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Deviating technologies to design personal and creative help in e-learning

Chrysta Pélissier[a] *, Stéphanie Mailles-Viard Metz[a]

[a]*Laboratory PRAXILING, UMR 5267 CNRS – University of Montpellier, 17, rue Abbé de l'Épée 34090 Montpellier, France*

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Abstract

This paper deals with the concept of "creative help" observed in online learning. In this perspective, help is characterized by a moment of intervention (proactive and reactive help), intention (to pilot, to weave and to modulate) and a design process that allows the formulation of the help (content and form). The exploratory approach that we present here defines "creative help" as participants' reactions in the face of new problems encountered through the use of a device (teaching or learning problems). Such problems have not so far been considered by learning device designers. Thus, participants tend to deviate communication tools to reach their goal. Such deviation creatively transforms help through one or more of functionalities, with one of several advantages as well as one or more consequences for teaching and learning.
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Keywords: Creative tools; deviating; technology; e-learning; support artifact.

1. Introduction

In this paper, we present the first results of a multidisciplinary research that allows define the concept of help observable in online teaching and learning. Our study focuses specifically on distance education schemes that involve digital technologies.

Whatever the learning domain, we define help as a "space of dialogue". Within this space, two different participants interact: the "knower" and the "less knowing"(Giasson, 1997). The " knower " generally is the teacher but in the context of online education, he/she may be a tutor, the platform administrator, a designer or a learner. The "less knowing" is in most cases a student, but he/she may also be the course designer. This dialogue aims at promoting the construction of knowledge and expertise among the "less knowing".

* Chrysta Pélissier. Tel.: +0033 636 503 734.
E-mail address: Chrysta.PELISSIER@iutbeziers.fr

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Once we have presented the theoretical framework and problem, we then describe various “creative Help variants” that occur in particular contexts in online learning.

2. Theoretical Framework

Firstly, our research is part of a socio-constructivist approach through the definition we give to the notion of Help as a device. Help is an area in which the “knower” and the “less knowing” interact. These interactions lead to changes of state that may (or not) allow the resolution of problems they face.

In this context, we consider Help to be always creative. Indeed, for many authors (Amabile, 1996; Bonnardel, 2009), creative activity is associated with new productions adapted to the contexts. The creative process follows three stages: “formulation / reformulation of the problem, finding creative solutions and the evaluation of ideas or creative solutions"(Bonnardel, 2009, p.11). Thus, in our study, we define creative help when its designer has found a new way to solve a problem that he/she has to cope with. Hence, any observed help in these situations is considered as creative meaning in a specific context.

Our research also takes into account cognitive ergonomics : the design process of instrumented devices. Norman (1999) argues that the quality of design must go through the intervention of the user at different processing stages. In our study, help must be designed taking into consideration needs, users' requirements but also tests results. Thus, the design cycle of help is dynamic: if the context changes, requirements and user needs evolve, help is modified. This approach is helped by the work of Rabardel (Rabardel 1995; Rabardel and Pastré, 2005) who demonstrated how users adapt their activity to tools while designing them into a learning device that reconfigures the situation. The device thus appears as a means intervening in the development of the person's empowerment to act. The device then appears as a means being an integral part of the productive activity (p23) which in itself is an important actor in the construction of personal power to act in itself in constant evolution.

Our work is inspired by the "professional gestures" model of the teacher as actor (Bucheton 2009). This model identifies actions that the teacher performs professionally. Thus, after this work, the teacher must manage an agenda of concerns, as an "equalizer" (Pelissier and Brudermann, 2009), which enables him to maintain educational activities in his class.

3. Problem

We consider three aspects in the design of help in online learning environment, the moment, the intention and the design process.

3.1. Help design in two stages:

In online learning situation, we expect to find at one level, proactive and reactive help. Help is proactive when it is inserted in training situations by the “Knower”" before the “less knowing” has completed his tasks. For example, it would provide the “less knowing” with a glossary of terms covered in the course. Reactive help is that which has not been provided by the designer. It is given by the “less knowing” during the course. For example, it is an answer to an email asking what is the procedure to upload the required task.

