International Journal of Business, Human and Social Sciences
ISSN: 2517-9411
Vol:6, No:5, 2012

Interaction at a Distance – An Approach for Redesigning for Distance Education

Martin Henkel

***Abstract*—**Different forms of interaction are an integral part of modern courses. Traditional courses held on-campus might focus on teacher-student interaction, or student-student interaction, or both. However when these traditional on-campus courses are to be held as distance courses there is a risk that these well-designed interactions will be difficult or impossible to uphold. For example, student-student interaction in traditional project assignments might not work well if the students are scattered across the world. Thus, even a well-designed traditional on-site course cannot without modification be turned into a distance course. Traditional on-site courses simply have to be redesigned to become true distance courses. This paper describes a structured approach which facilitates the redesign of a traditional course into a distance course. The approach is based on that the desired forms of course flexibility are identified, and thereafter that the course activities are redesigned to facilitate interaction in a distance course. The approach is making use of known patterns of pedagogic interaction and existing guidelines for distance education design. The approach is illustrated with an example course in the field of information systems design.

***Keywords*—**Distance education, interaction in education, course design.

I. Introduction

THE flexibility that distance education can offer provides many opportunities, but can also create problems if a distance course is not designed carefully. Flexibilitycan for example be that students can participate even though they have daytime jobs. However this flexibility might mean that the distance education course cannot be based on synchronous communication, such as traditional lectures. Furthermore, distance education can mean that physical meetings are not possible or desirable. Distance education simply affects the interaction between teachers and students and the interaction between students. Not considering how distance education affects the way a course is designed can of course lead to problems. For example, it is pointed out that on-line meetings might not be very efficient, compared to traditional meetings, for lettings student know each other before a project is started [1]. Teachers engaged in distance education need to have problems like this in mind. There are many existing university-level courses that are well-designed. However, most of these are created for a traditional learning at university campuses. When moving to distance education these courses need to be partly redesigned.

Martin Henkel is with the Department of Computer and Systems Sciences, Stockholm University, Forum 100, SE-16440, Kista, (e-mail: martinh@dsv.su.se).

This paper provides a structured approach on how traditionalcourses can be redesigned into distance courses. The purpose with the approach is to facilitate the transition from traditional educationinto distance education.

The approach presented in this paper is based on the concepts of flexibility and interaction. Flexibility can be seen as the goal of redesigning a course into a distance education format. Flexibility can be expressed as temporal and spatial flexibility (this will be more discussed in Section 3). Different types of interaction, for example, between teachers and students and between students, provide a basis for analysing the problems that might arise from distance education. An example of the interaction is a group discussion, which is usually easier to implement in a physical meeting than at a distance. To structure the analysis of interaction Moore's [2] basic forms of interaction is used as an integral part of the approach (this will be more described in Section 4).

There exist guidelines for how distance education courses should be designed. Of the many guidelines available, however few exists that focuses on the differences between traditional and distance education. For examplein [3]and [4] there are lists of guidelines that should be adhered to in when designing distance courses. These guidelines particularly highlight the importance of clear goals, frequent feedback and teacher support. However, few of the guidelines are specific to distance courses, they rather stresses the importance of anoverall good course design. Moreover there is a lack of guidance when it comes to the redesign of traditional courses into distance courses. The approach presented in this paper directly target guidelines for distance education by being grounded in the concepts of temporal and spatial flexibility that are the core of distance education. Furthermore.the approach structures existing guidelines so that they can be applied to distance course design in a stepwise manner.

The intent is that the approach presented in this paper should be generic, that is, it should be possible to apply to any course. However to exemplify its use it is applied to a course in software engineering. The course being used as an example is the course "Model-driven development of components", held at the Department of Computer and System Sciences at Stockholm University. The course is briefly introduced in the example box.

Example:
The course ”Model-driven development of components” is a 7,5 ECTS credit course taught on the master-level. The goal of the course is to let the students develop the skills needed to describe, design and develop component and service oriented software systems. As a theoretical foundation principles for system design and model-driven development are being used. A simplified list of activities on the course is:

- Lectures within the area of software design and model-driven development.
- A set of smaller exercises in the areas of model-driven development and system development.
- A project assignment divided into two parts where a system is designed (part 1) and implemented (part 2). The project assignment is performed in groups of 4-5 students.

