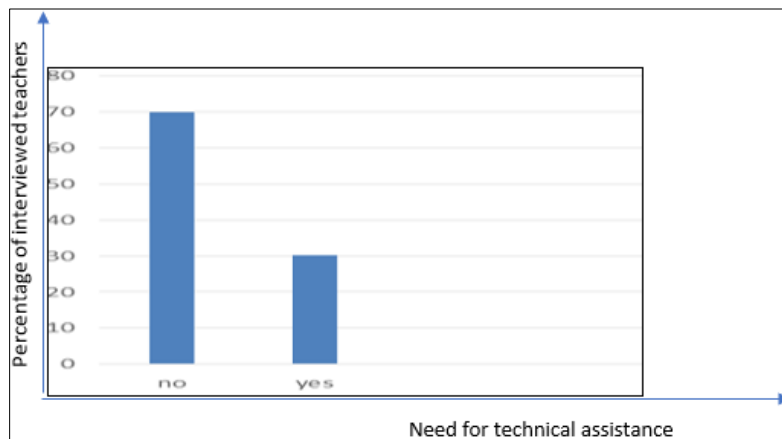
**Figure 3** Technical assistance needs

Figure 4 Using the device

The results recorded (Figures 2 and 3), show that the installation of the device is considered mostly convenient, or even very easy, without the need for any external technical support. Thus, the device can be easily installed and used at all levels.

The Question (Q5) attempts to clarify how easy the device is to use. The answers to this question are ordered according to a scale of four values (intuitive, simple, delicate and very delicate).

Following Heutte and Tempez (2008), the use of a simple device reassures the teacher and reinforces his or her pleasure in teaching. Fig. 4 shows that the majority of teachers consider the use of the device to be simple. Indeed, using the IWB requires little experience in ICT. Similarly, access to the associated forum remains simple given the characteristics of the Claroline platform. In any case, a user's guide is made available to users to introduce them to this new device.

In order to fully understand all the issues related to the accessibility dimension, it was necessary to ask a question (Q6) which relates to the degree of adequacy of the digital resources used in relation to the pedagogical intentions.
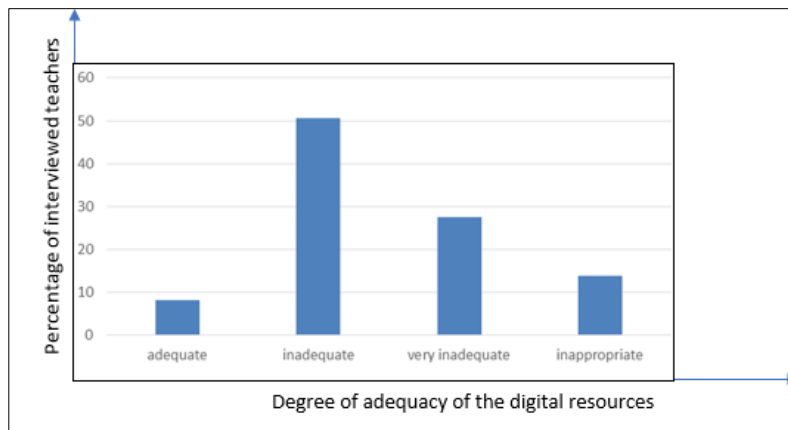

Figure 5 Software resources

Whereas it is the resources, i.e. the content and the pedagogical strategies of use, that give the IWB its full meaning and educational value. Figure 5 shows that the majority of the digital resources supplied by the manufacturer are judged to be not very suitable for the curriculum, although they are of good quality.

Under these conditions, it is up to the teacher to learn the techniques and principles of creating his or her own resources in relation to his or her own pedagogical intentions and to the needs of his or her learners. The sharing of resources in a community of practice and the setting up of mutual aid and sharing networks are necessary.