3.2. Intentions in Help design

Help can be defined as being associated with an "intention" from the "knowing". Four intentions are differentiated:

- Piloting aims at helping the “less knowing” to build understanding of the task, situation, problem.
- Weaving aims at storing knowledge involved with different situations in long-term memory. We distinguish social and cognitive weaving. Social weaving focuses on establishing a favorable atmosphere to interactions between different participants. Cognitive weaving focuses on linking knowledge within a single subject or across subjects.
- Modulating is meant to help the “less knowing” to solve problems which may occur later in a learning situation. But it is also designed to encourage the "knower" to reflect in anticipation of its forthcoming proposals situations.

3.3. Help design process

We hypothesize that some help variants are designed on the basis of the creative process as defined by Bonnardel (2009). Indeed, subjects are confronted with a problem that needs to find a new solution in order to achieve its objectives in a specific context. In this context, we define creative helps as solutions that are designed in response to a problem that was not anticipated in the training environment. First, the solution brought by help may be technical, educational and / or pedagogical. Secondly, the solution is defined as a "diversion" of communication tools presented in the situation. We find herewith a link between the two types of help outlined by Tricot (1998): reactive help is linked to proactive help by the deviation of resources.

Thus, among creative help, we do not focus on the distinction between reactive and proactive ones. We define creative help as corresponding to one or more of the three intentions outlined above (piloting, weaving and modulating), and implementing the diversion at its disposal.

4. Method and hypotheses

The analysis here is exploratory. It involves global reading of traces left by different participants on the online training platform: VCIel (Sehaba and al., 2009, Metz and Renaut, 2006). This training is a masters degree course that aims at developing skills and knowledge in the area of visualization and computer graphics design. Designed as a three year course, it was opened in 2006 and has an intake of twenty students per year. This course comprises of a dozen of tutors that, for most of them, authored the courses scenario stored on the SPIRAL platform (Charles and Batier, 2007). In our study, the analysis specifically focuses on finding creative helps that were produced in a course on cognitive ergonomics.

For three reasons this training seemed interesting to us to observe helps. First, the long period devoted to the design indicates that some elements of training have been anticipated and led to the design of proactive help. Second, the novelty of the training suggests that all problems were not considered and so we set out to observe the design of reactive helps. Third, this training may be associated with the design of an innovative product, the actors find themselves in an unfamiliar context in which they must implement creative processes to achieve their goals. As such, the observed helps should therefore be creative.

5. Results

We conducted an interview with the tutor in cognitive ergonomics field, who is also the designer of the course. We have identified five helps that are characterized here by the intentions and the design process. All helps were reactive to a problem that has to be solved, and were designed during first trainings.

5.1. Help 1: Chat as a tool for the acquisition of knowledge

Chat sessions, through the platform, generally allow interactions between different participants after the reading of stored resources. Students who have not read the course and who were not present at the chat session, read the chat conversation asynchronously. They use it as a medium of knowledge such as a pedagogical resource.

The intention associated with this help is didactic piloting. For learners, the chat tool serves as resource. It allows them to acquire knowledge and replaces pdf files provided by the teacher. Some of them replace all provided resources by the chat session to gain time on the training. This diversion may have consequences on understanding basis concepts that are not mentioned in chat sessions. Indeed, the chat tool does not produce long explanations. In addition, a chat session consists of information related to a particular course but also to other courses as well as information to do with schedule or course program as for instance the exams dates.

5.2. Help 2: Marking speech turn taking in chat sessions

The chat tool provided by the platform SPIRAL that VCIel is using, was not designed with a functionality to allow chatters to quickly identify when somebody is writing an answer to a question, who is speaking and to whom

the chatter is answering. This lack of functionality implies a disorganization of the conversation. Thus, to facilitate their reading, students and tutors color their interventions (a color per person) inside the chat box.

