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For pedagogical alignment in an e-learning device

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Abstract

This study intends to identify the factors likely to have an impact on the process of knowledge appropriation within an online teaching device in a Moroccan university context. We postulate that pedagogical alignment, which is based on the scripting of collaborative work within groups of learners, positively influences the process of knowledge appropriation more than didactical alignment, which is based on the structuring of disciplinary content delivered by a technical device. The context of the experiment is that of a presential training in real situation within which we inserted a distance part from the Moodle platform. This training lasts for one semester during which the learners are led to appropriate the theoretical framework and then to exploit it in a collaborative project.

Keywords: Pedagogical device; Alignment; E-learning; Scripting

1. Introduction

At the Moroccan university, the teacher is often faced with a major difficulty: the pedagogical supervision of large groups. The significant increase in the number of students at the university and the absence of alternative solutions push him to find a pedagogical salvation in the digital environments of remote work.

At present, the implementation of a digital distance working environment, at the technical level, is almost no longer a problem. It is the questions relating to pedagogical engineering that are slow to find clear answers. This difficulty stems from the fact that any technical device necessarily calls for two other devices: didactic and pedagogical. The didactic device is equivalent to the disciplinary knowledge specific to a program of a class level (such as negation, direct and indirect speech, etc.). The pedagogical device is the pedagogical scenario in which the didactic device takes place (such as studying direct speech through a corpus of independent sentences or through a full text, through individual exercises or through collaborative work, etc.).

This means that in the teaching process, subject knowledge is inseparable from its staging. The didactic device is always associated with the pedagogical device. When a digital environment is used in teaching, a third device, which we call technical, is added to this association. This association of different devices (technical, didactic and pedagogical) is at the origin of several dysfunctions which can affect the pedagogical framework, thus hindering the learning process.

It is precisely the relationship between these different devices that we want to highlight in order to draw the contours of the pedagogical innovation of a hybrid system in language courses, implemented at the Abdelmalek Essâdi University (ENS of Tetouan).

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2. An old pedagogy

The Moroccan university implements a pedagogy that is no longer in line with the learner's socio-cultural environment. Today, many university students were born at the end of the 20th century and cannot do without digital technologies, whereas university teachers (or at least a large proportion of university teachers) were trained at a time when information was scarce. The point here is not to put Moroccan university pedagogy on trial, but to explain why it is no longer adequate. To answer this question, we conducted an exploratory study among teachers.

This study showed that the vast majority of teachers at Abdelmalek Essaadi University adopt the theory of didactic transposition. This "corresponds to an approach to didactic systems that chooses the pole of knowledge as its point of entry" (Chevallard, 1988). The transition from scholarly knowledge to taught knowledge calls for the teacher to implement a process of structuring content in which he organises the information and highlights the essential notions to be learned in order to increase the probability that his learners will retain them. Given the large number of learners, the university teacher resorts to lecturing to transmit this structured content. The lecture, it should be remembered, almost always follows the same scenario: a teacher who explains and learners who listen.

The scripting of the course is the production of a scenario that accurately describes the stages of the course and the roles of the teacher in relation to those of the learners. The study showed that no teacher uses a script or formalism to represent a planned or previous course of action. In other words, they do not use any means of expression through which they can describe what they have done in the most organised way possible. This means of expression can be called different things: teaching sheet, activity diagram, learning scenario, description of a learning sequence, etc.

As a result, the teachers interviewed never think of the course of a lesson in terms of a scenario. This always exposes them to the risk of a possible scenario or a single scenario. A lesson session then always takes the same size, the same format. University teaching is staging a standard size of lecture. This pedagogy puts the future of the university institution at stake: teachers teach yes, but do learners learn? The current challenge for the university is no longer to transmit knowledge but to help students to develop in a world where information abounds.

## 3. Technology and pedagogy: relationships to be clarified

Our aim is to meet a twofold challenge: to change pedagogical practices and culture (until now mainly oriented towards the transmission of knowledge) and, to this end, to bring teachers to question their pedagogical practices and to move towards more active practices. We believe that one of the ways to challenge one's teaching practice is through e-learning. This rethinking is not self-evident. Various authors describe the necessary step-by-step progression and emphasise the duration. Lebrun (2007) thus likens it to a learning process on the part of teachers.

