

# **DISTANCE LEARNING IN THE TIME OF COVID-19 LOCKDOWN: NEW OPPORTUNITIES FOR INFORMATION AND COMMUNICATION TECHNOLOGIES IN EDUCATION?**

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## **ABSTRACT**

This research aims to study the changing perceptions of primary and secondary school teachers towards information and communication technologies (ICT) for education, during the period of health lock down in France in April 2020. It is based on the Pedagogical, Social and Technological affordance model, suitable for analysing online learning environments and situations. Selected factors are the presence and use of ICT in Education, as well as interactions and innovation. In order to identify these elements, a questionnaire was proposed and the data was processed quantitatively and qualitatively. The results tend to confirm existing studies that claim low affordability of technology in education. Previous experience seems to be a perception-amplifying factor, but it does not in itself ensure the transition from perception to action. However, under certain conditions and in the longer term, such a rich and constrained experience leads to expression of new training needs that could reveal new affordances in a richer professional development process.

## **KEYWORDS**

Distance Learning, Learning Environment, Affordance, ICTE, Interaction, Teacher Professional Development

## **1. INTRODUCTION**

Health lock down and the injunction of pedagogical continuity have created an unprecedented situation of distance education in primary and secondary education in France. How did we consider this specific situation as a professional development experience for teachers?

The disruption of the environment by the sudden need to use ICT could affect teaching activity and change the complex relationship between the teacher and the technologies. Beyond the question of the effectiveness of ICTE, we have chosen to focus on what teachers do in this constrained situation in order to try to perceive possible changes, from and through practice. Did confined teachers grasp ICT differently than usual, and does this open up new perspectives or even innovations? The term innovate is particularly appropriate as it implies the introduction of something new in a field. It raises therefore the question of the environment and its importance in learning. ICTE is an element of this environment. As practices are linked to the context in which they interact (Bru, 1991), a sudden evolution of this environment can then become a factor of change. But in order to study a change, it is necessary to know the previous state.

The starting point is the low level of use of ICT in education noted by the institutional surveys PROFETIC (Médiamétrie, 2018). The actions noted by these data show a use of ICTE mainly centred on the simple functions of these tools, in particular for the preparation of lessons and projection of documents in class. Thus, their place and role in education remains limited and sometimes their effectiveness and usefulness questioned (Cuban, 1982). At the same time, it should be mentioned the strong incentive of educational policies for a greater integration of ICT in education. The goal being to move towards so-called new skills such as collaboration or creation (*OECD Skills Outlook*, 2019).

In regular face to face classrooms, teachers can perceive live actions, productions and reactions of learners to engage them in a fluent interaction that scaffolds their knowledge construction and highlights their doubts and understanding. Such an interactive process can help the teachers to adapt the lesson to each of his/her pupils.

In confined mode, interaction becomes more scarce. There is a risk for teachers to concentrate their efforts on documents to deliver front transmission of knowledge and instructions for homework without direct feedback from their learners. This may lead to demotivation for some pupils. In this situation, the use of technology become necessary, which could lead teachers to glimpse new possibilities previously unexplored. Therefore, confined teachers could envisage new uses and perhaps lead to a shift in their representation of ICT. This is what we have chosen to analyse.

## 2. RESEARCH ISSUE AND QUESTIONS

This leads us to the following question: in what way had the situation of sanitary confinement made it possible to introduce new potentialities of action into teaching by constraining the use of digital technologies?

We try to understand who are the teachers who may perceive new potentialities and whether they drive them to action. But also whether their experience may generate new knowledge and perspectives.

Practically, we try to break down this main question into different sub-questions:

- Bringing their own experience and expectations: Do the teachers perceive new affordances of ICT for education in this context?
- Do they implement some of these new potentialities?  
From the many potentialities allowed by ICT, and according to the experience, needs and goals pursued by teachers, they might or might not perceive and implement a selection of these potentialities.
- What actions do they select in this context?
- What experiments do they carry out?
- Do they innovate?

Finally, what kind of new affordances does emerge in the French landscape of this lockdown period? With what effects on uses and practices?

In order to address these questions, let us present the theoretical background in the following section.