II. Overview of the Approach

To support course redesign the approach presented in this paper is divided into two simple steps: 1) select the desired level of flexibility for the course, 2) adjust the course activities. To cater to different types of interaction forms that can exist on courses Step 2 are further broken down into three sub steps.The steps of the approach are described briefly below and in more detail in the following sections.

Step 1 - Select flexibility level.In this step the desired flexibility of the course is selected in terms of temporal and spatial flexibility. This is further described in Section 3.

Step 2-Activity redesign based on interaction and flexibility. In this step the course activities are adjusted/redesigned to that they follow the desired flexibilities selected in Step 1. Some activities of a traditional course can also be used in a distance course, others need to be adjusted. Central to the adjustment/redesign is the task's interactivity. For example, activities with a high degree of interactivity between teacher and student is difficult, but not impossible, to implement in a distance course. To accommodate different types of interaction this step is subdivided into: 2.1 Teacher-student interaction redesign, Step2.2 Student-student interaction redesign, Step2.3 Student-content interaction redesign. These steps are further described in Section 4-7.

III. Step 1 - Selecting Flexibility

Central to distance education is increased flexibility. A part of this flexibility is the flexibility in both time and space [5]. A distance education course is simply a course that, for the most part, offers temporal and spatial flexibility. Although the goal of distance education is flexibility it does not mean that all distance education courses have complete flexibility. An example of limited flexibility is that even a distance course can have a requirement to conduct a written examination in a particular place, or to participate in online discussions during a certain timeframe. It is interesting to note that Anderson [6] points out that it is temporal flexibility, rather than spatial flexibility that attracts students to take distance courses. Furthermore, it is clear that there is disagreement about if flexibility is generally beneficial for student learning, various studies comes to different conclusions [7]. In the remainder of this section we discuss forms of spatial and temporal flexibility.

Temporal flexibility can be given in various forms. The most frequently discussed in the literature is the use of synchronous or asynchronous communication.

Asynchronous communication, for example by e-mail and discussion forums, gives students a greater opportunity for reflection, while synchronous communication provides motivation and helps to shape a common understanding [1]. Temporal flexibility can also be about the attention span needed to follow the course. One example is that an exercise, or recorded lecture, may require attention for 30 minutes, while another activity requires several hours. A simple way to discern the attention span is to examine how large “blocks” a course consists of, each block being a separate activity that the students does. Smaller block size gives greater flexibility, because it is easier to fit into an otherwise full schedule for a student. Another form of (temporal) flexibility is whether or not a course begins and ends at fixed dates, or if the start and end is “rolling”. Rolling start & end times means that the student can start and finish the course whenever they like. Here, it appears that a higher proportion of students complete a course if the starting and ending time are fixed.

Spatial flexibility may vary by offering all or parts of a distance course to be taken without any physical meetings. There are examples of courses where the bulk of the course work consists of activities which can be carried out remotely, and with a few activities that should be performed at a certain place. The degree of spatial flexibility can thus be determined by the number of physical meetings in a course. The forms of flexibility in a distance education course in accordance with the above arguments are summarized in Table I.

TABLE I
FORMS OF FLEXIBILITY

Form	*Inflexible*	*Flexible*
Spatial	Several physical meetings	No physical meetings
Temporal – Communication	Synchronous	Asynchronous
Temporal – Block size	Hours, days	Minutes
Temporal – Course start and end	Fixed start and end	Rolling start and end

Example:Step 1 - choosing flexibility.
One of the key elements in redesigning the course "Model-driven development of components" to a distance course is to be able to give it to international students. This places very high demands on flexibility. For example, to require student to travel from Pakistan to Sweden to attend an exam is not possible. To have synchronous communication with students in different time zones can also be difficult. This requires great flexibility in time and space. The course is relatively small, about 50-70 students per season, it is therefore not considered to be appropriate to have a rolling start and end time. This would require too many resources of teachers, while the number of students who complete the course would probably be lower (see above).
Given the above, *full spatial and temporal flexibility* is selected, with the exception that the course is going to be offered during a certain period each year. The choice of flexibility in this case means no physical meetings, asynchronous communication, and small block sizes.

