

Paper presented at the [conference BITE](#), March 25 - 27, 1998 in Maastricht, The Netherlands

Design of a group oriented, virtual learning environment

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Summary

This paper presents the design and implementation of a group oriented, decentralised, virtual learning settings where students meet in groups of 3 –5 people at different locations all over the world and communicate via the internet. After presenting the objective of such a didactical design the paper gives an insight into the technical implementation. It presents the advantages and disadvantages of several internet services in such a virtual setting and a way of combining these internet applications according to their special characteristics. While the role of teachers change to those of coordinators the communication process within and between the groups becomes more important – as discussed in the following chapter. The paper concludes with the presentation of two practical applications as offered by the Institute for Didactics and Economics at the Johann Wolfgang Goethe-University Frankfurt/Main (Germany) and some evaluating remarks.

Introduction

One major potential of applying internet in the area of education lies in its connectivity: internet allows to connect teachers and students from all parts of a country or even of the world in a common seminar, a lecture, or a tutorial. The Institute for Didactics and Economics at the Johann Wolfgang Goethe-University Frankfurt/Main in Germany applies distributed learning settings in order to offer seminars accross several German and Southamerican universities. One major objective of our didactical modell is that learning takes place in group processes. In the applied setting students work in groups at each location where they get support by local coordinators and enter into a communication and learning process with groups at other universities.

Objectives

The functionality of the internet allows that a seminar is offered by one university to students at other parts of the world. This supports an international aspect of learning: students of one university can practise their language abilities by communicating with students from other countries through the internet. The contact with foreign students can take place in a discussion or a role play in a virtual seminar session. The contact with other cultures opens the students' minds for other point of views such as cultural aspects and national differences. Also it increases their awareness for the need of learning another language and it may stimulate their interest in an international exchange programm.

The interdisciplinary aspect is supported when virtual seminars are offered by teachers of several different majors or specialisations: the application of various disciplinary methods and models on one topic increases the sensitivity of students for how to handled scientific results and how to approach problems from different points of view. This improves their problem

solving abilities more than just one disciplinary educational programm.

Learning and working within groups provides the students the opportunity to trains their team competence and communication skills. Therefore in our modell a major part of the individual learning process takes place within the local student groups. Besides cooperation they learn how to distribute and coordinate working assignments among themselves.

