

# Open Distance Learning in Higher Educational Systems: A Technological Approach Within a Social Constructivistic Perspective.

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## ABSTRACT

The aim of this paper is to provide an argument material in order to open up a discussion concerning educational and technological strategies within the field of distance education. I would like to argue for the flexible learning within the social constructivistic perspective. Within this context the crucial question is: How should we generate various educational alternatives within the distance educational system? It has been argued that there is a need for alternatives within the system, i.e., a [social] constructivistic approach where we include cultural and other demographical aspects. In this regard we have to deal with the participant's standpoint and in the same time we need to be familiar with the public debate regarding the usage of modern technology. It is therefore crucial to reach all groups in the community and thus a flexibility in the system is required.

In the field of computer supported collaborative learning (CSCL) the best typifications are where the exploration of the new possibilities is represented by the emerging technologies. In such work, there is a desire to build learning environments to support a range of distributed cognitive work, i.e., communities of learners, conceptual learning conversations, and knowledge building communities. Instructional designers are in the initial stages of exploring the commonalities and discontinuities between the varieties of CSCL activities.

**Keywords:** Technology, ICT, CAI, ITS, Distance Education, Constructivism and Epistemology.

## 1. INTRODUCTION

Teaching is a process of conveying ideas to students. Good teaching means, mostly, more effective communication between learners. The prerequisite has been due to the fact that because teachers "maybe" have studied ideas longer, they understand them better and are therefore better able to communicate them. Other requirements, which are important to control, are that the strategies and methods we use are empirically based and validated.

Whatever, the level of distance education or teaching organization, many factors make teaching a distance education course different from teaching in a traditional classroom. When using the technology tools the material should be developed from a good point of learning theo-

ries. For example see figure 1. When choosing a paradigm or a direction "maybe" we need to consider selecting a theory about learning, or more explicit, a theory connected to open distance learning [1-3]. We can also take into consideration cultural and ethical aspects, between different countries, in this paradigm discourse. For example, in Sweden we are using some aspects of open-ended strategies within the higher educational system. I am not convinced that other countries doing this in the same extension. Furthermore, if we wish to develop open global learning environments, we should also take these approaches (the cultural- and the ethical aspects) in to consideration [4].

Designing a learning environment begins by trying identify to what is to be learned and reciprocal the real world situations in which the activity occurs [3, 5]. When designing a course we need to consider several related aspects. For example, first we need to be clear in specifying our objectives. Secondly, we need to structure the modules of presentation with attractive design. The language should be appropriate and clearly defined and there must be an option for variety of questions and feedback [3, 6-8]. These aspects are crucial, since they are involved in assessing student's participation in these courses. However, we need to be conscious about which aspects are suitable tools for these assessments.

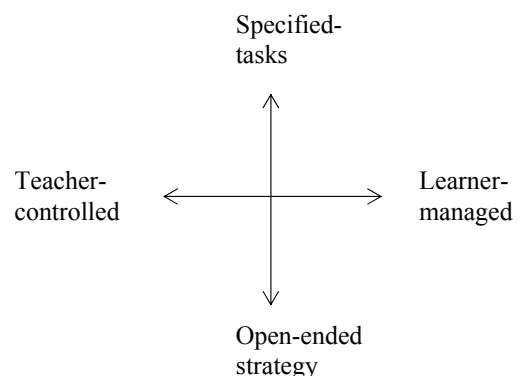


Figure 1. Paradigm web concerning teaching on-line, adapted from M. Coomey and J. Stephenson, 2001, p. 41, [9].

- Teacher-controlled learning concerning specified learning activities.
- Learner-managed learning concerning open-ended learning.

### Information- and communications technology

Information- and communications technology (ICT) provides us with a better prerequisite for open distance learning. Maybe a better word is flexible learning [3]. In this constructivistic approach the education would be considered as communication between people in terms of problem solving issues. In this context, in the future, the educational approach would be more learning- than teaching based. The new generations ICT-tools have been developing by considering new prerequisite for the new type of learning environment. For example, we can use the ICT-tools in a traditional educational situation, in campus environments, as well as in distance education [10]. Furthermore, we probably are going to use an automatic e-learning system, the fifth generation of distance education<sup>1</sup>, a form of intelligent tutoring system (ITS). In this context, the role of the instructor would be reduced.