5.3. Dimension 3: Quality of teaching
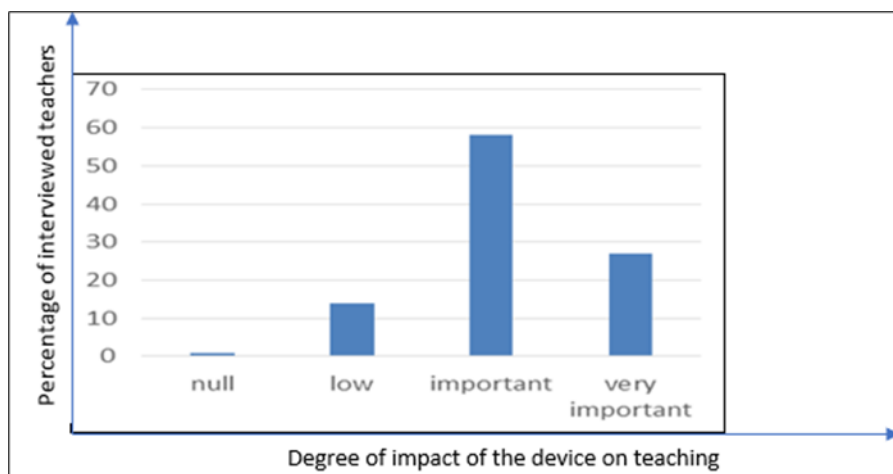
Figure 6 Impact on teaching
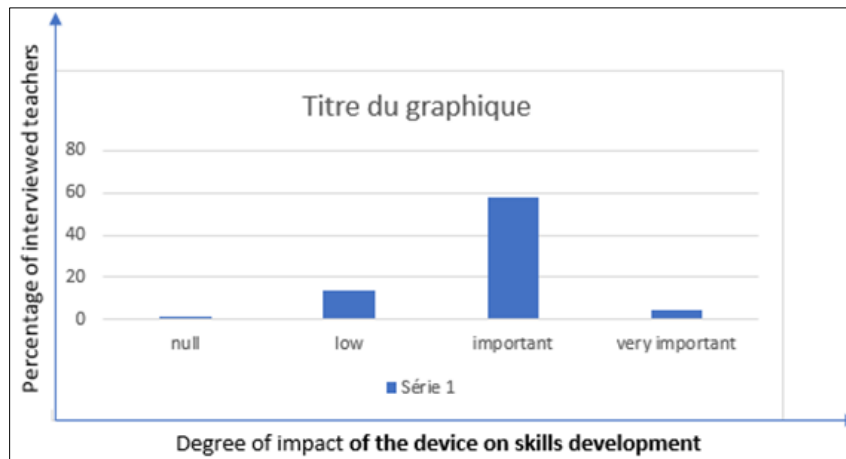
**Figure 7** Impact of the device on skills development

The third dimension that we were able to analyse concerns the quality of teaching in the teaching-learning device, which is the subject of our research. Question (Q7) considers the teacher's opinion on the impact of the device on the quality of teaching, while question (Q8) collects his or her opinion on the impact of the device on the development of skills and the acquisition of knowledge.

The impact of the device on the quality of teaching is considered to be important, sometimes even very important. Teachers seem to have a very positive view of the device. The impact on the development of skills and the acquisition of knowledge by the learner is judged very positively.

Following Becta (2003), learners are often inclined, when faced with this type of device, to work in groups. This stimulates participation and collective exchanges and helps significantly in the development of skills and the appropriation of knowledge. In the context of our research, the data collected confirms that it is more the value of the learning situations that determine their use than the specific characteristics of the artefact. The device alone is not enough to transform teaching practices.

5.4. Dimension 4: Levels of satisfaction

The fourth dimension revolves around the degree of satisfaction felt by the teacher with the device.
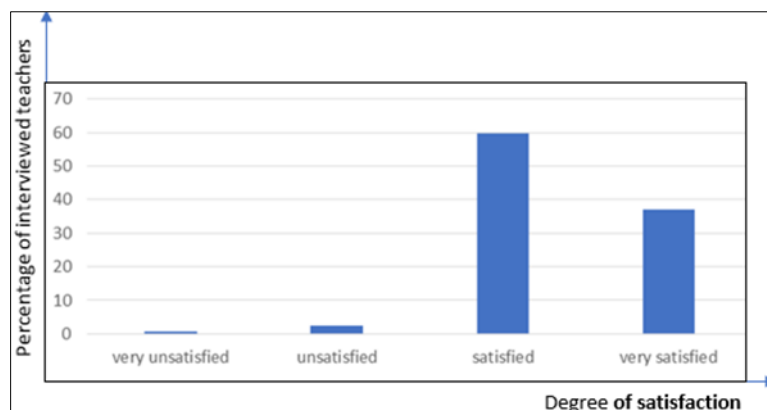
Figure 8 degree of satisfaction