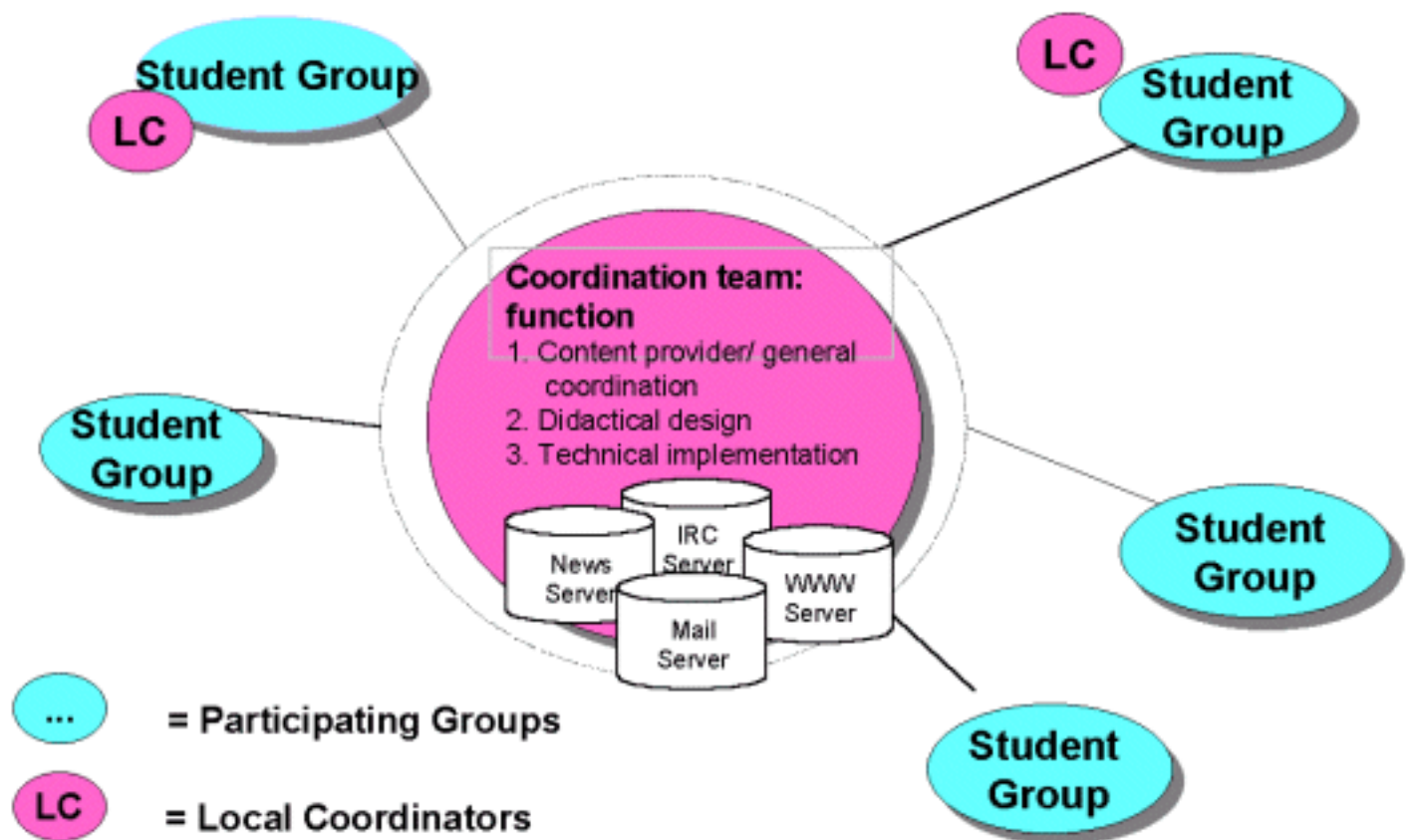
The communication process among the groups via internet provides the students with a decentralised, cooperative working experience. The students will be prepared for new forms of working arrangements as they can be found more and more in practice - especially in international organisations.

On an individual level the didactical concept we apply supports an exploring way of learning. The local teachers or coordinators have rather the function of supporting the students than those of lecturers. In a project phase the students work on a topic which they have chosen. They do research, collect material, prepare a paper or another form of documentation and conclude with a final presentation. In an ideal setting the students work cooperatively via the internet on one topic across the institutional boundaries: they exchange data material and write a common project paper via internet with somebody sitting in another city or even another country.

Implementation

The virtual tutorials and the virtual seminar which have been offered by the Institute for Didactics and Economics at the Johann Wolfgang Goethe-University in Frankfurt, Germany had a local coordination team in Frankfurt and decentralised students groups either around Frankfurt (tutorials) or at other universities in Germany and Southamerica. The following picture provides an overview over the technical implementation of the educational setting:

Geographical Distribution of Roles and Functions



Picture 1

The local coordination team has the following functions:

- content provider
- didactical design
- technical implementation and coordination

The content provider function includes the general design of the seminar or tutorial, the provision of material and exercises, the design of each of the single sessions, and the support of the students with feedback, tutoring and so on.

The didactical design is a major challenge in these kinds of virtual seminars. After the decision upon the content of the seminar and each single session the didactical design has to take into consideration the special form of decentralised group work. Here lies one of the main problems in many internet based educational settings: an inappropriate or poorly designed didactical method can prevent the attainment of the learning objective.

