

# Information and Communication Technologies in Collaboration Projects via the Internet

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**Abstract**—The aim of this study is to determine the basic information and communication technology (ICT) skills that may be needed by students studying in the 8<sup>th</sup> grade of the primary education in their cooperative project works implemented via the Internet. Within the scope of the study, the curriculum used for European Computer Driving License (ECDL) and the curriculum used in Turkey are also compared in terms of the ability to use ICT, which is aimed to be provided to the students.

The research population of the study, during which the pre test – post test control group experimental model was used, consisted of 40 students from three different schools. In the first stage of the study, the skills that might be needed by students for their cooperative project works implemented via the Internet were determined through examination of the completed Comenius, e – twinning and WorldLinks projects. In the second stage of the study, the curriculums of the Turkish Ministry of National Education (MEB) and ECDL were evaluated by seven different teachers in line with these skills. Also in this study the ECDL and MEB curriculums were compared in terms of capability to provide the skills to implement cooperative projects via the Internet.

In line with the findings of the study, the skills that might be needed by students to implement cooperative projects via the Internet were outlined, and existence of a significant difference was established in favor of the ECDL curriculum upon comparison of both curriculums in accordance with this outline ( $U = 50,500$ ;  $p < 0,05$ ). The findings of the study also suggested that the students had considerable deficiencies in implementation of cooperative projects via the Internet without the ICT infrastructure.

**Keywords**—Collaboration Projects, Comenius, Curriculum, ICT.

## I. INTRODUCTION

ONLY the students who have been able to use the tools in the information technologies can keep up with the dimension of globalization in the field of education. It is necessary for students to use ICT as a tool both in every field of life and in the teaching-learning process. One of the ways in which students can use ICT as a tool is the involvement in collaboration projects, where they can work on a common subject along with other students under the supervision of educators. The globalizing world today attaches importance on students' inter-cultural interaction, sharing and collaboration, and projects in this field are supported with a

variety of programs by many countries and organizations. The Comenius and e-twinning programs implemented in the European Union, the WorldLinks program of the World Bank, and UNESCO's ASPnet program are some examples of these projects. The aim of Comenius, one of such programs carried out in the European Union, is to increase the quality of education at schools, and to improve "information exchange" by strengthening the European identity and inter-cultural dimension of education [1]. In addition to improvements in these fields, collaboration projects also aim to induce positive effects on students' individual characteristics such as assuming responsibility, learning about different cultures, and having initiative through team works and cooperative works within the scope of project development. However, it is known that, in order for students to be able to participate in such projects, they should not only be able to use the Internet for communication and information exchange, but also have competency in computer skills. While the teachers' role is to be counselor in collaboration projects, students use ICT to accomplish the required works, such as communicating with each other, sharing information and solving a problem within the aim of the project. According to the results of the studies conducted by Kehm, Kastner, Maiworm, Richter, and Wenzel in 2004 on ICT used in Comenius projects or in products created at the end of the projects, 55% of the projects contained digital photography technologies, 45% Internet technologies, 42% digital videos, 40% CD technologies, 37% printed materials and 21% presentation programs [2]. Whether the students, who are expected to involve in teamwork in common projects and to be in communication with people from different cultures, are competent in terms of the ability to use ICT, as well as the sufficiency of the education provided at schools within this context, is among important problems that need to be studied.

In Turkey, the Ministry of National Education declared that computers should be used as a tool both in daily lives and in the learning-teaching process [3], and on grounds that "computer literacy should be gained through experience". At this point it is important to decide what are the criteria of ICT skills to teach to students. The European Computer Driving Licence (ECDL), which is a valid certificate program in the EU, may be a reference. ECDL aims to use the same methods and procedures to set the basic ICT standards for end-users that are supported by governments, computer societies and international organizations all around Europe. ECDL may not be the best solution to outline ICT curriculum, but in

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comparison, the Turkish curriculum for ICT lesson lacks international standards.

However, the requirements those students should have sufficient ICT infrastructure that teachers should be equipped in terms of integration of ICT into other courses and of creating models for students in order for the computers to be used as a tool are disregarded. In this context, it is obvious that learning the basic ICT skills through experience or participating in projects would be closely related to the computer literacy levels of teachers, the level of use of ICT in lessons, and the physical possibilities of the school [4].

This study aims to determine the basic ICT skills that might be required by 8<sup>th</sup> grade students in their cooperative project activities via the Internet, and to outline the computer course curriculum that would meet these requirements. Additionally, within the scope of the study, the curriculum of ECDL and the curriculum of MEB are compared in terms of ICT skills aimed to be provided to the students.

## II. METHOD

The research population of the study, during which the pre test – post test control group experimental model was used, consisted of 40 students in the 8<sup>th</sup> grade at three different schools (Table I). The experimental group was provided education using the ECDL curriculum and the control groups using the MEB curriculum during one semester. All working groups were formed with students from two different schools and the students included in these groups were enabled to perform their activities via the Internet. At the end of the semester, the students' skills of implementing cooperative projects via the Internet were evaluated.