I would like to say concerning this form of tutoring systems that we can compare ITS with a very sophisticated form of computer assisted instruction (CAI). If this paradigm can get our acknowledgment is another issue. Sometimes we referred to an intelligent computer assisted instructions when we argue for intelligent tutoring systems. Intelligent tutoring systems are not new phenomena it has the origin from the 80<sup>th</sup> and where developed throughout by artificial intelligence (AI).

By introducing the fifth generation of an intelligent flexible learning model into a meaningful conceptual learning framework, it might be worthwhile to review briefly certain features of the previous generation of distance education. One issue that might be of interest to discuss is whether a student should be given an answer directly through the computer instead of through an instructor. I am however not convinced that this would be the right way to develop the distance education and the scope of this paper is beyond this issue.

Further, we must be carefully when we implement the above mentioned psychological approaches in a design phase concerning distance education. Although the behaviourists maintain that knowledge may be derived

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<sup>1</sup> Distance educational operations have evolved through the following four generations: first, the Correspondence Model based on print technology; second, the Multi-media Model, based on print, audio and video technologies; third, the Telelearning Model based on applications of telecommunications technologies to provide opportunities for synchronous communication; and fourth, the Flexible Learning Model based on on-line delivery via Internet [11].

through the conditioned process for Skinner's learning machine [12] or Bandura's social learning processing, within the process of learning environments [13] have we feel dubious about the conversation. Throughout the 70<sup>th</sup> and much of the 80<sup>th</sup>, the most prominent form of CAI where drill and practice programs [14, 15].

CAI represents learning from computers where the computer is programmed to teach the student directly. Furthermore, this instruction technique was concentrated towards mathematical problems. Drills were based on behaviouristic beliefs about the reinforcement of the stimulus-response activity. A question I would like to discuss is: are we going to a more behaviouristic approach in this form of learning environments there computers been using as artefacts?

A possible answer could be that the sophisticated system we wish to develop is very expensive and therefore not so easy to do the way we desire. A largely university has other possibilities of having a system there a high level to distribute all kinds of learning material is possibly, i.e., streaming video, interactive web based material and high collaboration between the students. If you do not have an economically framework to develop or bye large distance education system, you must be pleased over systems as not are so collaboratively. The constructors or team of learning systems have a large challenge to develop good systems to reasonable costs.

We can still see several Web-platforms using behaviouristic ideas about knowledge construction. Naturally, we have more sophisticated ideas about behaviouristic learning methods within our era. The controls of learning processes are still within the teacher's area. If we wish to change this context the designers must think in other ways and open up for more "non traditional environments" (for example, open learning communities, computer supported collaborative learning environments and computer supported cooperative works environments).

## 2. CONSTRUCTIVISTIC APPROACH

The constructivism has its roots in the Italian philosopher Gimbattista Vico (17<sup>th</sup> century) e.g., [16, 17] and, of course, Immanuel Kant's synthesis of rationalism and empiricism, e.g., [18] where it is noted that the subject has no direct access to external reality, and can only develop knowledge by using fundamental in-built cognitive principles (categories) to organize experience. One of the first psychologists to develop constructivism was Jean Piaget, who developed a theory (genetic epistemology) of the different cognitive stages through which a child passes while building up a model of the world, e.g., [19].

Student- and learner centered environments provide interactive, complementary activities that enable individuals to address unique learning interests, and needs, to study multiple levels of complexity and to deepen under-

standing, e.g., in case-, project-, and PBL methodology. Fundamental issues have arisen related to the kinds of learning such environmental support, how to design them and whether or not designs can be generalized across varied domains in contexts [20].

A constructivistic model concerning a distance educational system requires, not always but mostly, collaboration between students. For example, open discussions are voluntarily among the participants and we must try to open up for these discussions. Furthermore the students' mentalities are crucial for a good learning environment. We should also create structures so that the groups open up for cooperation. Constructivistic epistemology assumes that learners construct their own knowledge on the basis of interaction with their environment. Four epistemological assumptions are essential for what we refer to as "constructivistic learning" [21].