The third centralised function is the technical implementation: based on the functionality of the four internet services newsgroup, IRC, email, and World Wide Web the appropriate didactical design can be implemented. The range and possibilities within the didactical design is strongly based on the available technical equipment and its functionalities.

One precondition should be stressed at this point: concerning the usage of technical services it was the major objective to keep the necessary equipment of the students at a minimum. In settings where students participate in the virtual sessions with their home computer the minimum technical requirement should be kept as low as possible in order to avoid major technical discrimination. In settings where international student groups participate the technical requirements should be adapted to the available technical equipment at these locations.

Concerning the available technical applications it is the challenge for the didactical design to combine these services in an appropriate way according to their special characteristics – as they are described below:

Characteristics and usage of the applied internet services:

Chat is a useful service for synchronous communication. It is appropriate to ask short questions, to announce and discuss time frames, and to assign working exercises. Difficulties arise when chat is used for the exchange of long text elements or when used for a discussion with more than 5 partners. Then a strong need for a coordinator arises whose role is to give permission to chat, to collect virtual handsigns, and to structure the whole discussion process. One advantage of chat is that the very linear discussion allows the fast and efficient exchange of comments on one topic. A major disadvantage lies in exactly this point: the linearity does not allow to follow different courses of the discussion and earlier remarks get forgotten along the discussion process. This can be solved by opening different discussion channels but this also increases the necessity of more coordination.

Email can be used for the exchange of longer text and data material, for example for results of a group session, papers, project work and so on. Advantage of email is that the data exchange can be limited to a circle of addressed people. Its disadvantage is that problems arise when email is used for a discussion: because of time delays between a notice and a comment on it the discussion gets spread over a time interval. Also delivery delays of mail servers can interrupt a discussion process. The discussion can be split up in various threads and it might get difficult to keep it along one major topic.

Newsgroups are an appropriate tool for asynchronous discussion on one or several topics across a certain time frame. Most of the tools which are used for newsgroups support the structure of the discussion by an optical structure. Therefore one advantage lies in a structured discussion and the possibility to stretch the discussion process across time zones and seminar sessions. This allows - as well as email - a certain flexibility concerning the working hours of the participants. One disadvantage - as we observed in our research - is the publicity of newsgroups as perceived by the participants. They rather type an email or discuss in a chat than contribute a message to a newsgroup which is readable by everybody in the internet. One solution can be the implementation of a newsgroup which is only open to the participants of a seminar.

WWW-pages have the advantage that they are very useful for general announcements because they have a certain stability and availability in the internet. They can be looked at when needed and can be accessed unrestricted or restricted by a password. WWW pages are an appropriate tool for the publication of announcements, descriptions, overviews, lists, and

general material such as papers, instructions and so on.

WWW-forms are a very useful instrument to collect standardised information through data entry. They support data collection for a data base as inputs can be preformatted and processed automatically. The so received data can be published via email or on WWW-pages. Forms can also be used as a discussion tool when proper scripts (CGI-bins) are applied. Here the problem lies in the demand for a technically trained person who produces the scripts.

Appropriate media mix for the seminar sessions

All these internet services should be combined in such a way that each one is applied according to its specific characteristics. The resulting seminar setting should consist of synchronous and asynchronous communication parts. Asynchronous communication can inform about the general curriculum, the content of single seminar sessions, can provide material, papers and so on. The synchronous communication part play a major role in ,keeping the whole group together'. Only in the synchronous parts the groups interact more or less directly, communication only with little delay, and get a feeling of ,somebody is there'.