A first step in redesigning a traditional course to a distance course is to choose degree of flexibility. Greater flexibility provides greater opportunity for students work or is located in another country to follow the course. However, increasedflexibility do not appeal to all students. A survey showed that of those who drop out of distance courses, half was dissatisfied with not being able to meet other students (i.e., flexibility in space), while the other half of the drop outs were unhappy about the activities that were not tied to a certain physical space [5].

IV. Step 2 - Interaction Forms in Distance Education

There arepedagogic theories that view the interaction between students and teachers and between students themselves as a prerequisite for effective education. Among these theories are socio-cultural learning and collaborative learning [8]. These two theories are based on that discussionsare an important part of building knowledge. Historically, however, interaction has been difficult to achieve in distance education. For example, [9] describes the problem of using distributed printed materials and the use of printed mail correspondence, as these offers little opportunity for interaction. Further evidence that interaction are importantfor distance education is that Moore [10]put forward the development of interactive telecommunications as the most important developments in distance education.

In the transition from a traditional course to a distance course it is important to be aware that the increased flexibility (place / time) could be achieved at the expense of interaction. It is simply more difficult for students and teachers to interact separated in time and space. In the transition to distance education it is therefore important to analyze what form of interaction a course contains. A basis for such an analysiscan be Moore's [2]forms of interaction (see Figure 1), which are also described in [11]. It is worth noting that Moore [10], in addition to teacher-student and student-student interaction also includes students' interaction with course content. This student-content interaction can for examplebe that the student shapes their own image of an area by reading course material, writing assignments, or searching for information.

The three types of interaction (teacher-student, student-student and student-content) have proven to have different effects on student achievement at the end of a distance course. In [11] a survey of existing empirical studies in the field is presented. The best effect for student performance was if a distance course had well-designed support for student-content interaction, followed by student-student and finally teacher-student interaction. Parallels can be drawn to [12], where a discussion is presented on the effect of teachers' participation in discussions, pointing out that the main role the teacher has is to ensure that the discussion is started by providing a starting point. The higher effect of student-content interaction as compared to teacher-student should not be seen as a marginalization of the role of the teacher. After all, it is the teacher who designs the context and form of the more effective student-content interaction.

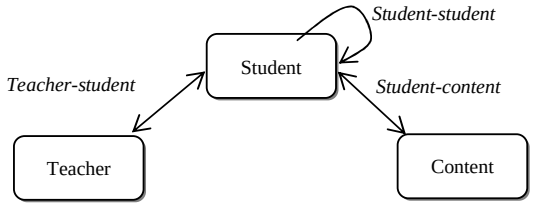

Fig. 1 Forms of interaction, simplified from Anderson [6]

As mentioned earlier, the flexibility of distance courses affects the interaction in a course. In order to provide a basis for a transition to distance education, it is therefore important to examine which types of interaction that are being used on a course, and how these can be supported in a distance course. As noted by Anderson [13] the different interaction forms can partially replace each other, which can facilitate the transition to distance education. In the following sections it is briefly discussed how the flexibility in a distance course can affect each of the interaction types. Furthermore, for each type of interaction a set of *guidelines* that aids the redesign of course activities are presented. The discussion of interaction and course flexibility is based on spatial and temporal flexibility as presented in Step 1 of the approach, while the guidelines are anchored in research in distance education.

Example: Step 2.1 Teacher-Student Interaction.
The course activities on the course ”Model-driven development of components” are to a large extent based on teacher-student interaction. Considering the high level of teacher-student interaction on the course, all of the above stated guidelines should be considered. This for example entails doing the following redesign of course activities:

- The project assignment should be divided into smaller assignments (guideline divide long activities into short).The assignment now consist of two parts, but for a distance course 4-5 parts should be developed. For example, the graphical models created during the current first part could be divided into two assignments. The guideline increase the level of student self-regulation could also be applied to the project assignment. A possible way to do this would be to let the students do web-based self-assessments where they assess how well their assignment adheres to a set of quality criterias.