There is a certain satisfaction due to this belief of self-efficacy to fully exploit this device. According to Bandura (2003), adaptation to change due to the introduction of an innovative device is closely linked to the feeling of self-efficacy. This is defined by the latter as the belief of people in "their ability to mobilise the motivation, cognitive resources and actions necessary to manage any new event". It is in this sense that we wanted to anchor dimension 4 on the degree of teacher satisfaction.

5.5. Dimension 5: integration of the device in the teaching of FFL

Studies have shown that the ability to go through certain stages of appropriation is a key element for the integration of the Interactive Whiteboard in language teaching. This appropriation depends largely on the frequency of use of the tool. Peraya (2012) argues that teachers who have experimented with the tool for several years are using it more and more extensively. In the same vein, we wanted to measure the degree of integration of this device (IWB and associated Forum) (Q16) in the teaching of French as a foreign language in relation to its frequency of use (Q17).
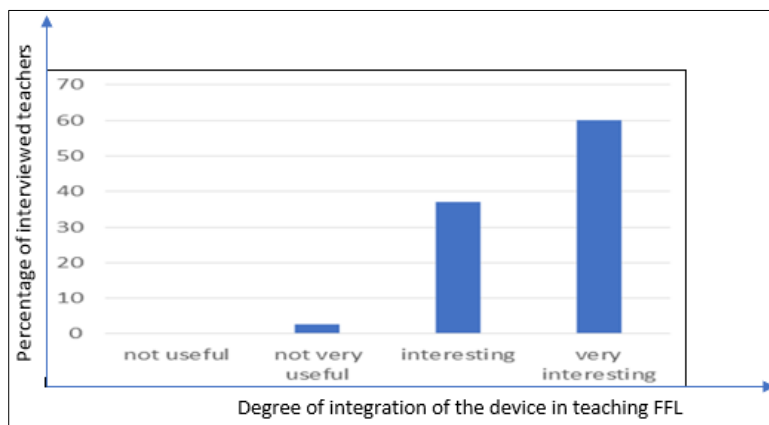
Figure 9 Integration of the device into FFL teaching
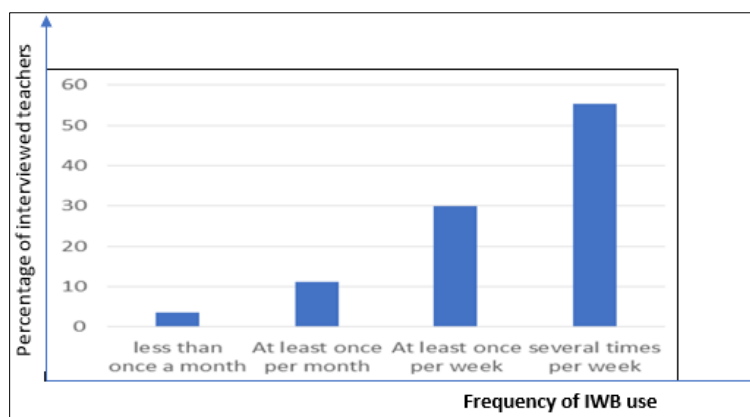
**Figure 10** Frequency of IWB use

As expected, the IWB is used almost daily, or at least once a week. This frequency of use explains well the results obtained in terms of the integration of this tool. However, integration also calls for better planning of classroom activities.

The device develops a group dynamic among the learners. The question of the contribution of group work to the acquisition of individual skills in French as a foreign language is at the centre of our interest. In fact, the device is based on collaborative work while favouring the "action perspective" recommended by the Common European Framework of Reference for Languages (CEFR), which is the result of several years of linguistic research carried out by experts from the member states of the Council of Europe.