## 3. THEORETICAL BACKGROUND

The concept of affordance is proposed in 1950 by Gibson, an American psychologist, who defines it as the potential for action within an environment (Gibson, 1977). As an example, a door handle can suggest either an entrance or an exit and thus lead to a particular action (i.e.: pull or push the door). This concept leads to the study of relationships between humans, their activities and their environment with the ecological theory of development (Gibson, 1986). In this context, the ability to discover what can be offered by an environment stems directly from action. For this reason, experimentation is essential in the development process. Such an experimentation is itself a potential source of innovation. These affordances are objective, i.e. always available in the environment, subjective since they are visible only to the observing subject, and functional since everyone can see and implement them differently (Reed, 1993).

This notion of affordance is adapted to the ICT field by Norman in 1988. He distinguishes perceived and real affordances and adds the notion of utility and usability. Indeed, not only the tools must correspond to a desired function, but it has also to be easy to use, and thought for the user's satisfaction (Norman, 2002).

### 3.1 How do we Adapt into an Environment?

The complementary concept of the development niche (Super & Harkness, 1986) lights on the possibilities of adaptation and evolution of this environment, of humans and their activities, by taking into account the physical and social context, the practices, the beliefs of the individual and the group he or she belongs to. For example, these changes may be induced by the emergence of new tools, such as the possibility for confined teachers to teach lessons via videoconferencing or make use of other online working tools to bring their pupils to a different kind of interaction or production. Because technology is changing the environment we live in.

It provides new ways of doing things and allows us to adapt to new opportunities.

At the same time, however, we must take into account new constraints that are specific to this new environment. Therefore, each *niche* is unique and must take into account the particularities of everyone. For example, someone can have a bad Internet connection, particular needs or a specific experience that may help or impede him or her to take advantage of this *niche*. For the locked down teacher, the efficacy will depend on the ability to find the right information, adapted to his or her abilities, within his or her environment, his or her niche, by interacting, in order to extend it. And hopefully go as far as innovation.

### 3.2 Scientific Background

There are few studies on teaching in confined mode. For this reason, it seems important to look first at the concept of distance education to identify its specificities. The notion of distance should be understood not only as geographical or temporal, but above all as pedagogical and transactional (Moore, 1993). If distance learning is protean, it always brings out interaction needs to keep learners motivated and avoid drop-outs. Distance learning has to provide interaction between content and learners, between teachers and learners, between learners themselves and between technical devices and users (Swan, 2003). Then, interaction can be considered as a driving force for the success of fully online mediated learning and therefore an essential indicator to be taken into account when evaluating the effectiveness of the distance education system implemented. Finally, learning modalities have to be varied to offer different possibilities because everyone has different perspectives and perceives the new environment differently. Now, in such a short period of time, it is challenging to combine and articulate the appropriation of new digital tools with the variation of pedagogical approaches to build an environment that suits every actor of the learning situation.

The second area of study concerns learning environments. In her introduction on “Ethno theories, learning and contexts”, Bril (2014) claims that “learning is trying to explore and exploit the constraints that organize the space of the activity”. The verb “trying” emphasizes an operation whose results are not guaranteed. The success (i.e.: learning occurs) relies on the ability firstly to recognize in the environment, the components whose function can support the project and secondly to implement these functions. Such a presentation follows Norman’s idea in 1988 that separates the perception and action phases.

### 3.3 What Model should be used to Observe Teachers in Confinement?

There is a need for a model capable of observing but also analysing learning environments that includes technologies. The pedagogical social and technological affordance: (PST) model presented by Kirschner (2002) allows us to keep the concept of affordance and niche, and the articulation of the learner-activity environment with the primacy of experimentation. It relies mainly on the support of interactions, which we have previously defined as essential. It relies on the principle that the potential of technologies can improve learning conditions by supporting pedagogical and social affordances. For example, the installation of a chat tool can make it possible to communicate directly and simultaneously in a group online.

Furthermore, this model includes a process to test the effectiveness of group e-learning modes. For this reason, this model can be used to study and assess the design of e-learning more generally.