However, studies on the use of e-learning systems focus on the user in his or her interaction with the technical device. They do not take into consideration that this technical device is only the visible face of two other devices (didactic and pedagogical) which are associated with it and which also require particular attention.

The design of a technology-based pedagogical innovation must therefore be carried out for all three types of device and not just for the technical device, which remains, most of the time, the entry point of the innovation. Hence the importance of the concept of alignment.

3.1. Alignment

We propose to use the concept of alignment, which we borrow from J. Biggs (1999), and which we develop within the framework of our research in the form of a model capable of accounting for the unfortunately frequent inadequacy of one of the three devices with the other two and therefore the difficulty or even the impossibility for the user to appropriate the whole, and consequently to fully appropriate what is expected of him. We propose three types of alignment, modelled as follows:
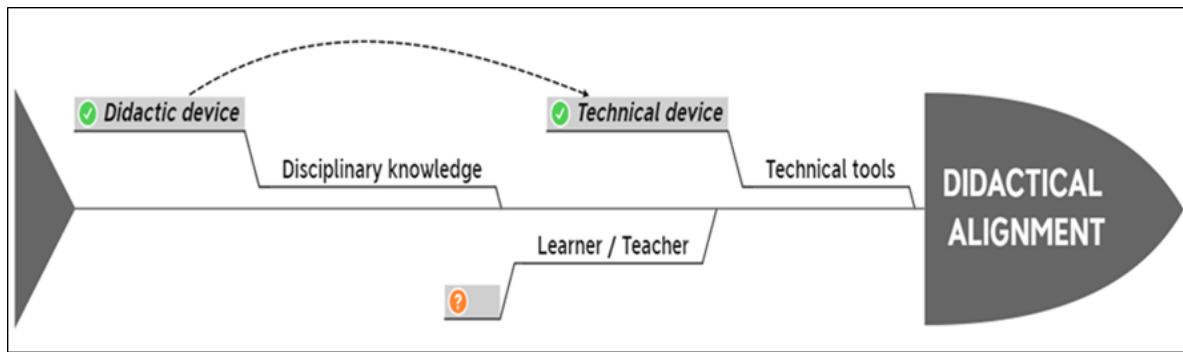
Figure 1 Didactical alignment process
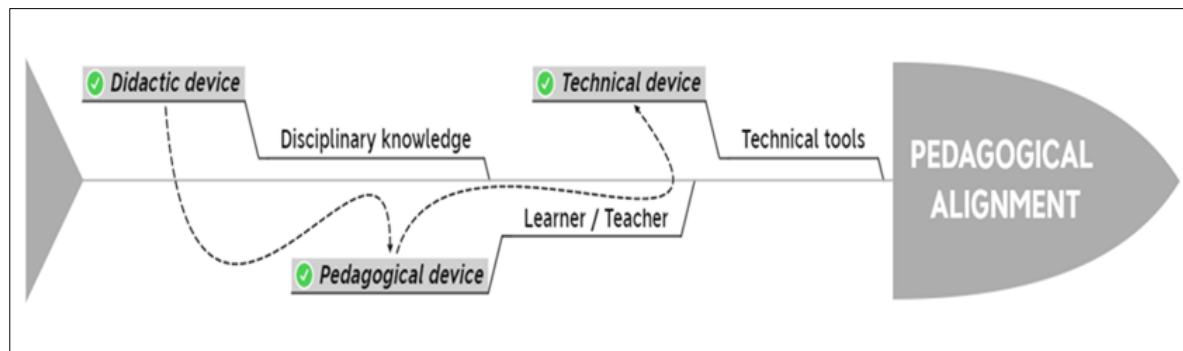
Figure 2 Pedagogical alignment process

This model was tested in order to evaluate the degree of knowledge appropriation generated by each type of alignment.