- Currently, the lectures are far too long (2*45 minutes) to be flexible enough on a distance course. Instead of these long lectures increased focus could be put on student-content interaction (guideline convert teacher-student interaction activities into student-content interaction). In order to perform this shift of focus to student-content interaction new forms of content need to be produced. For example, currently the student follows a design method that is partially documented in the course literature; some of the more detailed information about the method is given during lectures. To cut down on the lectures the method could be elaborated in an article that the student can read themselves. Sections of the method that are difficult to understand could be demonstrated during short (10-15 minutes) video-clips that the student can watch via their mobile phones.

The course currently got a well-functioning case study, a fictitious company, this should be kept in accordance with the guideline have a *common thread across the course*. Moreover the guideline *provide opportunities for teacher-student interaction* is currently followed by frequently pointing out that the teachers are available via mail if help is needed, there are also scheduled hours where the teachers are online.

V. Step 2.1 - Teacher-Student Interaction

Teacher-student interaction might occur to a different degree in different course activities.One example of an activity with student-teacher interaction are large classroom lectures. In this example it can be argued that it is a risk that the interaction becomes a one-way interaction. Further examples, with increasing focus on two-way interaction, can be various forms of discussion-based seminars.

How to redesign a course activity when transitioning to distance education depends on the selected level of flexibility. For example, given that only spatial flexibility is desired, simple live video streaming can used for both lectures and various seminars. Temporalflexibility in the form of *asynchronous communication* can be achieved by recording lectures, and to conduct discussions in online forums. Temporal flexibility in *block size* can be achieved by dividing lectures in smaller pieces, such as 15-minute blocks. If the course should achieve at least a certain minimum degree of flexibilitychangingactivities like this is required.

In the remainder of this section a list of guidelines that aid the redesign of activities that contain teacher-student interaction is presented. These guidelines can be selectively implemented to address problems that teacher-student interaction at a distance can cause:

Increase the level of student self-regulation. When frequent contacts with the teacher, or other student are missing, there is an increasing need for the student to use appropriate studying approaches and to perform self-assessment of their current knowledge level. Nicol [14] refers to this as “self-regulated learning”. One example of the use of self-assessment is to provide on-line questionnaires that automatically can be graded. This is also in line with the desire to increase the temporal and spatial flexibility, as the questionnaire can be utilised at any point in time, at any location. The use of automatically graded questionnaires for distance education is also one of the recommendations put forward in [4].

Divide long activities into short. To achieve maximum flexibility it is beneficial to use short activities (15 minutes) rather than longer ones (hours). Short activities makes it possible for the student to perform them when time is available to them, for example when traveling home from work on the subway, or when there a few minutes left before going into bed at night. Something to be aware of when replacing longer activities with short ones is that the course might be fragmented. This could make it difficult for the student to see how all activities fit together. To counter this, it can be beneficial to provide a common thread/scenario across the course (see separate guideline below), and to provide clear instructions at the course start on how the course activities are interlinked.

Have a common thread across the course. When increasing the spatial and temporal flexibility on a course the course activities will increasingly complete with other activities that draws the student attention. It is therefore advisable that each activity have a clear position in the course, this makes is easier for the student to quickly come back to the course after shorter (hours) or longer (weeks) interruptions. Brown [15] points out that a common realistic case scenario in a course can increase student motivation. Furthermore, it has been shown that having a clear sequence of course activities raises the number of students that passes a distance education course [16].