Module	Content	Internet service
Information	Provision of material generally accessible	WWW pages
Communication	One-to-one or or-to-many exchange of information	Email, Chats, Newsgroups
Discussion	Role play	IRC Chats und Newsgroups
Project work	Research, preparation and presentation of a project	Search engines, Emails, ...
Online-Exercises	Exercises for training Results published online	WWW forms, Email
Feedback	Feedback on project work & results of online exercises	Emails, WWW pages
Evaluation	Online evaluation of the seminar	WWW forms

Picture 2

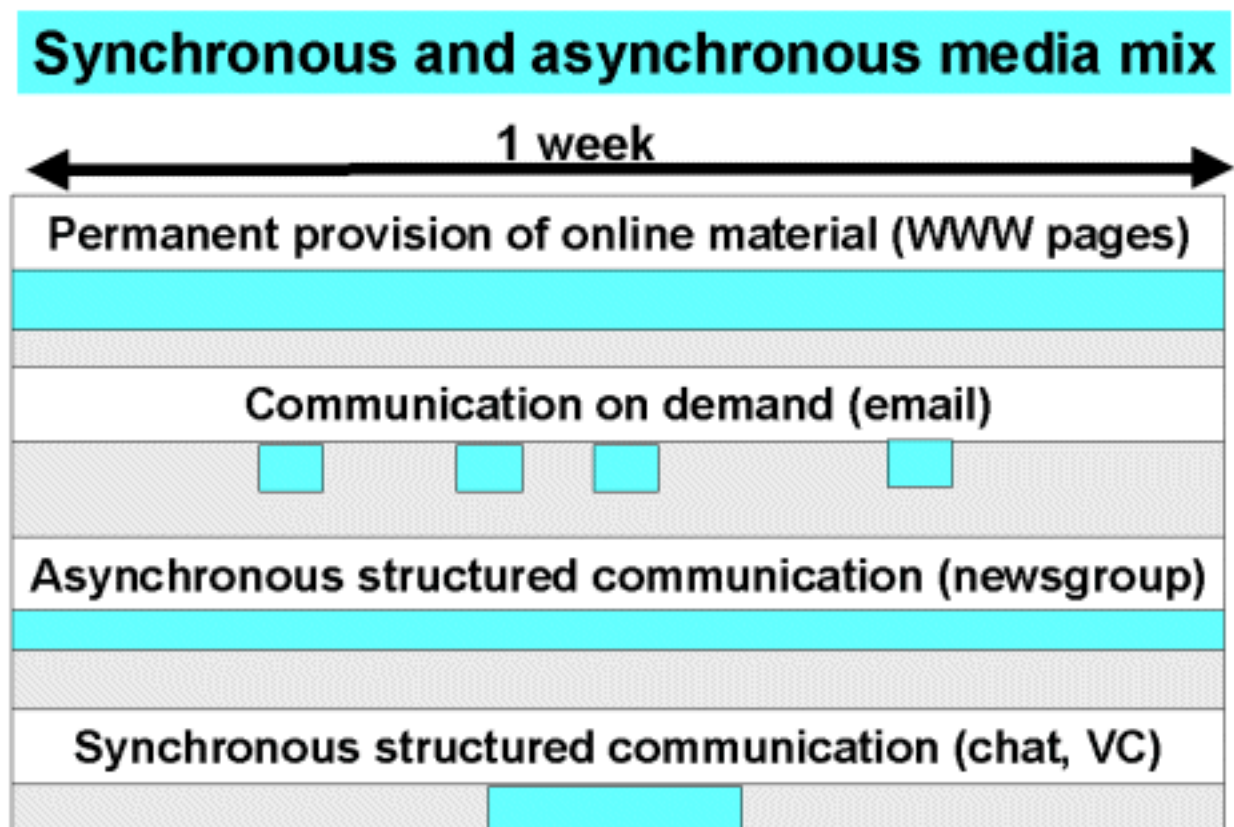
Besides a general asynchronous provision of material in the World Wide Web (WWW) the

synchronous communication between coordinators and groups and among the groups takes place in the virtual sessions.

The asynchronous internet support consists of WWW-pages where material and literature is provided. So the local groups can work at different times on their weekly assignments and send results, questions, comments to their coordinators or the other groups via email, newsgroup, or WWW forms.