### Epistemological assumptions

- Knowledge is *physically* constructed by learners who are involved in active learning.
- Knowledge is *symbolically* constructed by learners who are making their own representations of action.
- Knowledge is *socially* constructed by learners who convey their experience making to others.
- Knowledge is *theoretically* constructed by learners who try to explain things they don't completely understand.

Providing a new situation in an educational system requires more flexibility. This suggests that they (i.e., the Universities, Universities Colleges, and other educational establishments) should be able to create a more flexible atmosphere. Thus they need to attract the students and newly emerged groups; those who were earlier lacking the possibilities of education, particularly within the university environment. The management of distance education institutions and the administration of programs is a complex issue [4]. At institutional and governmental levels there is need for new policies to support the development of distance educational programs, units, institutions, and other consortia, and there is also need for procedures to make such policies [3, 22, 23].

The constructivistic view, can be helpful in creating a meaningful learning environment and is necessarily in order to engage oneself in a different kind of thinking [16, 17, 21]. From this follows that, we must consider the ways that we teach and the ways that educators could use the technology to engage students, in order to achieve the objectives, especially within the distance educational system [22, 24]. Furthermore, the student should have the possibility of studying independent of time and space. Another important aspect of this viewpoint is that stu-

dents should be able to control their process of learning [25].

The student, from her/his own experience will be able to construct her/his own knowledge. Thus, a student should be able to teach himself, what he or she would wish to learn (the content) and the way in which this should be accomplished (the method). We have now noticed an overwhelming interest among the researchers concerning pragmatic approach of a constructivistic viewpoint, particularly in the area of flexible learning. This means that a flexibility should also be taken into consideration concerning the aspects of instructional design technique when the courses or materials are being developed. Furthermore, we need to find models for how the techniques (ICT) could be implicated when the courses and the materials are distributed on-line.

In this discourse, the constructivistic view, I am mainly focusing on David Jonassen's (Pennsylvania State University) research [26-29]. Jonassen explicitly discussed the relevance of constructivistic approach in learning. For example, the structure of a learning process is explicitly connected to theoretical foundations of learning environments [20]. According to Jonassen, the process is as follows: when learners articulate what they have learned and reflect on the processes and decisions that were entailed by the process, they understand more and better, and are able to use their constructed knowledge in new situations.

Jonassen's model (figure 2) explains the requirements for the interactions within the field of meaningful learning.

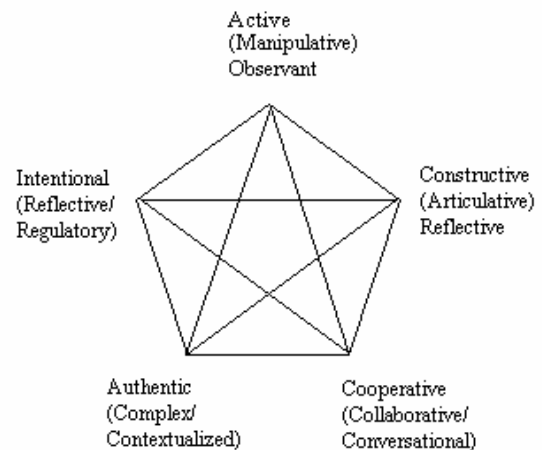


Figure 2. Five attributes of meaningful learning which are interdependent, adapted from D. H. Jonassen, K. L. Peck, and B. G. Wilson, 1999, p. 8, [24].

It is evident that learning is a complicated process, which contains many interacting ingredients. Within this process

we focus on five characteristic attributes in terms of meaningful learning, see also [30, 31].

The notion of an active learner originates from the work of John Dewey [32, 33] who advocated for learning by doing. Learning is a natural, adaptive human process. Real learning requires active learners, people engaged by a meaningful task in which they manipulate objects and the environment in which they are working. Michael Moore (Pennsylvania State University) advocates following: The first key strategy is to identify the innovators in the organization, the small number of people who exist at every level who are interested in change. These people, if we can find them, should be helped with money, time, and external assistance to organize themselves, to develop a consensus of ideas and strategies for developing education in the organization [3], p. 193. Even if I like the statement, I don't agree.