Didactical alignment consists in establishing coherence between the disciplinary knowledge and the learner on the one hand (here it is the principle of didactical transposition that is implemented) and between this didactical transposition and the technical tools on the other hand. However, in this kind of alignment, we are only reproducing a classic situation. We are doing the same thing differently. We reproduce classic situations with electronic means.

The pedagogical alignment here results from the choice of a disciplinary content that fits in with a pedagogical scenario in line with the functionalities of a digital distance working environment.

Non-alignment would therefore result from the fact that this environment, based on collaboration between peers, delivers knowledge that requires individual effort. Or conversely, the fact that knowledge that would be more easily learned in a collaborative scenario is delivered by a digital environment that does not offer collaborative possibilities. Non-alignment therefore occurs whenever one of the three devices (technical, didactic and pedagogical) hinders the appropriation of one or both of the others. For this reason, the design approach adopted takes these different principles into consideration.

3.2. Research device

3.2.1. Principles

The learning strategy in this training scheme is based on the principles of the socioconstructivist theory of learning socioconstructivist learning theory: "Socioconstructivism emphasises the relational dimension of learning. In pedagogy, we would say that the student develops his or her understanding of a reality by comparing his or her perceptions with those of his or her peers and those of the teacher. Kanuka and Anderson (1998) recommend using different types of interaction: student-student, student-teacher, student-group (dyad, triad, small group, large group)" (Lasnier, 2000).

This theory is based on the idea that knowledge is not transmitted, but is constructed by the learner by interacting with others in a given context. Therefore, the affective, intellectual and sensorimotor participation of the learner is indispensable in learning. Effective learning, according to the socio-constructivist theory, takes place in a social context,

i.e. in a multi-relational interaction between the learner, the teacher, the peers, the didactic material and the environment in general. The principle of alignment that we mentioned above is justified here.

3.2.2. Research hypothesis

Our research aims to identify the factors likely to have an impact on the appropriation process of a techno-pedagogical device in order to better insert E-learning in the Moroccan university context. The research hypothesis can be expressed as follows: Pedagogical alignment, which is based on the scripting of collaborative work within groups of learners, positively influences the process of knowledge appropriation more than didactical alignment, which is based on the structuring of disciplinary content delivered by a technical device.

3.2.3. Context

The context of the experiment is that of a face-to-face training course in a real situation within which we have inserted a distance learning part from the Moodle platform. This training lasts for one semester during which the learners are led to appropriate the theoretical framework and then to exploit it in a collaborative project. The data analysed in this research are from the first activity. The data analysed in this research comes from the first activity. This is the most decisive part, as it calls for important decisions to be made regarding group work and thus calls for more intense collaboration. The collaborative activity is carried out by teams of 6 learners.

The technical device we have chosen is the Moodle platform. This device is an LMS (Learning Management System) dedicated to online learning and collaborative work. The wide range of tools available to the course designer allows the system to be used in a variety of contexts.

3.2.4. Sample

The subjects that make up our sample are university students in initial training. In total, there are 98 students enrolled in the first year of the Bachelor of Education programme for the academic year 2021-2022, who attend presential activities for the appropriation of the language and communication course.

3.2.5. Design of the experiment

We divided our sample into two experimental groups. The first group (G1) worked according to the principle of didactical alignment. This consists in structuring the course according to three systems:

- An entry system, which takes care of the management of student flows at the entrance of the module (pre-test and entry test): the pre-test is a test administered to the learner in the form of MCQs on each of the specific objectives of the module. The analysis of the students' answers allowed us to have a clear idea of their level of mastery of the objectives before starting the module and to direct them, within the module, towards the parts that correspond to the objectives they do not master. The pre-test also gives the student a clear idea of their skills by reference to those that the module will help them to acquire. The prerequisite check (here called the entry test) consisted of a MCQ test which, following the pre-test, allowed us to ensure that students had mastered the prerequisites necessary to enter the learning system. Failure to pass the entrance test, which was not the case in the experiment, obliges the learner to correct his or her shortcomings through a remediation module.
- A learning system that contains learning activities (local and global activities): we have organised the content of the module in two ways to better solicit learners' activity. In the first part of the course, learners' activity is solicited through local activities. This means that they are embedded in a content presented in small fragments. Each fragment is followed by one or more activities that require the learner to put into practice the fragments just presented. In the other parts of the course, learners' activity is solicited through global activities. This means that they are separate from the content. The activities are grouped at the end of a chapter or a coherent part of the course. These activities consisted of a series of self-correcting exercises that could give the learner a clear and immediate idea of his or her level of mastery of the material. of their level of mastery of the course knowledge.
- An output system, which manages the flow of students at the end of the module (post-test): whatever the mode of work proposed to the learner (local or global activities), it is essential to propose to the learner activities of synthesis and transfer of knowledge to avoid the risk of learning by juxtaposing course elements. The post-test is therefore designed to help the learner establish links between what he or she has learnt by producing a synthesis likely to help him or her memorise and transfer the knowledge.

In summary, the course content, structured according to these three systems, is made available online through the Moodle platform. The students were first asked to appropriate individually a didactic content structured according to a method of modularisation which is aligned with a technical device. In a second step, they were invited to write an individual synthesis of the work done.

The second experimental group (G2) works according to the principle of pedagogical alignment. Let us recall that our research hypothesis stipulates that pedagogical alignment, which is based on the scripting of collaborative work within groups of learners, has a more positive influence on the process of knowledge appropriation than didactical alignment, which is based on the structuring of disciplinary content delivered by a technical device.

The pedagogical alignment is thus based on a scenario that aims to develop collaborative work in the completion of the task and calls for the mobilisation of certain approaches conducive to establishing a collaborative spirit among the members of the group (communication between teammates, design of a collective plan, organisation of the work of each teammate, joint action, etc.; Quintin, 2008).

The scenario is designed for a duration of three weeks spread over three learning activities in which the forum has a special place. We made use of the forum based on pre-structured discussion threads, according to the knowledge co-construction model of Gunawardena & al. The steps that structure the discussion forum align with the technical device, since this structuring is transposable to any discussion forum, regardless of the technical constraints of the digital environment. They are also aligned with the didactic device, since this structuring touches on disciplinary knowledge (language lessons/communication). Finally, they are aligned with the pedagogical device, since it concerns the structuring of interactions.

The first activity focuses on the appropriation of the course content (introduction to the themes of communication and the different forms of communication). In this activity, the aim is to

- get acquainted with the frame of reference and to appropriate the main concepts put online on the Moodle platform;
- communicate in writing their understanding of the concepts (on the forum);
- Situate their own understanding in relation to those of their peers (on the forum).

The second activity revolves around collaborative writing. This activity allows students to reinvest the main concepts. Students are encouraged to use a pedagogical tool called a "wiki", to use a concept map to map out their points of view and finally, to be enriched by the contributions of the group.

The third activity is devoted to debriefing. It is about discussing the concept maps made at a distance. The IWB (Interactive Whiteboard) helps to better structure the interventions. Each concept map becomes a spatial and interactive representation of the information. Each reworking by the student or the teacher calls for a process of argumentation that frees up the floor. To better situate the results of the research device, we detail here the first activity.

3.3. Description of Activity 1

(Appropriation of the course content; introduction to the themes of communication and the different forms of communication).

Objectives

This first activity is devoted to an introduction to the themes of communication and the different forms of communication to enable the learner to:

- become familiar with the framework and to grasp the main concepts,
- communicate understanding of the concepts in writing,
- situate one's understanding in relation to those of peers.

3.3.1. Modalities of functioning:

At the beginning of the week, a question about the content of the module is asked in the group forum. The student is asked to think about it and to provide answers in a discussion in the forum.

They must participate regularly in the debate, showing involvement, effort to justify, argumentation, demonstrating their understanding of the concepts, their ability to energise the group, quoting their references and/or colleagues they question, etc. One learner is responsible for moderating the forum.