Here, teaching combines technological, social and pedagogical affordances. It emphasises the importance of choosing an adapted pedagogy, taking into account the characteristics of the media used and their functionalities, including possible social interactions at a distance. In order to design and analyse these interactions, the model proposes to answer six questions which are all steps in an iterative system:

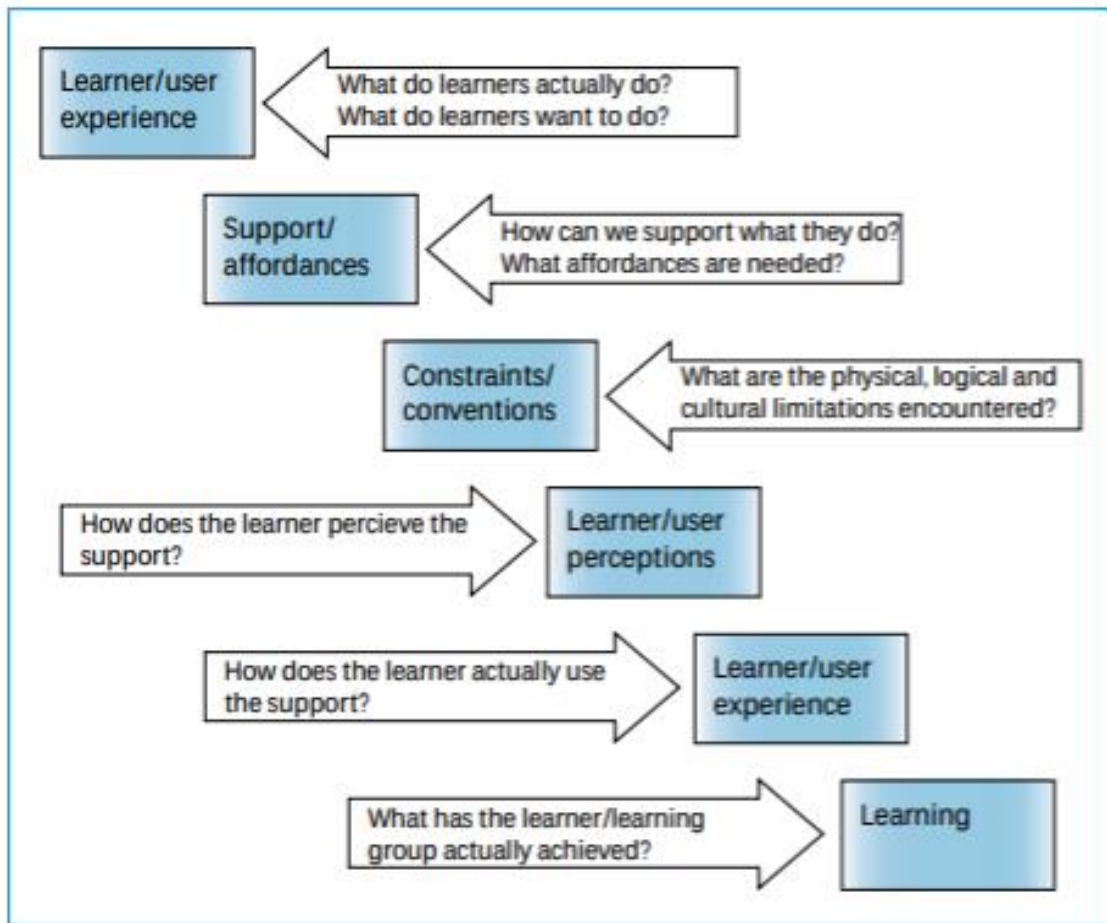


Figure 1. Interaction questioned by the PST affordance model (Kirschner, 2002, p. 33)

#### 4. METHOD

We questioned the expectations, practices and emerging perspectives on ICTE of primary and secondary school teachers in France (i.e.: teachers of pupils aged 3-16 years). The questionnaire articulates closed and open-ended questions to determine the needs, means, organization facilities and perspectives perceived by confined primary and secondary school teachers, whether experts in ICT or not. It was distributed online to three different groups of teachers. This means that only connected teachers did answer our questionnaire.

The first group is made up of 100 experienced primary school teachers who are candidates for the trainer's certificate and who are present on social networks. The second is made up of 75 secondary school teachers who participate in online communities of practice. Both of these two first groups can be considered as experienced with ICTE, as they are active on exchange platforms. The idea was to have more opportunities to see innovative practices. The difference between these two groups helped to identify whether the level of the pupils (3-10 years old; 11-15 years old) could be an interesting variable. Finally, a third group consisted of 75 secondary school teachers of literature at the Besançon Academy, contacted through the disciplinary mailing list. This third and last group is not particularly experimented in pedagogy or in ICT. We consider this group as a control group, compared to the more experienced two other ones.