A good idea is to try to find "these" people in the "open" market. We need to find people from, eg., architectures of information systems, systems programming educational environments, and bring them in to the pedagogical education's area [34, 35]. Clearly, I mean why we should identify people who are interested when we can find instructional designers in the area, mentioned above, see for example, [4, 36].

According to Dewey, the key to meaningful learning is ownership of soluble the problem or a learning goal. It is important to present learners with interesting, relevant and engaging problems to be able to solve and these problems should be ill-structured. Sometimes, the students know that ordinary textbook problems or on-line material are prescriptive and well-structured and therefore have little reason or desire to solve them. Then we have ill-structured problems meaning that some aspects of it are obvious.

Activity is a necessary component but not sufficient for constructive meaningful learning. Learners must reflect on their activity and observations to learn the lesson that their activity is supposed to teach. For example, new experiences often provide a discrepancy between what learners observe and what they understand. This means, which I mentioned above, that the student from his/her own experience is able to construct the knowledge. Thus, a student should be able to teach himself, what he or she would wish to learn and the way in which this should be accomplished [37].

All animals, including human beings, interact with their environment and learn about their world through those interactions in order to fulfill a goal. The activity theory focuses on the purposeful actions that are realized through conscious intentions and before intentions are manifest in action in the real world, they are planned [38]. For example, technology based learning systems might require learners to articulate what they are doing,

the decisions they make, the strategies they use, and the answers that they found [39]. A great deal of recent research has shown that learning tasks that are situated in an authentic meaningful real-world task or simulated in case-, project-, and [or] PBL environments are not only better understood, but are also more consistently transferred to new situations [27, 40].

Collaboration mostly requires conversation among participants. Learners should be accountable for their own knowledge, so even if you agree with the collaborative learning principles, the hardest part of applying for your beliefs will be assessing learners. I discussed above the creation of structures where the groups open up for collaboration. In this respect, we are to consider the assignments created together within the group. I am convinced that the collaboration in groups should be a way to have better control over the dropouts in the system.

Furthermore, as we could establish before, the interaction and collaboration are explicitly focused in this model (figure 2). In this context, where the knowledge of the context is transferred to the student, we need to be aware of the following: Using a constructivistic model in the distance educational system, we require cooperation among participants. Furthermore, we need to be more aware of how and in what way these structures or modules are created. It is however important to remember that we must be aware of prerequisites of an environment where the cognitive structures of the process of learning are growing.

Thus, the constructivistic perspective needs these characteristic aspects in order to generate the knowledge within the learning activities. Together with these perspectives we need to crystallize a better technology and a greater cost-effectiveness as well [41]. For example, the fixed costs of a distance educational system tend to be higher than those of the conventional university, while the variable or direct cost per student usually is lower. And of course, in distance education, the more students take the course, the lower the average cost of the course. For more discussion around costs and economical frameworks; see, [41-43]. I am convinced that this economical point will play a major role in our academic renewal at the beginning of the 21<sup>st</sup> century.

### 3. CONCLUSIONS

To conclude, first, the [social] constructivistic theory provides a different view of analyzing learning processes and outcomes for the purpose of designing instructions. Rather than focusing on knowledge content, it focuses on the activities in which people are engaged, i.e., the social and contextual relationship among the collaborators in those activities, the goals and intentions and the objects or outcomes of those activities; e.g., [24, 44, 45].

Secondly, I would argue for the student's "rights." For example, in what ways will technology facilitate or inhibit learning processes?

- Will the student be a more active designer and participant in the learning process?
- Will technology permit new forms of learning?
- How can I get students to work effectively in non-traditional classroom environments?
- How will new technological environments affect the social aspects of learning?
- Do we need new approaches to assess these effects?

Finally, a meaningful learning might be created when technologies engage learners in these structures. Furthermore, with the ICT-tools, we could create good opportunities to transmit these structures within the distance educational system. On the other hand, good teaching cannot be reduced to technique and technological innovations. The professional skill comes from the identity, integrity, and good knowledge of the teacher or the instructor. When the ICT is to be used in a more extended approach within distance learning environments, we should also take into consideration the above mentioned viewpoint.

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