In this sense, we asked (Q18) about the activities proposed in this device. The results are clearly shown in Fig.11.

These results can be explained by the fact that the proposed activities make learners work in small teams around the collaborative realization of language tasks anchored in an authentic, fictional or fantasy context. The commitment and perseverance in carrying out the tasks make the class time more profitable. This last aspect leads us to look in detail at the activities of learners in the French foreign language classroom.
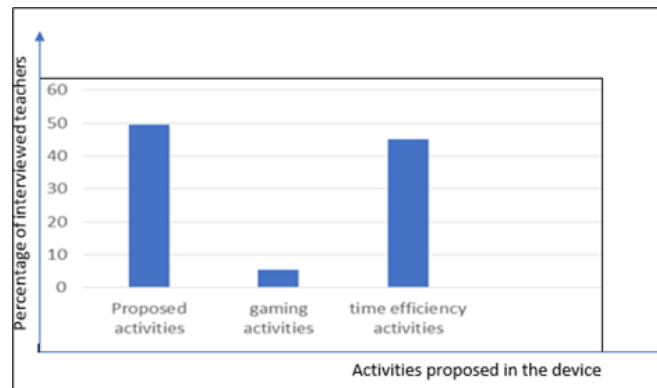
Figure 11 Activities Proposed in the Device

5.6. Learners' activities

5.6.1. Learner participation

It is noticeable that learners participate more when they are asked to use the IWB, which was not always the case with the traditional blackboard. For example, pupils in the 6th year of primary school, corresponding to level A2 of the CEFR, show willingness to work with the IWB. Their teachers believe that this used to be rare. The explanation for this lies in the socio-constructivist approach called for by the implementation of learning activities within the device, in which pupils help each other to complete the task according to their individual skills. They were thus able to enlarge objects, reduce them, move them and, if necessary, modify them with great skill and care.

As far as participation in the forum is concerned, the fun aspect certainly played a decisive role. Far from any hard, constraining work, the learners felt that they were participating in a game, an exciting activity that appealed to their creativity and choice. As a result, they found it fun to participate and apply themselves.

In addition to the fun aspect, the willingness to publish their ideas, views or output in the forum, as well as the curiosity to learn about the work of others, are all factors that stimulate learners' motivation and maintain it throughout their learning process.

Indeed, children expect to see the immediate effects of their work and its practical utility. The forum is an environment that provides this function and allows learners to become aware of what they are doing. Preparing to do such work on the forum was as motivating and crucial for the learners as the written production itself.

5.6.2. Reading activity

Using the IWB, learners are able to recognise words and click on them to reveal the correct answer, which reinforces the development of reading skills. The use of the hidden word texts also calls for students to discover the answers by moving the masks of a different colour according to the grammatical category of the word, which increases learners' concentration and attention.

5.6.3. Grammar activity

Learners are able to recognise different types of words and classify them into categories. On the other hand, the tool allows them to associate words (compound words, subject, verb...) with each other, which makes it easier to understand the regularities and irregularities of the language. Reflection on language becomes more interesting and reinforces the development of metalinguistic competence in the child.

5.6.4. Writing project

For the writing project, at least three sessions were needed to produce the writing. In order to set up writing workshops, a material on the theme of "travel" was studied in class (a theme that coincided with that of writing production). In order for all pupils to have a legible copy of each piece of writing, computerised input was a viable solution for the whole class.

The main uses of the IWB in this workshop were firstly, to manipulate the stylus to point, move, validate choices directly on the board and correct. Secondly, choosing the right pens and highlighters. Finally, navigating through the pages to get the job done.

The workshops that were set up made it possible to develop procedures for understanding the text, to enter the written production on the forum of the Claroline platform, to add comments concerning the other productions on the forum, to share the display of the written productions on the whiteboard and to correct them collectively.

After digitisation and projection on the IWB, the fact of seeing their own productions displayed and commented on gives the pupils satisfaction and motivation because their work is thus recognised by the teacher and by their classmates. This recognition makes them more involved in the activity. In addition, the spontaneity of the interventions leads to a speed of execution thanks to digital technology. This makes it possible to rapidly increase the number of "samples" and production proposals.

