Combining Traditional And Virtual Teaching Techniques In Cross-Border Higher Education

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Abstract: Our paper describes the important role of virtual education in the process of building a unique cross-border educational environment between Finland and Russia. Against a background of the latest trends in international virtual education, we propose a realistic solution for equal collaboration between two different systems. The final model strives at combining the directly applicable features of both academic sectors into an innovative educational structure that offers attractive study programs and provides a wide range of educational services worldwide.

Keywords: cross-border education, equal partnership, common study programs, semi-virtual course

1. Introduction

The challenging idea of sharing students and courses on a virtual basis through international partnership networks is of widespread interest nowadays (International Institute for Educational Planning 2003, Commonwealth of Learning 2002, Hawkridge 2003b). A recent literature survey (International Association of Universities 2003) shows that the amount of titles published in this area is continuously increasing and that authors are widening the scope from rather technical topics to the institutional or qualitative aspects of these processes. One can find various features of virtual education (in this paper we consider the term virtual education as being a synonym to e-Learning) at many educational levels, starting from individual virtual teaching units, such as lectures, through fully virtual courses and study programs to specialized virtual institutions that deal with education on a commercial basis.

Thompson (2000), Hayes et al. (2001) and Latchman et al. (2001) present the structure and experience from their own experimental virtual courses. Uskov (2000) describes the prototype of a US-Russian Web-based educational project. Miller (2001) reviews and classifies the research hitherto performed into distance education. According to Harper et al. (2000), virtual learning environments should be authentic and support constructivist learning. He illustrates these conclusions using two practical examples. Powers (1999), Heck et al. (2000), Sala (2001) and Hokanson et al. (2000) discuss various combinations of teaching methods and computers. Lee (2001) profiles students' adaptation styles in Web learning. She groups students into model learners, disenchanted learners, fanatic learners and maladaptive learners. Beaudoin (2002) analyses the level and structure of knowledge, obtained through the Internet. Hawkridge (2003a) documents the important role of the education and training of teachers, involved in open and distance learning.

Many universities have their own educational technology centres that cooperate with national coordinators. For example, the Finnish Virtual University (2003) offers and maintains virtual courses provided by local universities. In January 2004, the Finnish Virtual University offered 73 active courses.

Starr (1998) has studied the current trends and future directions in virtual education. For example, she describes the Western Governors University, which is a regional virtual university that was piloted in 1997. She also introduces some design issues for virtual courses and discusses the institutional aspects of future virtual universities. Kullenberg (2002) presents a working model for an international virtual university. The Virtual University of the International Ocean Institute offers a Master's Degree program for students who already hold bachelor-level degrees. Thiriet et al. (2002) describe a European-wide effort to define the core curriculum for electrical and information engineering. Their article also includes student assessments for two experimental courses for students in Denmark or France and Morocco, respectively. A summary, published by the Commonwealth of Learning (2001), collects comprehensive data and case studies concerning the institutional, international and networking aspects of future virtual education.

There are also working cross-border projects, like an "open higher education space" between the border regions of the Netherlands and Germany (Huisman 1998) and the Baltic Sea Virtual Campus (2003) around the Baltic

countries, or a model used at the University of Adelaide (Field 1999).

The Department of Clinical Nursing at the University of Adelaide takes advantage of multimodal learning at their international education project. The students have Internet access to the university library, regular e-mail contact with their coordinator, a chat capability and material on CD-ROM and on the Web. In addition, students have periods of intensive contact teaching. The University of Adelaide sees two major limitations in this kind of co-operation. The first one is students' access to Internet in areas where the telecommunication infrastructure is not up-do-date and the second is the cultural background of the students.

Finland and Russia are countries with different cultural backgrounds, which must, naturally, also influence joint educational activities (O'Loughlin 1992). Numerous related practical findings from other cross-cultural educational projects are already available. The University of North Carolina at Wilmington and the Digital Communities of Japan initiated a virtual university experiment in 1997 (Thompson 2000). Its pilot phase, implemented in 1999, included three courses, four seminars, and a professorial symposium. The whole experiment ended in 2001 and revealed four facts. Firstly, the researchers found collaborative learning to be an efficient technique for virtual education. Secondly, the national differences in semester scheduling caused problems. Thirdly, the Japanese students requested face-to-face interaction with the teacher. Fourthly and finally, these students requested the course material in their native language instead of in English.

