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The characteristics of the activity generated in a forum type informatics setting

Las características de la actividad generada en un escenario informático tipo foro

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Abstract

This research (Trujillo, 2004) analyses situations of exchange of arguments, questions, synthesis and other types of contribution within an instrument that has a "forum" type design used in a partial distance / partial face-to-face course on Bioclimatic Architecture. The objective was to identify and understand didactic aspects that should be used in a forum type technological mediation so that a group of students could interact with the purpose of constructing a significant knowledge with respect to a learning object.

The results showed that at the beginning of the forum, the questions asked were essentially of an explorative nature in order to determine what the exact objective was. By the end more historical feedback was being received and there was more verification and relating of the different interventions. Interventions on regulation predominated, mainly between teacher and students, and to a much lesser extent between the students themselves. It was also shown that the processes of student interaction were very teacher-orientated and essentially tended to respond to the proposals guided by the teacher intervention. However, there were plenty of contributions that were indirectly stimulated by the other interventions.

1. OBJECTIVE

To identify and understand the necessary didactic aspects that should be used in a technological informatics mediation, so that a group of students can *interact* with the purpose of constructing a significant knowledge.

2. CONTEXT

The information analyzed came from 13 fourth year undergraduates studying Architecture who participated in a virtual forum on Bioclimatic Architecture for a period of two months, following an intensive face-to-face session of one week (9 hours a day). The virtual forum was accompanied by the course teacher, another architect (as tutor) and the writer of the research as an observer/researcher.

3. GUIDING MODEL FOR THE EXCHANGE OF ARGUMENTS

The use of ICTs frequently reproduces traditional models of teaching/learning, based on the view that providing information is the fundamental variable for learning. But with teaching models based on the social construction of knowledge, the function of this type of tool should be much more orientated towards the genesis of knowledge through processes of interaction between people.

In order to produce this type of situation in this research, processes of interaction were designed around actions of an argumentative nature. These actions were implemented through forums that were measured by information technology. The model for the debate was taken from workshops undertaken in the face-to-face context and guidance was given into order to help the students construct positions organized into categories or hierarchies. The intention of the argumentative construction was for the participants to build knowledge through the exchange of questions, replies, justifications, comparison of ideas and regulation, validated around the guidance of the teacher.

The purpose was also to generate *self-awareness* on the part of the students of how to manage the *categories* during the process of argumentative exchange. In this case the aim was to understand the *principles* surrounding the *operation* of attributing a category to the action executed (for example, the type of justification used to support the argument or counter-argument) and to observe what meaning was attributed (valuation) to each argumentative construction.

Likewise, the schemes of interaction were limited to the principles of Scardamalia (2002), with the support of the teacher and organized around:

(1) The necessary actions for expressing, asking about, explaining or sharing ideas. These includes

- Checking unlikely ideas.
- Proposing different types of additional ideas.
- Suggesting possible courses of action for surmounting the initial proposals.
- Recognizing and establishing theoretical (epistemological) reference points to explain and support the arguments.
- Generating influence through the contributions.
- Using authorized sources in a constructive way.
- Undertaking continuous actions of verification and control in order to reaffirm and transform the contributions to the interventions.

(2) The important units of support relating to the task, amongst others, the type of design, organization or instruction (direct or indirect), included:

- Dealing with real ideas and authentic problems.
- Generating community knowledge under collective responsibility.
- Assuring that the knowledge was acquired and handled in a democratic way.
- Developing knowledge in a symmetric way amongst the members of the group.
- Achieving a significant discursive construction of knowledge.

4. CONSTRUCTION OF THE INDICATORS

In order to construct the indicators, guidelines were designed for the analysis of the data around three core elements:

- The dimensions of the Activity Theory.
- The types of interaction.
- Characteristics of the learning *activity* in context, where the *forum* intervened with the different actors (learner, teacher, other students, context, the subjects of the context, and the different relations between the knowledge object with the context and the subjects of the context).