It is worth to mention that the questionnaire has been addressed during the third week of the lockdown period, i.e.: a relatively short period after the unprepared lockdown.

The data collected by this questionnaire are analysed with a mixed method. It is necessary to articulate quantitative and qualitative data and to elaborate grids to examine open-ended responses. This leads us to use content analysis method proposed by Bardin (2013), which consists of studying the comments collected to bring out a certain number of significant indicators in relation to the subject studied and the model, by coding and then categorizing this information using a lexicological study aided by the TXM software (Heiden et al., 2010).

The quantification criteria are based on the presence and level of use of ICT but also on indicators of perceived affordances in relation to: creation, differentiation, collaboration and autonomy. These choices are linked both to the PST model and to institutional expectations. It is not the purpose of this study to present these elements as central to education in general, nor to defend the effectiveness of ICTE.

## 5. DISCUSSION AND RESULTS

This study confirms a use of ICTE restricted to simple functions, in particular messaging and video proposed by the teacher to his or her pupils without interaction.

First, ICT are scarce in the comments collected. Among 250 teachers, 37% cite tools with limited capabilities, usually messaging. A quarter of teachers surveyed do not cite any tools. Only five teachers surveyed mentioned spontaneously they discovered a new tool during this period. Second, the tools chosen are used in their simplest functions such as communicating lessons or instruction and receiving assignments without feedback. Third, the interactive support for the activity is very limited: the so-called advanced functionalities of an online working environment, such as forums or personalized feedback are rare. The means generally offered by Distance Learning have not really been deployed by these teachers. They seem to ignore that more motivation is needed for learners at a distance and that some means are available to them to sustain this motivation.

We are at the beginning of lockdown when teachers fulfil the questionnaire and the vast majority of them are keeping with their routines and well mastered face to face practices. Most of them worry about how to adapt their practice to the new environment and very few try to find new opportunities to modify their teaching strategies. As a matter of fact, there are very few new experiments mentioned, and no significant perception of new training needs. Thus, the answers to question 1 "What are your needs, as a teacher, during this confinement?" indicate mostly modest needs. Only two answers receive a majority of votes. The answer "I need new tools" gets a small majority. And the answer "I need time" gets a very high score. In addition, in question 4, where confined teachers are asked to select among various expectations, only 28% of all respondents chose "to develop new skills".

This result applies for all three groups (primary or secondary school teachers, ICT experts or not), although the experience seems to be correlated with a better perception of affordances and a greater expectation of added value. Affordances are even more fragmented when the person did only recently test and manipulate ICT. Experience makes it possible to envisage new and more appropriate practices for the future. Even if this is not translated into action at this stage. The presence of sometimes negative affordances among non-experts should be also noted, e.g.: technical failures.

The main difference between primary and secondary school teachers concerns the use of ICT to communicate with parents this is why online messaging is cited 12% more by primary school teachers. The aim is to create the necessary link for young pupils to get to work. But they point out that this kind of coeducation is too time-consuming to be sustained afterwards. Primary school teachers also mention the use of online work plans and the implementation of challenges with a playful dimension.

The second part of the questionnaire, which is more prospective, outlines some forms of change in perceptions, more strongly among the group of experts. The main horizons identified, particularly in the free text areas of the questionnaire, are opportunities to work on:

- student autonomy, i.e.: the student is an actor of his or her own learning process, by providing young pupils numerous challenges;
- a greater use of audio, more multimedia creation;
- the need for a variety of approaches; active teaching methods; enriched teaching practices and
- the desire to learn.

They articulate pedagogical, technological and social affordances. However, these new affordances remain very limited and produced by only few (less than fifteen) respondents among our population.

- Creativity is generally restricted to video creation by the teacher,
- differentiation is at the desire stage and does not appear like an added value of the distance learning,
- collaboration is emerging mainly between teachers and finally,
- student autonomy remains to be built up.