In the timely fixed seminar sessions all groups meet virtually on a IRC channel or via audio or video conference. The session is opened by the main coordinator and the participants can ask questions, exchange remarks, and so on. Then the local groups work separately on an assignment till they get back on the IRC channel or a conference tool in order to discuss their group work results with the other groups. Also they might have role plays or discussion or receive further support by the coordinators.

One major advantage of a fixed virtual meeting per week is the perceived connectivity between the decentralised groups. The synchronous communication as for example the exchange of opinions supports the "perception" the existence of the other groups among the participants. It is helpful to support the personalized contacts by pictures of all the participants and groups (homepages) on WWW-pages including personal remarks.



Picture 3

The roles of the coordinators and the groups

In this chapter we take a closer look at the role of the teachers, the groups and the communication process within and between the groups. As mentioned above the learning process within and between the groups has a major function in this didactical design.

Central and local coordinators

In the design presented above in Picture 1 a central coordinating team is responsible for the design of the virtual sessions. This function has been describe as content provider and as responsible for the didactical design and the technical implementation. This team sets up the curriculum, the content of each week's session, the homework assignments, the exercises, the provision of feedback and so on. But what role does the coordinators present within each virtual session? This means: what behavior do the coordinators present towards the students groups in the virtual sessions in order to maximize their learning progress. In our experiences it has been proved to be appropriate for the central coordinators to have more the role of consultants and coordinators than those of teachers or lecturers in order to stimulate learning processes within and between the groups.

Up to now the design includes only one central coordinating team which is responsible for the virtual sessions. But in an international setting or in a seminar setting across universities several local coordinators can be installed at each participating university. They role can vary from just announcing the seminar up to participating the central coordinating team. Mainly the function of the local coordinators is to organize the local student groups, to provide them room, equipment and time frames with online access - if the students do not participate from the own home - and to consult and guide them along the seminar sessions. The local coordinators can also participate in the seminar just as the students and provide their own expertise and knowledge. Or they can design the curriculum and the content of the seminar in cooperation with the central coordinators. According to their special field of interest, their major, or their areas of research the local coordinators can influence the topics of the seminar and its process. It is still advisable to have a central coordinating team which is responsible for the curriculum, which provides a centralised database, and prepares the WWW-pages and sets up the boundaries of the seminar and its single sessions such as start and end of online discussions. But it is also possible to have this role being rotated among the different local coordinators in a cooperative way.

Group work

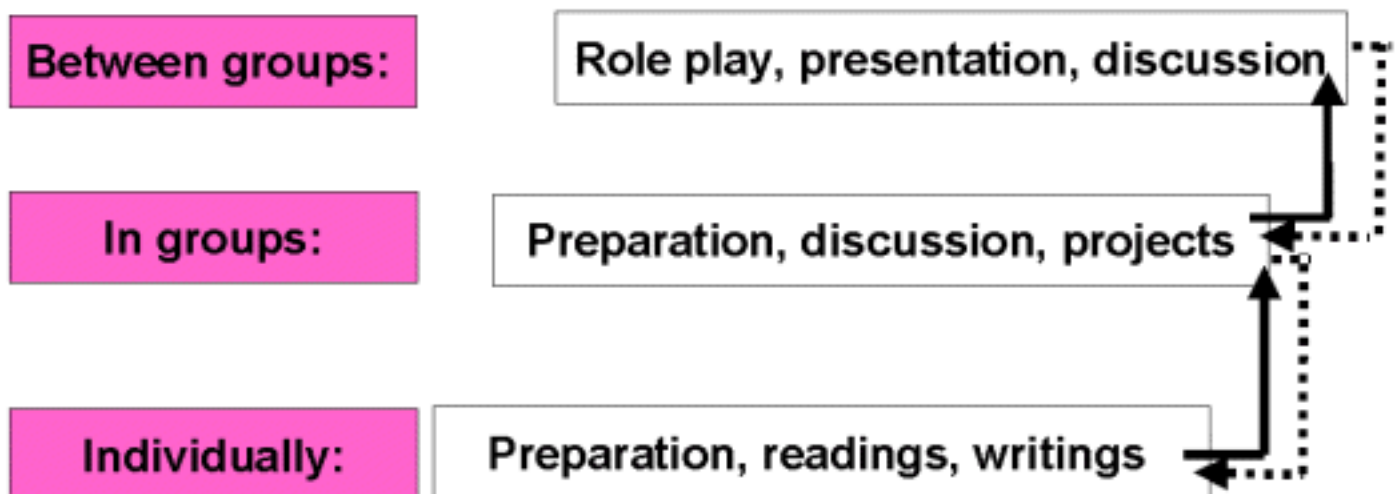
As mentioned before the main objective of this seminar design is to support learning processes within and among groups. Therefore the setting is designed in way to have local groups of 3 - 5 students who are supported by the local coordinators and who communicate with the other groups through the internet. The local groups discuss topics, exchange material, prepare papers and project work, and have role play discussions. The results of their learning process is exchanged with the other groups via email, chat, WWW-pages and forms, and newsgroups. Also audio and video conferencing can be applied if the technical equipment is available and compatible at all the locations.