In order to obtain indicators for the first core element of our research we looked at what Jorba et al. (1997) observed with regard to the Activity Theory namely, that the mechanisms that lead to the self-construction of knowledge require agreements to be reached in aspects such as:

- The clarity of the problem, recognizing where it applies, where it leads to and some idea of the possible solutions (diagnostic evaluation + representation of the objectives).
- The plan (in stages), for approaching *the solution*, accepted as possible to execute by the members of the group (moving from what is known towards what is to be learned and the agreement on where to begin and what point to reach at each stage).
- The execution of the plan, continually verifying (controlling) whether the actions that are executed provide a structure for the solution of the problem (relation and restructuring of the known concepts with the new concepts).
- The development of processes of feedback in order to make corrections and to ensure approximation to the solution. That is to say, to assure that the evaluation criteria that are going to be used are shared, in order to regulate the application and generalization of what is learned in the partial solution of the current stage, with respect to what is hoped to learn in the following stage.

– The coordination of the linking together of the stages defined in the plan until reaching the end in a self-regulated and successful manner.

In order to obtain indicators for the second core element in our research we followed the models suggested by Gómez (1998) in order to configure the climate for good interaction. He proposes beginning by giving particular attention to the characteristics of *individual* feeling and meaning, in order to then attend to the processes of negotiation, management of the comprehension of the meanings and the theoretical reference points that support the argumentative construction of the *shared* concepts and interpretations. This should be done so as to form a common base in the climate of interaction around the references, materials, contents, signs and codes that are represented and exchanged.

Therefore, the *collective construction* of meaning (through an academic learning object) was established in the management of interactions *contextualized* to the classroom dialogue. As Crook suggests (1996), the purpose of this was to facilitate, amongst others things, the interpretation, comprehension and projection of the knowledge amongst the participating subjects. This situation provided reactions of intervention towards the construction of knowledge, maintained and organized around the solution of the problem.

The linking together of the argument, although it made reference to the immediate actions at that moment, maintained links and incremental complementary with respect to other participations (*reasonings*) and contributed during the different time sequences in which joint activity was carried out (historically accumulated). The reasoning and analysis of common knowledge was observed through shared knowledge, motivated and orientated by the specific purpose put forward as the *objective* with respect to the object of study.

In order to obtain indicators for the third core element in our research, we took an interest on identifying the different relations that arose from the mediations from and for a socio-cultural context amongst the learners, the teacher/s and the learning objects. We considered that the learning activity ought to be guided through necessary coordination so that the group of participants responsibly assumed the progressive and collective appropriation of the formative instruments (tools, codes, etc.), the mental operations (discrimination, comparison, deduction, synthesis, etc.) and the theoretical contents of the study object within the specific (cultural) context of study (Crook, 1996; Wertsch, 1995).

Achieving coherence in the justifications of the arguments corresponded with the evolutionary creation of the shared knowledge. The arguments of the discussion were orientated towards presenting the *possible* sustaining elements in formal theoretical principles in order to establish a certain level of reflexive self-awareness, conceptual knowledge and capacity for strategic management in the attainment of the proposed objectives. At the same time it was orientated towards the construction of empathy amongst the participants (putting oneself in the place of somebody else in order to communicate with that person). The points that characterized the construction of shared knowledge were based on the proposals of Crook (1996):

– *Articulation*, which is obtained when making public and explicit the justification of the thinking, organized and interpreted to the benefit of the joint activity. The idea of one participant served to create or recreate that of another.
– *Conflict*, which arises from the discursive disagreements in the justification and the efforts to resolve them. This requires processes of cognitive re-reflection and restructuring. This action has a direct impact on the processes of change and conceptual *articulation*.
– *Joint construction*, or the construction of jointly constructed cognition in the articulation and linking together of the arguments in the course of the exchange of texts orientated by collective reflection.