Example: Step 2.2 Student-Student Interaction.
The course "Model-driven development of components" currently contains student-student interaction primarily in the form of project work, which is done in groups of 4-5 students. This group work can be problematic in a distance course. To remedy this there is two alternative redesigns discussed below:

1. Keep the group work, but to facilitate student-student interaction. This can be done by directly after the course start let the groups do a small group assignment, to let the student get acquainted (guideline *Make sure that all students are "up to speed" before starting group assignments*). To aid the group work on the larger project assignment the student could also be assigned different roles, this would make it clear what is expected of each group and each student (guideline *Provide a starting point for interaction).* Note that this way of assigning roles are going against the *Avoid coordination if cooperation is the purpose* guideline. However in this course it can be argued that coordination is desirable, since it reflects integration issues arising in the industry.
2. Replace group work with student-content interaction. This entails cutting down the project assignment and let it be an individual assignment rather than a group assignment. This might lead to increased requirements for supervision and might put higher requirement on the content that is available, since student will not coach each other in the project assignment. Something that point in favor of this alternative is that distance courses that focus on student-content interaction have higher student performance, compared to courses that focus on student-student interaction [11].

To provide a common thread is more important when redesigning the course activities into smaller blocks – that is, when the temporal flexibility increases.

Convert teacher-student interaction activities into student-content interaction. Something to consider when doing a redesign is to gain flexibility by moving from teacher-student interaction to student-content interaction. For example, a lecture could be exchanged into a short video introduction and reading instructions for the course literature. In this case, it should not be forgotten that a benefit with lectures is that they are also a part of increasing student motivation [11]. This benefit could be lost when redesigning activities into activities with student-content interaction. Something that could counter this would be to make use of on-line assessment questions for the activities.

Provide opportunities for teacher-student interaction. It should be possible for the student to contact the teacher and to engage in a discussion, even though the teacher-student interaction might not be the main interaction form on a distance course. This guideline is based on the discussion referred to in [11], where it is shown that the *possibility* for student-teacher interaction is important for student satisfaction, even though the student-teacher interaction is not used. The importance of student support is also put forward in [17] as an important issue when designing distance courses.

VI. Step 2.2 - Student-Student Interaction

In traditional courses, student-student interaction can be in the form of group work, different forms of peer assessment and, for example, voluntarily formed study groups. Just as for the teacher-student interaction the student-student interaction can be complicated in a distance course that provides spatial and temporal flexibility. It's easy to assume that students have a great ability to adapt to each other, and work synchronously in groups. However, justthat students are in different time zones, or that they work day / night can quickly complicate the student-student interaction. The problem here cannot be fully compared to that found in teacher-student interaction. In a teacher-student interaction, both teacher and student have a certain defined (if implicit) role, which sets a framework for interaction. These roles can make distance communication easier. These roles are not given when students that are unknown to each other begins to communicate. Additional examples of problems with student-student interaction is that direct, synchronous, communication makes it easier for students when they need get to know each other and to perform planning of the tasks shall be undertaken [1]. This is in clear contrast to distance education where asynchronous communication is better from a flexibility standpoint.Below is a set of guidelines that can help redesigning course activities that rely on student-student interaction.

Make sure that all students are "up to speed" before starting group assignments. An important part of getting student-student interaction to work is to make sure that students feel comfortable with the technologyand that they feel that they can contribute to the discussions. Something that helps students to get up to speed when it comes to the used technology is to first perform some simple exercises using the distance technology to be used during the course. Salmon [19] uses a five-step model to get students to go from "distance novices" to actively work together in groups. Noteworthy is that two of these five steps is "online socialization" and "access and motivation", that is, to let the student get to know each other and the technology. Of a five-week distance learning course, these two steps should occupythe first two weeks of time [19]. Clearly, this start-up time should not be underestimated. Salmon [18]gives as a recommendation to first make an initial estimate of the start-up time, and then double it to get a realistic value.

If full flexibility is not required, create geographical student groups. To facilitate physical meeting the students could be divided into groups based on their geographical location. The advantage of having physical meeting, for example in the beginning of the course, is to cut down on the start-up time discussed earlier.

Example: *Step 2.3 Student-Content Interaction*.
In the course "Model-driven development of components" there is a need to formalize the content. As mentioned earlier, a method is used on the course which is only partially documented in the literature, the rest is given during lectures. This method needs to be documented in accordance with the guideline *formalize the content*. Moreover, the course utilizes advanced software tools that are installed in the department's computer rooms. These software programs can be complex, and not all students have the computer equipment to run them from home. Here the guideline *make use of simulations* could be applied to create virtual machines running on the departments servers. The students could then log into these virtual machines and install software in them, even from a simple home computer.