In this way, it is very interesting to be able to annotate, amend and develop several versions of production for the same work.

It should also be noted that the learners themselves seem to have perceived the board as a tool that effectively promotes their reasoning by providing them with multiple technical skills. Indeed, if the teacher records the whole activity, the pupils understand that they can come back to it at any time, which encourages them to intervene much more by asking the teacher. They thus become more active in steering the teaching sequence.

Moreover, we were able to observe, in the context of the awareness-raising exercises, that the learners carried out systematic work on the text and implemented strategies. It was then interesting, based on the establishment of the computer functions relating to the Interactive Whiteboard, to continue to focus not on a single correction, but rather the interaction of several corrections. One could even envisage reinforcing the device for learning written competence by building bridges with the courses given in French expression/communication, particularly with regard to the rules of writing and the construction of a text. The developments concerned mainly the transfer of strategies. As the experimentation progressed, the learners learned to make them more complex through exchanges of practice. They had consciously implemented the methodological advice we had given them during the course. They also had additional opportunities to practise writing in the reading files.

It is also important to provide students with opportunities to apply what they have learned, without their work necessarily being sanctioned. In this way, they learn to give a hearing to their written work that better values their work. Before editing the work on the forum, the word processing software assists the writers by facilitating more thoughtful writing by implementing the operations of co-writing and textual structuring. The cognitive load is thus lightened, especially since the choice of subjects is linked to notions already seen in class. The forum is thus an integral component of the course and not just an accessory.

Another component is also decisive in the forum, namely the evaluation of learners' participation and their written productions. Perceived as a recognition of the efforts made by the learners, it has the advantage of encouraging the learners to be active in the construction of learning.

5.7. Interviews with pupils

To determine the degree of integration of the device in the teaching practices of the French as a foreign language class, we asked the learners, after each session, several questions relating to the usefulness of the device, its usability and finally its acceptability.

5.7.1. Usefulness dimension

We first tried to determine whether the pupils think that they learn easily by using the interactive whiteboard with a supporting forum in French as a foreign language lesson. Then we focused on the possible uses of the device.

Apparently, learners find that they learn more easily as long as they are able to review the course of previous lessons. This allows them to put their ideas in order. This is likely to be the meta-cognitive skill expected of grade 6 pupils. However, we found that learners often consulted the recorded material on the IWB. The files reviewed were, for the most part, correction approaches.

"*Thanks to the written trace, we remember very well how to do it; we can review what we have done at any time and it helps us to learn better*". The fun aspect is not negligible. Learners no longer seem bored and are therefore more attentive and engaged.

The practical aspects also promote learning. Indeed, the fact of acting on the animations and manipulating the tools of the IWB or on the forum without being satisfied with watching, apparently gives the learners the feeling of better understanding. This makes them more attentive and focused on any new information.

In addition to these aspects, group work is also a main asset of the device for learning. Indeed, in a group, learners feel more reassured than when they are alone in front of a computer. Working in a group allows them to grasp and process information better and thus to learn better.

5.7.2. Usability dimension

Interactive whiteboards are used regularly, which is confirmed by the questionnaire. More than 53% of teachers use them several times a week. While learners would like to use them daily. This objective can be achieved given the teachers' interest in integrating this device into the learning of French as a foreign language.

In addition, computer literacy has a significant impact on learners' learning. The more ICT skills are mastered, the less difficulty there is in integrating these tools into classroom practice. The innovative device resulting from this combination reinforces this observation.

"*All you have to do is know how to turn on the computer*". The device is easy to use since the tools are those of the computer. However, some learners sometimes find it difficult to handle the stylus: it is large and heavy. Notwithstanding this difficulty, learners think that it is possible to do more activities with the IWB compared to other materials available in the classroom. They also said that using a projector alone without an IWB would be restrictive, as the teacher would often be hidden behind the screen or from the back, whereas they prefer to see the teacher in front of them.

In short, apart from the problem caused by the shadow, particularly for writing, the Interactive Whiteboard allows the group to do in class what could not be done in front of a computer. It is therefore possible to work collectively using computers. This is an advantage of the IWB regardless of the age level of the learners. Without the interactive whiteboard, it is undoubtedly difficult to work with twenty or so learners in classrooms which, for the most part, lack computer equipment.