In order to establish specific supports for research purposes, it was necessary to plan (with greater clarity) how it was anticipated that the information technology would provide mediation in order to foster the construction of relations between the different agents and members of the community, and how to foster the coordination of agreements in the evolution of the process of formation/acquisition of knowledge. In order to achieve this a model of relations was formulated based on the recommendations of Engeström (1987). This was represented as a macro triangle of exchange between *individual learner/ knowledge object/context.*

In this macro triangle the following systems of relations were identified that demonstrate the tensions managed through different mediators (Figure 1):

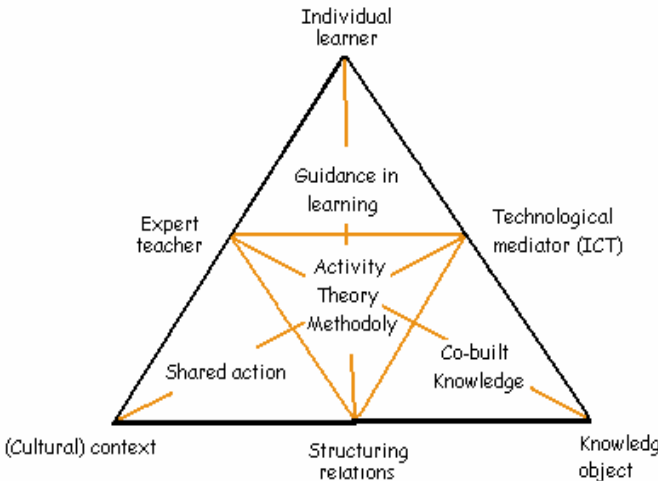

Figure 1 Tensions through the different mediators

– *Individual learner*, who relates to a *context*, and the tensions that are generated are relieved with the help of a *teaching expert* who gives guidance on the cultural requirements through the design and orientation of the learning that takes place with the individual learner.
– *Individual learner*, who relates with a *learning object*, and approximation *measured by the technological*

instrument that promotes access to information and encourages verification and regulation of points of view through stimulating processes of exchange between all the participants.

- *Knowledge object*, who relates with the *context*, whose tensions are stabilized with the definition of some "rules of the game" or "*structuring relations"*, the purpose of which are to abstract the interpretive keys that make it possible to recognize the usefulness of this knowledge object in the social context referred to.
- *Individual learner*, who relates with these *structuring relations* that enable her/him to approach the solution of the "activity" through relations between the knowledge object and the applied context. This relation allows the individual to be aware, on the one hand, of the usefulness of the abstract knowledge object in the social context referred to and, on the other hand, of his potential for analyzing and explaining different realities.
- *Expert teacher*, who relates with the *knowledge object*, for whom tasks need to be planned that, bearing in mind the potential of the technological instrument, promote a significant learning "activity" in relation to the knowledge object.
- *Context*, which relates with the *technological mediator*, in order to promote and stimulate actions of cooperation between the participants with the purpose of fostering the construction of the knowledge object by the individual learner.

This macro triangle is in turn shaped by the inter-relations between a number of micro triangles that make reference to:

- A first triad formed by *technological mediator/structuring relations/knowledge object, which* puts into relief the need for concrete actions between these three poles, and between other poles of verification, hierarchy, synthesis and regulation, in order to generate a jointly-constructed knowledge.
- A second triad formed by *expert teacher/structuring relations/context*, which expresses the need to form a participative action that promotes the development of the capacity to autonomously apply the "structuring relations" in relevant contexts. In the institutionalization of this participative action the expert teacher has a very important function when she/he exercises his specific role within the structure of the relations that are generated, although this function can also be jointly exercised by other people (for example, family members or other experts) who can intervene during the "activity" measured by the informatics tool.
- A third triad formed by, *individual learner/technological mediator/teaching expert*, which expresses the need for *guidance in learning* which, in this case, is generated through the inter-relation between the guidance that the expert teacher promotes, the functioning of the technological tool itself, and the representation that the learner constructs, which in turn has to be regulated through the mediation of the two poles.
- A fourth triad formed by *expert teacher/technological mediator/structuring relations*, which forms the framework through which the "activity" is methodologically structured, and through which it must be possible to promote in an inter-related manner:
  - The use of strategies conducive to guiding the learning of the individual learner.
  - The participation of the different social actors that support processes of education from diverse contexts of application.
  - Communication in order to promote processes of joint construction of knowledge.