In [19] there is an example that shows that the startup time can be greatly reduced, from two week to one, by arranging a few physical meetings in the beginning of a distance course.

Encourage discussion, but do not require participation[3]. Involuntary participation can lead to artificial discussions, especially if the student needs to fulfill quantitative requirements such as "participate in the online discussion with at least three messages".With this type of course requirements it is easy to focus on grades rather than learning. Note that there are also advocates for the opposite, that the participation should be included as a part of the grade [18].

Provide a starting point for interaction. Besides a clear goal with an activity, the teacher should also providea starting point for student-student interaction. In[19] this starting point is referred to as a spark that ignites the work, in[20]there is a similar concept referred to as "scaffolding". The aim of sparks and scaffolding is the same, to give a direction tothe work the student should do together. This should not be seen as providing students with a rigorous task list to follow, there should be room for both ideas and mistakes [20].

Avoid coordination if cooperation is the purpose. There is a threshold associated with student-student interaction over a distance, for student it might be tempting divide an assignment into pieces done by a single student and then compile a final hand-in from the pieces. If this style of working is not the purpose of the activity, which it may very well be, for example, courses in project management or integration of any kind, the activity should be redesigned. This redesign can be done by making it more difficult to divide the task, or simply make it more interesting to work together. If you cannot, from a student perspective, explain why a task should be solved together with other students the activity may have to be redesigned [19]. An example of more radical redesign is to change from student-student interaction to student-content.

VII. Step 2.3 - Student-Content Interaction

Of the three types of interaction considered in this paper student-content is the most likely to pose the least concern when redesigning course activities for the move to distance education. The usual textbooks, study questions, etc. just works the same way as in traditional education.Redesign can be done to accommodate smaller block size (refer to the teacher-student interaction guidelines). One problem is however obvious: the contents of a course that is of sheer physical nature might cause problems when spatial and temporal flexibility is desired.

This could be problematic in some domains, for example, medical education, where access to patients may be central [21]. Another example is geological excursions where access to certain physical locations is crucial. The following guidelines can be followed to improve the student-content interaction in the transition to distance education:

Make use of simulations. As stated earlier, it might be difficult to get the full flexibility if the content is restricted spatially. One possibility is to let students interact with content through a simulation, or "virtualization" of the content. This can for example be carried out by having chemical experiments be simulated in a computer program, to keep virtual art exhibitions, etc.

Formalize the content. In traditional teaching, some of the content might be difficult to understand for the students alone, and thus the contents are explained through teacher-student interaction. For example, there can be lectures in which key concepts in the literature are problematized and explained. However, there is a risk that this supplement to the literature is forgotten during the transition to distance education. One possible measure to overcome this is to insert comments directly in the content (such as annotations to online literature).

VIII. Conclusion

Few traditional courses can be converted into a distance courses without redesign. The difference between traditional and distance education is simply too large. The differences highlighted in this paper are based on that a distance course should offer more *flexibility* than a traditional course. This flexibility comes in the form of temporal and spatial flexibility. This flexibility comes at a price - and that is its effect on the interaction between teachers and students and between students. To counter this effect, the guidelines for redesign presented in this paper can be applied.

In this paper the focus has been on general design principles, and design principles concerning interaction. However,there are other important areas that should be considered in the transition to distance education. One area not discussed in this paper is the economy. Each guideline presented in this paper represents an investment in the redesign of a course. This investment should be weighed against the benefit that redesign result in, and also against alternatives. Another important area is the issues of plagiarism and student authentication. When students are neither spatially nor temporally tied to the course it may be difficult to know

who does what. For example, to provide a degree without proper student authentication may ultimately cause significant damage to the university's credibility. Converting a traditional education to distance education requires work in terms of redesign of existing courses. The approach presented in this paper is an initial step to provide guidelines for this redesign.