The less experienced group does not perceive the confinement as being able to introduce a reflection on the proposed themes such as the construction of the courses or the expected skills. Moreover, teachers of literature perceive less added value in distance education. The difference varies up to 29%. The only item in which less experienced teachers have a higher score of 9%, but which is still in the minority, is 'facilitating exchanges'.

These main results lead us to answer our research question. Teachers have had little awareness of the potential of the tools available. Experiments are rare with no real perception of innovation and actions do not yet seem to lead to new knowledge after three weeks of this very unique situation.

However, in this unprepared situation, often uncomfortable, teachers were not strictly obliged to explore new possibilities. This is particularly the case if the means previously available keep working (according to them) or if they cannot consider other possibilities. Having resources and tools available, for those who have them, is not always a sufficient condition for action. Teachers also need to have a degree of (user) control over the task, i.e.: the users need to understand the process as a whole in order to control its evolution by their interaction as users. We have to take into account that people often limit themselves to what they think they can reasonably obtain (Sen, 1999). In addition, prerequisite knowledge is often necessary to perceive new potential and to learn how to exploit them. According to (Fernagu Oudet, 2012), a new resource must therefore be converted into a capacity for learning, which takes time.

In order to achieve this goal, interaction with the environment must be constructed by the learner (Brousseau, 2011) in a mutual, adaptive, continuous and interactionist process (Piaget, 1964). This implies for teachers to design their teaching by considering the new capabilities of the situation. In the specific context of a sudden confinement, they were critically unprepared.

Although teachers seem satisfied overall, their approach seems to lack effectiveness due to a lack of preparation, as the constraints and resources for e-learning activities are still little explored and little exploited.

## 6. CONCLUSION

This study has been implemented in the urgency that the sudden confinement imposed, and for this reason, we can recognize some limits to the results obtained. The teachers that answered this questionnaire cannot be considered as representative of the population of teachers in France. This study needs to be supplemented by others also because the qualitative data analysis is sometimes subject to interpretation and the study does shed light only on a limited number of elements of the teachers' environment. So it would have been helpful to also interviewed administrators of the same schools to complete the study and perhaps help them to meet future challenges. Finally, the study is based on the concept of affordance, which is evolving and whose value in the context of relationships between Human and ICT has yet to be consolidated.

Nevertheless, this study reinforces the observation that the use of ICT for education is limited, at primary and secondary schools, to basic functions of these tools. It confirms the necessity to reconsider time and scaffolding in distance learning. Beyond the initial hypotheses, one of this study's values is to underline the lack of knowledge for teachers on distance teaching and learning specificities: 46% of teachers want to be trained to distance teaching but 31% don't want to reconsider their teaching approach and 20% don't want to modify the content of their teaching. Our study shows the need for a specific training to prepare teachers for distance learning to emphasize the importance of redesigning their teaching as a whole, taking advantage of different communication tools to implement the needed interaction. The real expert is the one who is able to make the best use of his or her environment, to perceive the possibilities according to his or her own capacities and to realise them. For this reason, we may suggest teacher training to better observe their environment to capture the new opportunities to learn and to act for their own pedagogical practices. In any case, teaching in confinement is an experience that can be seen as a forced moment of training. The discrepancy between experts

who are aware of the existence of new potential even if they do not take action and non-experts who, for the most part, do not perceive this new potential tends to show the need to first work on the question of perception before accompanying the implementation. We suggest that such an experience produced learning outcomes for teachers that the agenda of our study was not able to reveal.

## 7. FUTURE WORKS

This is why we can conclude that the situation of health confinement has not made it possible to reveal new affordances in teaching by introducing the use of ICTE, but that it has nonetheless made it possible to open up new perspectives in terms of innovative practices and, above all, training.

This may be an ideal time to start training, because if teachers are not taking full advantage of ICT it is also because, until now, they did not necessarily think they needed it. The continuing health situation may lead them to reconsider this position. It takes time and a great deal of experimentation to allow a shift to take place because the coupling of perception and action is not immediate when we are dealing with complex learning. It would be interesting to start from the new needs in order to make the available means visible or even to build new ones, because the technological world is evolving and can be a leaven of future innovations.

This is why affordance analysis can be a useful framework for rethinking the links between teachers and ICTE in order to help perceive and take advantage of the opportunities offered by ICT for possibly making new horizons appear and raising some innovations.

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