Vogel et al. (2001) studied virtual groups from the perspective of the socio-cultural learning theory. The City University of Hong Kong and the Eindhoven University of Technology, Netherlands organized a common course with 73 participants who were divided into 10 multicultural (international) groups. The group members had seven weeks to finish assigned projects and communicated via email, videoconferencing and a Group Support System. The students involved found this kind of collaborative, experimental learning to be a meaningful method. This study, however, identified several cultural-dependent features concerning time management, the establishment of virtual trust and team communication.

Azadegan et al. (2001) also deals with academic international virtual teams. Students from the Towson University (Maryland, USA) and the Evry University (France), formed cross-cultural virtual teams and carried out a software development project. Interaction took place via websites, Internet Relay Chat and email. Although the students were acquainted with collaborative learning and group dynamics, it was finally discovered that the interaction between the team members, as well as their English skills, was not sufficient. Also, Last et al. (2000) reported communication and time-management difficulties in a virtual international study environment, established between Sweden and US universities.

Systematic cooperation with Russia in the area of higher education is one of the priorities of the Ministry of Education of Finland (Ministry of Education of Finland 2001, 2003). Since Lappeenranta University of Technology (LUT) is close to St.Petersburg and has traditionally enjoyed good contacts with universities in St. Petersburg, it was a natural choice to implement this governmental strategy between LUT and universities in St. Petersburg and, subsequently, also in other neighbouring Finnish universities. Our aim was to find a model of mutual virtual cooperation that would be convenient for both Finnish and Russian partners, applicable in the short-term and that would allow Russian teachers to be involved actively. In the following chapters, we present the experience that has been accumulated so far and propose a feasible local solution.

2. Expertise in cross-border and virtual education

Our know-how in the area of international education is based primarily on extensive personal experience with tens of Russians, who have studied and graduated from the International Masters' Program in Information Technology (IMPIT) at LUT since 1999. We collected another portion of this significant knowledge during the continuous development of this program while searching for optimal bilateral conditions with several partner universities from Northwest Russia. Finally, our extensive experience with different technologies in virtual education helped us to successfully realize and evaluate a regular semi-virtual course in several universities in Finland and Russia.

2.1 International Masters' Program in Information Technology

This program was established in 1998 at LUT and is currently being run at the other Eastern Finnish universities of Joensuu and Kuopio. It has the following two main goals:

1. To internationalise education at the host universities,
2. To provide more information technological (IT) experts for the local industry,

and includes several specific features:

- It focuses primarily on Russia but also accepts students from other countries,
- It lasts for two years, and successful students graduate with Finnish Master's degrees in IT,
- Applicants must already hold a bachelor-level degree,
- If necessary, it provides scholarships that cover the living expenses of Russians in Finland during the first two years of study,
- All IMPIT courses belong to the standard university curriculum,
- IMPIT instruction uses mostly conventional (face-to-face) teaching techniques. Some courses also have virtual features (videolecturing, WebCT), but their scope is limited to Finland only. The involvement of Russian teachers is minimal.
- The program handles students' employment matters and follows their professional careers also after graduation.

The total intake between 1998 and 2003 was 142 students, and the total number of graduates so far is 92; both numbers are from January 2004. The remaining students are still studying at Lappeenranta, Joensuu and Kuopio as the rejection rate from IMPIT is very low.

Our main experience is related to the study morale and work attitudes of Russians; we also learned a lot about their cultural habits. The current core network of three Finnish and seven Russian universities in two towns, St. Petersburg and Petrozavodsk, is shown in Figure 1.

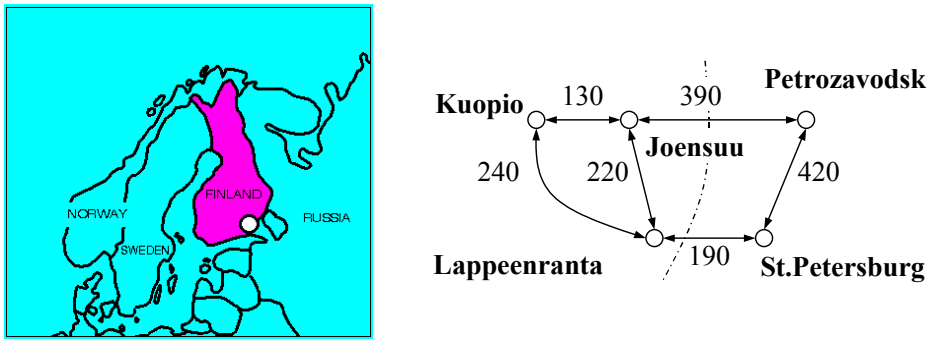

Figure 1. IMPIT network.