This help may be linked to a desire to promote social weaving through technical assistance. Indeed, weaving is detected by the meaning given to colors: a single color per person facilitates the identification of different interactions. The use of this method allows students and tutors to gain time because they detect at once who is speaking. The choice of color could have been replaced by the use of specific font highlighting (full, dotted, bold, italic...) but the number of options would have been more limited and differences more difficult to detect.

5.3. Help 3: Chat sessions as course help

In the training, VCiel tutors have to organize a one-hour chat session per week. Some answer students questions without specific scenario, therefore student-led. In the ergonomics class, the tutor uses the chat as an interactive course. Hence, there is a preparation that is supported by a Word file that contains a set of (1) questions about the key concepts of the lesson, (2) links as supplements to the lesson (film clips to illustrate a concept) (3) small exercises such as a request to illustrate a concept discussed in the lesson. These questions, links and exercises are copied and pasted from the Word file to the chat window as they arise. They act as the backbone to the chat session. This help is intended to control the activity in a didactic point of view. Indeed, it is designed to structure the course into different parts and focus on key concepts using a system of questions / exchanges / responses. This system requires students to read the course in order to participate.

An intention to modulation may appear in this help tool if the tutor uses the interactions to improve the Word file. He/She may adapt his questions according to the public involved without having to define them at the time of the chat session preparation.

5.4. Help 4: Chat as a medium for observing.

In this help, chat sessions are a means to observe what is understood and what is not, thanks to students' questioning. Depending on the nature of the interactions under scrutiny, tutors may have intention for piloting and / or modulating. If tutors' intentions are piloting, they may take into account the content of these interactions in their assessment of each student. The intention may also be related to modulation if tutors take these interactions into account so as to develop their future training sessions with students.

From the point of view of the implementation process, it seems difficult for an assessment to only take into account interactions present in chat sessions. Other tools may enable the observation of interactions such as forums or electronic mails. It is in the diversity of the means for interactions that the opinion of the teacher will be the most complete.

5.5. Help 5: Timely meetings

During his teaching activities, the tutor piloting the cognitive ergonomics class met other teachers on the platform. He had the opportunity to discuss the position of his course in the context of the rest of the course such as computer graphics, project management or image rights. Through these interactions, the ergonomics tutor had the idea of integrating in his course, students' productions on computer graphics. He uses posters as examples for interacting and discussion with students.

The intention associated to this help is a didactic modulation. The teacher adapts his course on the perception area treated by students in the computer classes. He creates a link between discipline and training.

6. Discussions

The results of this study allow the definition of help as creative because of the deviation the students make of resources available. This deviation occurs following one or more function(s), one or more benefit(s) and one or more consequence(s). Firstly, each of the five helps is associated with a particular function:

- Helps 1 and 3: acquisition of knowledge in the field of ergonomics,
- Help 2: students' interactions tracking
- Help 4: assessment of acquired knowledge and discussion in relation to it by students,
- Help 5: the design of pedagogical activities.

Then, the average deviation of help is defined by the benefit it brings:

- Help 1, 2, 3 and 4: saving time in the completion of the activity,
- Help 3, 4 and 5: adapting to student audience,

Finally, the diversion of a tool may have consequences, such as:

- Help 1: misunderstanding of the concepts presented,
- Help 3: limitation of the amount of information given
- Help 4: cannot be taken exhaustively into account. Other means must complete the observations
- Help 5: requires an investment from the teacher, tacking into account training in which the course fits.

7. Conclusion

This article was aimed at presenting the results of an exploratory study which focused on defining a model of helps existing in online training courses. We characterize the concept of help as (i) coming from a learning problem that teachers encounter (helps 3, 4 and 5) and/or which students (helps 1 and 2) have to cope with, (ii) appearing at a particular time (reactive and proactive help), (iii) linked to an intention (piloting, weaving and / or modulating) and (iiii) implementing a design process (content and form of teaching helps).

The discussion from this study reveals the concept of "creative help" as the deviation of a communication tool that have a function, a benefit and consequences. Thus far, we have reached only the premises from our results. We now wish to explore other teaching situations, other disciplines, other training and other platforms to validate this model more generally.

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