Communication across groups

Each group presents the results of their own work to the other groups. So each group learns from the others and gets to know their results. The comparison of their own results with those of the other groups supports their assessment of the quality of their work and where they stand within the whole group of participants. A database can be provided where the results are collected in order to provide all results efficiently and well organized. This builds up growing storage of knowledge with material, papers, literature lists which can be made available to these and future learning groups.

Communication across the groups can take place in form of discussions where different aspects and points of views and different results are exchanged. Very useful for the learning process are role plays where each groups takes another point of view or role in a discussion of a common topic. In a second step roles can be swapped and a second discussion round follows. This opens the students mind for different points of view on one topic and deepens their understanding of a problem. In the virtual environment the special advantage lies in the communication of students of different universities, majors, or even nations and cultures. Even without intentionally assigning different roles these differences will come to light. Students learn from different perspectives of offered by other nationalities and majors.

Learning takes place at different levels:



Picture 4

Practical applications

Starting 1997 the Institute for Didactics and Economics at the Johann Wolfgang Goethe-University Frankfurt/Main organized virtual tutorial sessions via internet with students around the University of Frankfurt. Sitting at home in groups of 3 - 5 people they discussed topics among themselves or with the other groups linked via internet. Based on these experiences the institute started the first virtual seminar in October 1997. The virtual seminar linked students and teachers across 4 universities within Germany and Southamerica. Besides 4 groups in Germany a student group in Sao Paulo, Brasil participated as well as a group in Cordoba, Argentina.

Results

Evaluating the advantages and disadvantages of the two virtual educational settings following concluding can be provided: As mentioned before one major advantage is the international aspect of the seminar. The internet supports the communication and cooperation of students across national borders which otherwise would be difficult or cost intensive to implement. But in any case the dicussion process across the decentralised groups: an IRC or newsgroup discussion does not have the same quality as a spoken one. But otherwise the discussion gets more structured, a written protocoll is avabile, and remarks are better formulated.

Surprisingly but understandable is the effect that the virtual seminar gives a better overview over the participation of the groups or individual students. While in a classroom setting some students never get attention the virtual setting instantly allows to overlook which group is participating. But nevertheless it give no insight into the decentralised processes within the groups - except a local coordinator is present who observes this process.

One major effect of virtual seminars is a change in the roles and functions of students and teachers and the relationships between teachers and students and between the students: in the design presented above teachers become cordinators and the students get into a much more active role. One results is that the students have to be taught how to learn without the teacher. But the teachers have to learn their new role, too!

As a concluding remark it should be stressed that a virtual seminar does not copy a face-to-face one in every point but is has potentials and advantages such as the international aspect which direct communication does not have. In order to avoid the isolation and individualisation of single learners the decentralised group work based on internet is a worthwhile alternative.