Using this model of relations we focus on the core element of *technological mediator* and we construct, from this point of view, the following five indicators in order to evaluate the third core element of our research:

1. To reconcile the tensions between the individual learner and the knowledge object through facilitating and promoting relations between the concepts that form part of this knowledge object.
2. To reference and attend in an explicit way to the demands and requirements of the socio-cultural context through supporting the execution of relevant actions in relation to the means.
3. To stimulate the establishment of coherent attitudes orientated to developing motivation and interest towards the learning object.
4. To establish relations of classification around the knowledge objects and the actions that are executed around these objects, using clear hierarchies.
5. To promote interaction between the individuals in a way that forms a conscious environment of interaction, stimulating the individual construction of knowledge through collective construction.

As a result of combining the three core elements, the guide in figure 2 was reached. From this the strategies for analysis used in the research were produced.

Guide of combinations to elaborate the analysis strategy			
Interaction types with the ICT mediation / **Dimension of the *Activity***	(**C1 -** Contribution that it doesn't respond to a requested intervention and it doesn't demand answer). What promotes the instrument by itself in the individual learner.	(**C2 –** Formative interaction oriented by the teacher). What promotes the teacher through the mediation of the instrument in the learners.	(**C3 –** Requested interaction that demands answer or that is answered). What it is promoted through the interaction among the subject with the mediation of the instrument.
D1 - To introduce a concept or discussion for the first time to negotiate the construction of a representation, accompanied by a share of the objectives, their reasons and intentions.	**Specific indicators** **P1 –** To reconcile the tensions between the individual learner and the knowledge object through facilitating and promoting relations between the concepts that form part of this knowledge object.		
D2 - To place an additional argument to a discursive thread already existent in order to negotiate processes of thinking, advancing, projecting and planning the action.	**P2 -** To reference and attend in an explicit way to the demands and requirements of the socio-cultural context through supporting the execution of relevant actions in relation to the means.		
D3 - To carry out or to execute, in a structured way, relationships among concepts, making synthesis and generating thematic cohesion or generalization of the partial results toward the final achievement.	**P3 -** To stimulate the establishment of coherent attitudes orientated to developing motivation and interest towards the learning object.		
D4 - To outline procedures or mechanisms to reinforce, to show different options of the pertinent thing, to correct and to reorient starting from regulation approaches and control in front of that expressed by the activity.	**P4 -** To establish relations of classification around the knowledge objects and the actions that are executed around these objects, using clear hierarchies. **P5 -** To promote inter-action between the individuals in a way that forms a conscious environment of inter-action, stimulating the individual construction of knowledge through collective construction.		

Figure 2

5. CONCLUSIONS

An analysis of the information arising from the cross-section of indicators has enabled us to achieve a better understanding concerning the possible function of information technology in the process of supporting more significant learning constructions. The conclusions reached were drawn up in accordance with the following characteristics for each indicator:

1. Principal strategies that facilitate the tool
2. Problems detected and possible limitations
3. Recommendations, changes and strategies to be implemented

INDICATOR I *Are the tensions between the individual learner and the knowledge objective reconciled through facilitating and promoting relations with the concepts (implicit or explicit) present in this knowledge object*?

1. Facilitating strategies:
- Suggest exploratory questions in order to ensure that the purpose of the activity is understood.
- To examine and motivate other views (about other relations and settings).
- Historical feedback. Linking together and regrouping in relation to the ideas that are introduced and sustained by group consensus.
- To request clarification or to expand the reasoning (students and/or teacher), establishing processes of control over the meanings and their relevance in context.

2. Problems detected and possible limitations:
- The interventions still remain focused on the teacher and there is little construction (interaction) between the students without the intervention (validation) of the teacher.