2.2 Cultural aspects of international education

We found that during the construction of a firm cross-border educational environment, cultural differences must definitely be taken into account. As a result of extensive qualitative and quantitative research in this domain, we concluded that there are significant behavioural differences between our Finnish and Russian students. The most obvious indications of these differences are their understanding and interpretation of academic honesty, learning and working practices, their communication skills or capabilities to work independently or in teams.

Consequently, it would be a mistake to believe that only the motivation and enthusiasm of foreigners helps them to joining standard processes abroad and accommodating the different nature of these processes. Especially in the initial phases of "becoming international", students need extensive personal guidance and exceptional administrative arrangements. The final solution that guarantees constructive cross-border coexistence, partnership on many platforms and continuously increasing involvement, consists of a bilaterally open and deterministically designed educational structure that equally incorporates the specifics of all the nationalities involved. The details concerning this matter will be published later.

2.3 Virtual education in the St. Petersburg region

One of the significant side-effects of the IMPIT program was the local availability of skilled Russian students and their interest in performing supervised research tasks related to the status of virtual education in the St. Petersburg region. Such collaboration was natural, inexpensive and produced excellent results. Zakharova (2002) and Kuzivanov (2003) summarized the following data concerning the preparedness of Northwest Russia to collaborate in international educational projects:

Advantages:

- A large amount of excellent professionals, who are interested in joining an international environment and capable of producing virtual courses.
- Existing experience from local forms of virtual and international education (Ministry of Education of the Russian Federation, State Institute of Information Technologies and Telecommunications 1999).
- The increasing importance of education in the Russian labour market, the need for lifelong education, specialized vocational training and transfer education there.
- The need to access education, also outside major centres.

Limitations:

- The overall shortage of funds in the educational system.
- A general lack of computers and advanced networking technologies.
- Unreliable and expensive Internet connections.
- Educational conservativeness, a lack of motivation, and distrust towards modern teaching technologies in the older school of academic society.
- Overall language problems.
- Institutional and legal limitations (the certification of courses, the internal status of virtual students, military service issues, the local approach to academic honesty etc.).
- A lack of general standards, coordination and quality control mechanisms for virtual education.

Before designing the first prototype of the cross-border virtual educational unit, we performed a related risk analysis. To identify possible future bottlenecks, the following three main components were identified and separately analysed from the functional and financial standpoints:

- *I*: the Institutional component that incorporates legal and institutional limitations, the current status of internationalisation or educational and cultural differences.
- *T*: the Teaching component, incorporating the content, presentation and language issues of the delivered courses.
- *V*: the Virtual component, connected mostly with teaching technologies and the technical aspects of distant education.

In our opinion, in a properly working system all the components should be equally important and mutually balanced, i.e. $I = T = V$.

We found, however, that the current situation in Russia is different. Concerning the overall process risks, it holds that $T > I > V$, which means the following:

a) The highest risk is connected with the teaching component, *T*, particularly because of the language skills of local teachers, their minimal experience in the application of computers in education, their difficulties in giving presentations if there is no audience and other personal and social limitations. It is evident that in the case of a teacher's unclear message, the whole concept fails even if the remaining two components are properly established.

b) The influence of the institutional component, *I*, is significant, especially in the later stages of building common programs, where a strong legal background (double-degree issues, exchange of credits, the mutual recognition of courses or certification and recognition of certification) is needed.

c) We assigned the lowest weight of the risk to the virtual component, *V*, as it includes mainly concrete, deterministic and easily verifiable entities (course material) and related technical arrangements (methods of transferring the course material to distant learners).

From the financial point of view, the relationship among T, V and I is rather different, particularly $T > V > I$. This finding can be justified as follows:

a) In the initial stages of implementation, it is not so important to invest in the institutions (*I*), but rather to concentrate on content production and the

motivation of the course designers (*T*), because only they are able to produce immediate results and influence the subsequent stages.

b) Investments in the technical infrastructure of Russian universities (*V*) are also crucial, although for the prototype building stage, we do not consider them to be important as direct investments in human resources.

2.4 Semi-virtual education on a cross-border platform

A semi-virtual course on Artificial Intelligence, which corresponded to 6 ECTS credits, was lectured by a single teacher for students from two Finnish and two Russian universities during the autumn semester of the academic year 2002-03. By the term "semi-virtual", we want to emphasize the regular personal contacts between teachers and students, which were carefully maintained throughout the whole teaching period.

Our experimental course was divided into five blocks that included audiovisual lectures, numerical exercises, Web-based homework and quizzes, as illustrated in Figure 2.