REFERENCES

[1] Hrastinski, S., "Nätbaserad utbildning en introduktion," ISBN: 9789144053240, Studentlitteratur, 2009.
[2] Moore, M., "Three Types of Interaction," Editorial, *The american journal of distance education*,Vol.3,No2, 1989.
[3] Grandzol, J., R., Grandzol, C., J., "Best Practices for Online Business Education," *International Review of Research in Open and Distance Learning*, ISSN: 1492-3831, Vol.7, No. 1, 2006.
[4] Swan, K.,"Learning effectiveness: What the research tells us," In J. Bourne and J. C. Moore (eds.) *Elements of Quality Online Education: Practice and direction*, pp. 13-45, Needham, MA, Sloan, 2003.
[5] Waddoups , G., Howell , S.,"Bringing Online Learning to Campus: The Hybridization of Teaching and Learning at Brigham Young University,"*International Review of Research in Open and Distance Learning*, ISSN: 1492-3831, Vol. 2, No. 2, 2002.
[6] Anderson, T., "Towards a Theory of On-line Learning, Towards a theory of online learning," Anderson, in T. (eds.) *The Theory and Practice of Online Learning*, AU Press, Athabasca University, pp. 45–74, 2008.
[7] Shachar, M., "Meta-Analysis: The preferred method of choice for the assessment of distance learning quality factors,"*International Review of Research in Open and Distance Learning*, ISSN: 1492-3831, Vol.9, No. 3, 2008.
[8] Laurillard, D., "The Pedagogical Challenges to Collaborative Technologies,"*Journal of Computer-Supported Collaborative Learning*, Springer, Vol. 4, pp. 5-20, 2009.
[9] McKee, T., "Thirty Years of Distance Education: Personal Reflections,"*International Review of Research in Open and Distance Learning*, ISSN: 1492-3831,Vol.11, No. 2, 2010.
[10] Moore, M., "Theory of transactional distance," In Keegan, D. (eds) Theoretical Principles of Distance Education, Routledge publishing, pp. 22-38, 1997.
[11] Bernard, R., Abrami, P., Borokhovski, E., Wade, A., Tamim, R., Surkes, M., Bethel, E., "A Meta-Analysis of Three Types of Interaction Treatments in Distance Education," In *Review of Educational Research*, Vol. 79, No. 3, pp. 1243–1289, 2009.
[12] Dysthe, O., "Dialogperspektiv på elektroniska diskussioner," in Dysthe, O. (eds) *Dialog, samspel och lärande*, Studentlitteratur, pp. 295–319, 2003.
[13] Anderson, T., "Getting the Mix Right Again: An Updated and Theoretical Rationale for Interaction,"*International Review of Research in Open and Distance Learning*. Vol.4, No. 2, ISSN: 1492-3831, 2003.
[14] Nicol, D., Macfarlane-Dick, D., "Formative Assessment and Self-regulated Learning: a Model and Seven Principles of Good Feedback Practice,"*Studies in Higher Education*, Vol. 31, Iss 2, pp. 119-218, 2006.
[15] Brown, A., Voltz, B., "Elements of Effective e-Learning Design,"*The International Review of Research in Open and Distance Learning*, Vol. 6, No. 1, ISSN: 1492-3831, 2005.
[16] Wettergren G., Hansson, H. Ekenberg, L., "A model for Mega online courses: Development, implementation and evaluation of an effective large scale online learning course," Proceedings of *International Council for Open and Distance Education* (ICDE'08), 2008.
[17] Endean, M.,"Learning Materials at a Distance," In Baillie, C., and Burton, L., *Learning materials science and engineering at a distance*, The UK Centre for Materials Education, 2003.
[18] Salmon, G., "E-moderating: The Key to Teaching and Learning Online,"Routledge publishing, ISBN: 978-0415335447, 2004.
[19] Salmon, G., "E-tivities: the Key to Active Online Learning,"Routledge publishing, ISBN: 978-0749436865, 2002.
[20] PLANET,The Pattern Language Network, http://patternlanguagenetwork.myxwiki.org, Accessed 1 March 2012.
[21] Trindade, A., R., Carmo, H., Bidarra, J., "Current Developments and Best Practice in Open and Distance Learning,"*International Review of Research in Open and Distance Learning*, ISSN: 1492-3831, Vol.1, No. 1, 2000.