Apart from this daily participation in the forum, the student may produce any documents that may help him/her in this task of appropriation: synthesis, summaries. This work is done individually.

At the end of the week, the student writes a summary of the discussion that took place during the week (max. 3 A4 pages). The content of this summary must include not only the synthesis of all the discussions, but also his or her own reflection and questioning on the theme addressed during the week.

3.3.2. Training modalities

A compulsory first meeting of one hour, in synchronous communication, is organised the first week of the course, in the chat room of each group. The times are communicated in advance by the teacher.

A chat summary is made and sent to all participants. The purpose of this synchronous chat is to clarify the instructions for the work.

A second chat is organised to answer any questions of clarification. In addition, the teacher is there to help and advise in case of difficulties.

3.3.3. Assessment method

This activity is evaluated according to the 20-point scoring system distributed as follows:

- Relevance of the answers given: forum and final synthesis (12 pts) :
  o Forum (6 pts) ;
  o Synthesis (6 pts);
- Regular participation in the forum and reaction to other participants' answers, involvement in discussions, effort to interact with other students (8 pts).

However, despite the above criteria, the teacher reserves the right to deduct points from those who do not hand in their work on time.

3.3.4. Timeline

- Start of the activity: Monday to Friday of the first week of the course.
- Writing the summary: Saturday and Sunday.
- End of the activity: Sunday of the first week of the course, until 00:00 GMT.

4. Results and discussion

The evaluation of the group work (G1) is based on predefined criteria. The table below summarises the way in which we assessed the synthesis work.

Table 1. Criterion-based assessment grid

Regularity of the connection to the platform	Clarity of the document (careful writing, presentation of the document,)	Completeness (concepts covered, justifications, links with the course, proposals)	Total
/5	/5	/10	/20

The students in the group (G1) appropriated the technical tool very quickly and did not develop any skills in relation to the course content. As a result, all students regularly logged on to the platform but only a few were able to submit the synthesis. And those who were able to hand in the synthesis did not respect the principles of writing. On the other hand, their work shows a flagrant lack of understanding of the notions and concepts covered in the course. It remains,

moreover, difficult to retrace the path of knowledge appropriation, through the analysis of the synthesis work submitted by the students.

From a practical point of view, the difficulties encountered by users are not necessarily technical difficulties, which we tend to invoke first. They are difficulties whose origin is more pedagogical, that is to say, they are in the staging of the targeted knowledge. Hence the importance of pedagogical scripting based on the principle of pedagogical alignment.

In order to consider the learner's opinion, we distributed an evaluation form to the 49 test learners in the group (G2). This form includes pedagogical, technological and organisational aspects of the training. The data was automatically recorded during the experimental run. The statistical software "Le Sphinx" was used to carry out the statistical analyses.

By crossing all the dimensions investigated, the following graph summarises the results of the analysis of the students' answers to the question related to the pedagogical aspects of the content.
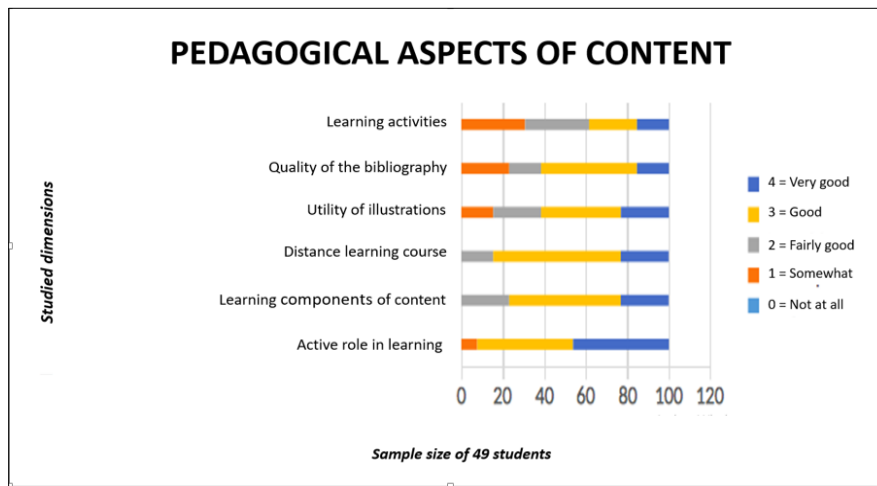

Figure 3 Pedagogical aspects of the content

The content of the course seems to have satisfied a large number of learners, only about 1/10 showed some reluctance with regard to specific aspects (learning activities, quality of the bibliography, active role in learning).