From classroom observations, we have seen that the Interactive Whiteboards are well placed to be seen without difficulty. Learners will no longer have to contort their bodies to take notes; see a picture or video. The teacher is also in the learners' field of vision, so their attention is sustained. Indeed, the fact that they are constantly moving around on their chairs and sometimes between rows makes learners less concentrated.

5.7.3. Acceptability dimension

The majority of learners find the device fun and exciting. They do not tire of it and even find pleasure in spending time working on it in groups. When they work with a traditional blackboard, they are no longer enthusiastic about the work; in addition, the dust irritates them, which makes the task less enjoyable.

From the point of view of acceptability, the majority of learners in the three classes complained about the impact of light on the Interactive Whiteboard when it was used without curtains: they were all uncomfortable when there was a lot of light.

However, although lowering the curtains solves part of the problem, the darkness of the classroom unfortunately also causes problems by greatly attenuating vision. However, this constraint can now be partly overcome thanks to the suspension arms of the video projector and the "short focal length" projectors. Thus, this tool ensures a complete field of vision for the learners and spares them the shadow area on the whiteboard.

While the forum is very popular with the learners, the teachers add that it produces a very remarkable "extrinsic motivation": the learners who have proposals will be the most solicited and the most read. Nevertheless, while all groups managed to produce a text in the time set by the teacher, the group dynamics seem to have had, in this new context, a great influence on the quality of exchanges between learners within each group and on the way this production was achieved.

6. Conclusion

We have highlighted the potential contributions of the pedagogical articulation of the IWB and the forum in the realization of foreign language tasks in a techno-pedagogical device intended for the learning of French as a foreign language (IWB associated with the forum on Claroline in French class). In order to verify the second hypothesis, put forward in this research, we made sure to present the pedagogical potential of this device according to an innovative conception of the didactic unit. The latter is structured according to defined stages via an aligned scripting process. We were able to see that thanks to this process, a particular pedagogy is called to be implemented to better succeed the integration of the IWB in the French foreign language classroom. The activity diagram thus becomes an indispensable and very effective tool to ensure the coherence of the pedagogical scenario integrating the IWB. This approach has had a positive impact on learning. The first hypothesis, according to the indicators displayed, is fully affirmed by the fact that the participation of the learners in the different activities (reading activity, grammar activity and writing project) attests to a degree of performance in the completion of the tasks. This performance is due, to a large extent, to their involvement and perseverance in the completion of the tasks, supported by the motivation shown by the indicators obtained during the classroom observation and the semi-directed interviews with the pupils. These attest to a very high degree of integration of the device in the learning process, in relation to the different dimensions: usefulness, usability and acceptability of the device.

The third hypothesis is thus rooted in an environment favourable to the development of particular learning strategies in the learner. Indeed, the device implemented remains an environment that invites the learner to develop particular learning strategies in the French as a foreign language classroom. The Interactive Whiteboard captures the attention of learners and promotes interactivity in language classes. The associated forum, benefits from encouraging exchange in its various oral and written aspects. Once engaged in discussions, learners tend to improve the quality of their interventions, while being willing to develop a rewarding collaboration with the rest of the participants. This also improves their written communication skills. They learn to put their ideas in order and to reformulate their thoughts in a concise way.

The implementation of a collaborative environment aims to create a climate of trust in order to overcome the feeling of failure among learners as the sanctioning component then decreases. Learners encourage each other and share their ways of doing things. Roles and functions are distributed naturally among them, regardless of their level, calling on them to benefit cognitively. The comparison we were able to make with individual work highlights these learning strategies. The example of the act of writing becomes significant since some learners, during the interviews, found that the physical work of writing on a word processing software before posting it on the forum was less painful and faster.

On the whole, this range of tools with pedagogical options contributes to reinforcing a certain motivation in the teacher, which encourages him to continually improve the scripting of the French as a foreign language course in order to meet the language and socio-motivational needs of the learners.

Compliance with ethical standards

Disclosure of conflict of interest

There is no conflict of interest between the authors of this article.

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