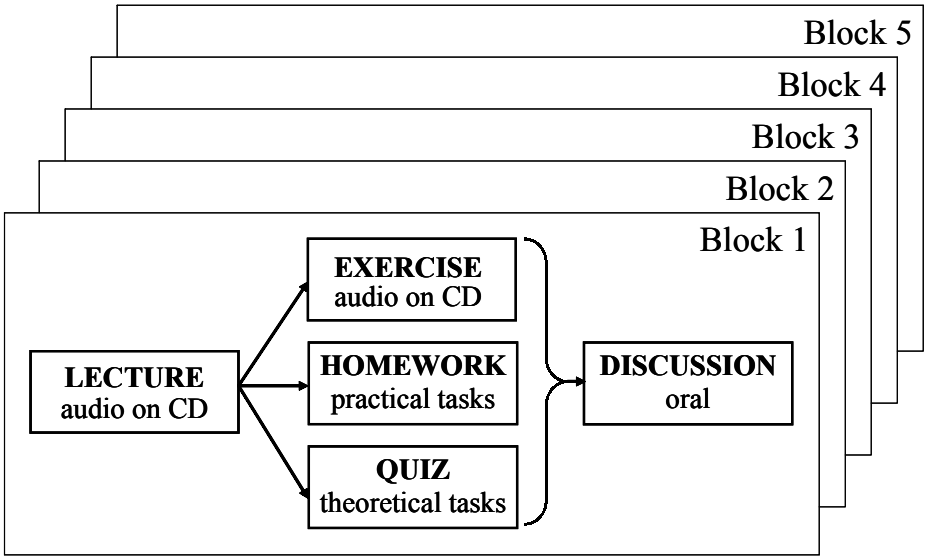

Figure 2: The internal structure of our semi-virtual course.

Students had to make notes of all the tasks they completed in their own study records by given deadlines. Only those students, who completed all the tasks in the current block, could move onto the next one. There was also a single course project, and the course ended with a written examination. In the final classification, we strived to suppress the importance (leading role) of the examination and to award students for continuous learning, creativity and teamwork.

The lecturer visited the students at the end of each block and discussed all the matters of interest. Moreover, by talking to the students he could immediately assess the level of some particular knowledge for a certain group and correct the original schedule or content, if necessary. The meetings were necessary also because the Russian students are used to being guided by the teacher. These sessions were theoretically time-unlimited but, in practice, took between three and five hours per group per block.

The majority of the course material was available off-line on CD. Students could access their personal study record over the Internet, and all impersonal communication took place via email. These technical arrangements were acceptable for both Russian and Finnish students. More information on the course structure can be found in (Alaoutinen et al. 2003a). All the materials and teaching was in English.

The significant differences between the Finnish and Russian educational systems required, however, special technical and administrative arrangements for the smooth implementation of shared courses in the both countries to keep the quality of education and the level of achieved knowledge on the highest possible level. For our research, this meant that we

developed, tested and optimized the expected semi-virtual technology initially only with the Finnish students and just after the local satisfaction extended its scope internationally. Details about these experiments will be published elsewhere.

In principle, our final model is similar to an old method called the Keller Plan (Keller 1968). The Keller Plan also divided the course material into smaller units and the students had to study the material by themselves. There were no meetings with the teacher. When a student felt that (s)he mastered the subject, (s)he took a unit test. After passing the test, (s)he could start the next unit. What we have done differently is that we have deadlines for the blocks but no unit tests and the teacher meets the students in every block. This method is in use in contact teaching, for example, at the University of Texas, Austin, and the Australasian Legal Information Institute

At the end of the course, we asked the students to answer a Web questionnaire, where we asked about their opinions about the realisation of the course. We got 90 answers, which is about two thirds of the number of the active participants.

Over half of the students felt that the use of blocks and deadlines helped them. One student made the following comment:

> *" I liked ... increased number of deadlines ... applies sufficient pressure evenly accross the whole course timespan ".*

They also liked the combination of audio files and printable lecture notes:

> *" The best learning situation for me is when I have written material (slides like here are enough) with me when I listen to the lectures so that I can add my own notes to them ".*

Russians felt that the contact sessions were of some help. 60 % of the Russian students replied that it helped a lot and 10 % could not have managed without it. Half of them did not have enough personal contact with the teacher and were not willing either to move the meetings onto the Web or have the meetings more seldom. 75 % of the Russian students did have technical problems while listening to the material. Their biggest problem was access to the Internet. They got the CDs only at the end of the course. At the beginning, they had an access to the material only via the Internet.