All pedagogical aspects related to the objectives were well appreciated by almost all learners. Figure 4, below, gives a clear idea of the degree of appreciation of these aspects by the students.
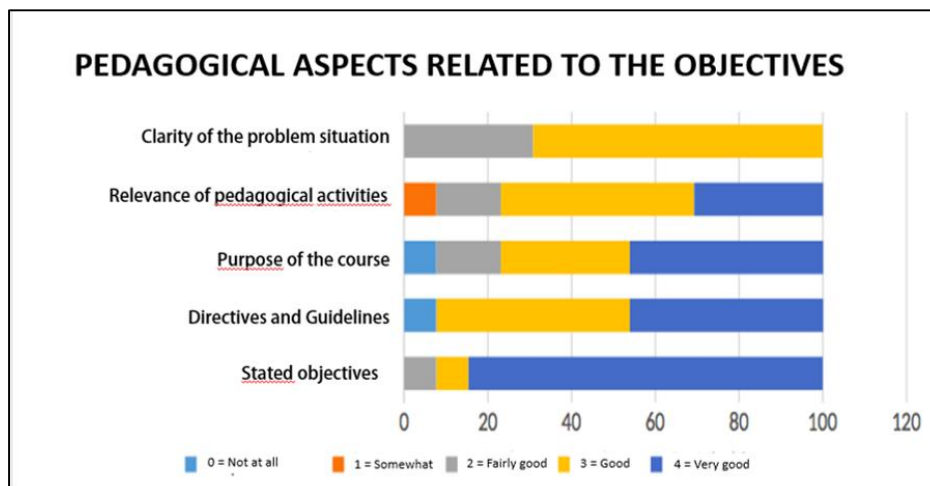

Figure 4 Appreciation of pedagogical aspects

Only a few expressed dissatisfaction, which was not significant compared to the other indices. Indeed, 3 students did not appreciate at all the purpose of the course and the guidelines and instructions attached to it. Although this number is not significant compared to the other indices, it draws attention to the pedagogical value of the objectives in orienting and motivating learners. If the student finds no purpose in the course, it is very likely that motivation will decline. Similarly, instructions disorientate the learner when they are poorly stated or misunderstood, thus minimising the learner's chances of success. Amotivation would be reflected in the learner's tendency to avoid the proposed task. This finding explains the fact that the synthesis task was not done by two students.

The organisational aspects of the training seemed to be highly satisfactory to the learners. Only one aspect had given rise to some remarks, that relating to the work done. Two learners considered the distribution of synchronous meetings to be poor in relation to the activities to be carried out.

The learning process, which indicates how knowledge is co-constructed, is observed by taking into consideration the participation of (G2) learners in the team forum. The first observations indicate that the structured forum - according to Gunawardena & al. (1997) model of knowledge co-construction - favours the participation of learners in the team forum. This modality of structuring the forum generates a large number of messages. Thanks to the structuring of the forum, learners also refer more frequently to the concepts used in the course and to the co-construction of knowledge, while ensuring that the social link and motivation within their team are maintained.

5. Conclusion

These findings lead us to adopt a particular approach to the language course. By not excluding any device from the situation, the concept of pedagogical alignment allows us to help with scripting. This allows us to better generate the process of appropriation of knowledge by a learner. In this sense, the hypothesis that we adopt stipulates that any didactic device lends itself perfectly to representation by a technical device, but that the pedagogical device must be invented. This is where the value of an innovation lies.

Compliance with ethical standards

Acknowledgments

Disclosure of conflict of interest

No conflict of interest.

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