3. Recommendations, changes and strategies to be implemented:
- To ensure that the objectives and rules of the game are shared. To stimulate the construction of representations, agreed by consensus, for each process to be developed in the forum.
- To promote the inter-relation of ideas amongst the students and the structuring of structure action plans before implementing them.
- To generate 'tempos' of discussion and or sub-groups in order to specify processes of comprehension and relations with respect to specific topics.

INDICATOR II *Is reference made and attention given in an explicit way to the demands and requirements of the socio-cultural context through providing support to the execution of the relevant actions using real and valid information*?

1. Facilitating strategies:
- To provide many examples (expressed in context).
- To check the data. To corroborate, check or reinterpret the reasoning itself using the historical information.
- To identify tendencies (to generalize). To look for and recognize the regularities that become apparent during the exchange.

2. Problems detected and possible limitations:
- Limited tendency to historical checking and validation. There is a tendency to consider that it is only necessary to respond to what has been directly requested.
- Tendency to respond only to what is requested by the teacher concerning the task, without assuming processes in an autonomous manner.

3. Recommendations, changes and strategies to be implemented:

– To widen the examples and data with support materials. To share materials, references and experiences, provided both by the teacher and by the students themselves, as far as possible in order to provide options outside the academic context.
– To remind the student of the need to base the arguments on real data. To check the accuracy of the data.
– To promote the identification of the regularities that appear in the construction of the arguments in relation to the contextual requirements.

INDICATOR III *Does it stimulate a coherent attitude towards the acquisition of relations that are motivated by, and of interest to, the learning object*?

1. Facilitating strategies (although there was little use of them):
– The teacher can stimulate motivation and minimize individual anxiety.
– The participation of colleagues stimulates others. This situation was corroborated when the interventions were monitored in detail. It was detected that just over half of them were interventions which, although they were not direct replies, did make partial reference to a previous contribution to the construction of reasoning.

2. Problems detected and possible limitations (in this case):
– This was an optional course with a high level of participation in the face-to-face course and the virtual action took place immediately after the face-to-face action. It was therefore presupposed that it would not be necessary to stimulate motivation. Nevertheless, the process of participation progressed very slowly and timidly during the first half of the process.

3. Recommendations, changes and strategies to be implemented:
– To promote a line of discussion on motivation, with respect to the comprehension of the study object.
– To make the interests and values explicit. Recognition of the learning objectives themselves.

INDICATOR IV *Are the relations of classification around the learning objects and the actions that are executed around these objects established, using clear hierarchies?*

1. Facilitating strategies:
– To qualify and arrange data in a structured way (with too much dependence on teacher guidance in the case studied).
– To relate data and to evaluate the references and reasonings used (sporadically in the case studied).
– To relate interventions (sporadically in the case studied).

2. Problems detected and possible limitations (in this case):
– There was little autonomous construction of hierarchies and structures.
– Use was not made of instruments of synthesis, for example graphs and diagrams, to facilitate the visualization of the concepts, their relations and hierarchies.
– The regulation was very teacher focused, around the categories suggested and the relation suggested with respect to other structures.

3. Recommendations, changes and strategies to be implemented
– To define 'tempos' for the different actions to be carried out: comparing, relating, justifying, summarizing or synthesizing in a collective way.
– To generate collective criteria in order to evaluate the arguments and reasoning to be presented.

INDICATOR V: *Does it provoke interaction between the individuals in a way that forms an environment of conscious interaction, promoting the individual construction of knowledge through collective construction?*

1. Facilitating strategies:
– To compare points of view and to generate actions of self-regulation or control.
– To reach opinions or ideas by consensus during the processes of execution of the *activity*.

2. Problems detected and possible limitations:
– Failure to recognize colleagues as valid peers for effecting processes of joint evaluation and regulation.

3. Recommendations, changes and strategies to be implemented.
– To dedicate time to the validation of contributions amongst colleagues (cooperatively).
– To stimulate relation of the contributions to other colleagues before they are shared.
– To agree evaluation criteria.

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