At least some of the students have noticed that they need to change their learning styles and to take responsibility for their own learning.

> *"It was actually more demanding for a student to make his own time for listening to the lectures".*

The same teacher had lectured the course also the two previous times and the final exam has been of the same type; therefore, we could compare the exam results to those of the previous exams to see if there was any differences in the results. Table 1 lists the exam results. LUT ’98 and LUT ’00 are the two old courses we used for comparison. The numbers show a clear improvement in the averages and according to a t-test, the difference is significant (95 %). These results are also in accordance with those obtained by Tyree on the Keller Plan (Tyree 1997). According to Tyree, the Keller Plan had been studied a lot and the results showed that it improved the learning results.

The majority of the students who quit the course (the difference between the registered and passed columns) did this during the first teaching block in reaction to the unusual teaching system, because they had overestimated their own language skills or due to conflicts in their schedules. For the Russians, the course was a demanding extra effort on top of their already fixed timetable, while at our university, students can enrol onto a course without being obliged to actually take it the same year.

Table 1: The data concerning the realized prototype of the experimental semi-virtual international course

University	Students			Final classification (5:best, 0:failed)	
	Registered	Passed			
	-	-	[%]	Average	Median
LUT[1] '98	112	32	29	2.5	3
LUT '00	146	66	45	2.7	3
LUT	149	89	60	3.9	4
UJOE[2]	28	8	29	4.6	5
STU[3]	49	11	22	4.7	5
LETI[4]	26	17	65	4.6	5

[1] Lappeenranta University of Technology, Finland, Department of Information Technology. AI was the mandatory course there.

[2] University of Joensuu, Finland, Department of Computer Science, optional course.

[3] St.Petersburg State University, Russia, Departments of "Applied Mathematics" and "Mathematics and Mechanics", optional course.

[4] St.Petersburg State Electrotechnical University, Russia, various departments, optional course.

3. Conclusions

We found, that currently there is a real possibility to establish a new type of international educational institution on the Finnish-Russian border. The IMPIT program helped us to establish an international, motivating and positively competitive environment in IT department of LUT. Through this, more or less traditionally oriented study program, we established relationships with several leading universities from St. Petersburg region, accommodated cultural background and working habits of Russian students. Another important IMPIT consequence is that we succeeded to include our international students to Finnish industry and found that, if managed properly, Russians are not only successful students and talented researchers, but also good employees.

IMPIT students did also a significant work as our research assistants in various Russia-oriented projects; especially when discovering the overall level of local virtual education. Based on these conclusions we implemented the first international semi-virtual course and learned numerous specifics of Russian higher education.

As the result of the continuous development of IMPIT, we succeeded in moving from a set of courses, taught in a conventional manner for foreign students in a host country, to the prototype of a semi-virtual international course, accepted by participants and recognized by the academic authorities in two countries. It is important to realize that the proposed prototype is something more than a heterogeneous package of audio files and lecturing materials distributed among students. It is a course with flexible study arrangements and improved level of internal communication. Such course can be delivered in a defined quality, when single teacher can serve many students in different places.

In this way, we also proved that it is possible to replace student mobility with the exchange of teachers. Such a model is less expensive and overcomes the multiple legal and administrative limitations between Russia and Finland. The students also felt that the meetings with the teacher were important and supported their learning. Students should not be dependent on the Internet connections and have all the study material available offline from the beginning of the course. Also the timetable and study arrangements were fixed, which made the studies deterministic and students were able to plan their activities in advance.

The exam results just support the statements above showing, that a group of good Russian students managed better than the average Finnish students and also that the exam results of the Finnish students, participating in the semi-virtual course, have improved.

In the future experiments with cross-border education we are planning to include also

shorter but intensive events such as summer or winter schools. Distant students, knowing each other only from the web newsgroup or through the teacher's interpretation, would meet there and learn how to practically cooperate in the international environment.

Because of the short geographical distances, the best students from both sides of the border could join research or industrial projects instantly on demand. Such a system is motivating, emphasizes quality over quantity and minimizes cultural shocks and brain drain.

The region of St. Petersburg area has all the basic prerequisites for the successful implementation of virtual international education. In accordance with our investigation in several Russian universities, we believe that the design of a future cross-border educational environment should start from the bottom, i.e. with the main investments being made in designers and semi-virtual courses. Once several such courses are properly underway, there will be more reliable evidence on the technical and institutional background needed in the future.

Although the cross-border education between Finland and Russian has many specific features, we believe that our results include also generally applicable conclusions, useful for every academic institution, interested in an immediate cooperation with Russian partners.

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