TABLE I  
GROUPS AND CURRICULUMS

Groups	School	Participation	Curriculum	Project
Group 1	School A	5	ECDL	1
	School B	5		
Group 2	School A	5	M.E.B	1
	School C	5		
Group 3	School A	5	ECDL	2
	School B	5		
Group 4	School A	5	M.E.B	2
	School C	5		

The project results developed by the students were used in group comparisons. Two groups that received education in line with the same curriculum were asked to implement one of the two projects designed (Appendix A and B), and these projects were scored based on the evaluation forms. The Comenius and e - twinning projects were taken as reference for cooperative project works via the Internet during the study. While skills were being determined in the project works, the Comenius, e - twinning and WorldLinks projects' database were closely examined, and the ICT frequently used in these projects were established (Fig. 1). Through these projects, students' skills of using e-mail technology, accessing

information through use of the search engines, instant messaging, presentation, word processing, and spreadsheet software, as well as digital media devices, and CD and printer technologies were evaluated. Web publishing and picture editing skills are excluded from the study due to the schools' deficiencies. Another data collection tool used in the study was the practical examination given before the study to measure the groups' skills of using ICT. With this practical examination, a total of eight different skills covering word processor, spreadsheet and presentation software, computer technologies and peripherals, and using Internet technologies to access and share information and to communicate were evaluated. The validity of the coverage of the practical examination was evaluated by seven computer teachers teaching at primary schools, and a consistency rate of 88% was found. The Mann Whitney U test was used for group comparisons.

## III. RESULTS

In the first stage of the study, the most frequently used ICT skills in cooperative project works implemented via the Internet were tried to be determined (Fig. 1).

Projects	Word Processor	Spreadsheet	Presentation	Instant Messaging	e - mail	CD Technology	Digital Cameras	Printers - Scanners	Web Publishing	Picture Editing
Our way to save our planet	X	X	X		X				X	
Telling lives	X			X		X	X			
Tourist guide of the students' hometown			X		X		X		X	X
Carbon footprints	X		X		X			X		
Children from other countries	X		X		X					
Chocolate and Chips		X	X		X		X			
Exchanging travelling buddies			X		X				X	
Learning together	X			X	X				X	
D&L eMag			X	X			X	X	X	
Twins NewsPaper			X	X	X	X		X	X	X
Drawing Our Country	X		X		X		X	X		X
Together in Europe			X	X	X		X			X
Good Morning Europe	X	X		X	X		X			
Learning and Sharing	X			X	X		X			X
Talking Through Time	X		X	X	X	X	X	X		
Hands on Europe				X		X	X		X	
Let us be friends	X					X		X	X	
Join nature		X	X		X	X				
Wetlands Project	X	X					X		X	
A school for all children	X			X	X		X	X		

Fig. 1 The most frequently used ICT skills in the completed Comenius, WorldLinks and e - twinning projects

In an attempt to determine the extent of the coverage of MEB and ECDL curriculums of these skills, seven different teachers evaluated the contents of both curriculums and the results are provided in Table II. The evaluation was made as

follows: 2 points if the curriculum covers the measured behavior, 1 point for partial coverage, and 0 points if it is not covered.

TABLE II  
COMPARISON OF CURRICULUMS

Skill	MEB	ECDL
Using Input / Output devices	7	10
Understanding directories and folders at computers	7	14
Using internet search engines	4	14
Having, using and managing an e – mail account	2	11
Managing folders and files (cut, copy, paste and delete)	12	14
Using Printers	12	14
Using USB cameras and storage devices	2	5
Formatting text (color, font, size, styles)	5	14
Inserting pictures or external objects to a text	8	14
Inserting tables and using tables in a text	2	11
Converting data format (currency, date, time, number)	0	10
Working with formulas	0	11
Representing worksheet data in a chart	6	9
Formatting and editing layouts for a slide	8	13
Inserting pictures, audio and video to a slide	7	13
Using animation at slide transition	7	14
Copying data to USB storage devices	7	6
Understanding security and safety	6	12
Using audio and audio devices	8	10
Editing and formatting charts	7	4
Using CD ROM	9	11
Using instant message programs	9	10
Burning a data CD	4	10
Protection From Viruses	4	12
Copyrights and Law	0	12
Configuring a computer (time, date, desktop properties)	2	13
Editing folder or file properties (size, attributes)	5	12
Copying data to floppy drives	13	10
Inserting symbols to a text	6	11
Copy – Cut – Paste in a text file	10	13
Inserting captions and page numbers to a text	5	8
Sorting data by ascending or descending order	0	6
Inserting figures to a slide	8	11
Using bookmarks in a web browser	2	12
Attaching a file to an e – mail	2	12
Using an address book in an account	1	14
<b>Percentage</b>	<b>39</b>	<b>79</b>

\*Top score is 14

\*\*Yes = 2 points, Partly = 1 point, No = 0 point

When we examine Table II, we can see that the curriculum of MEB covers 39% of these skills, while the ECDL curriculum covers 79%. The skills not covered by the curriculum of MEB are use of spreadsheets and presentation software, as well as Internet technologies, while the ECDL curriculum lacks use of digital input – output devices.

The MEB and ECDL curriculums were compared using the scores obtained by the groups from the projects, in terms of the ability to use ICT required for implementation of cooperative projects via the Internet. Prior to the study, the fact that the preliminary knowledge of both groups were at an equal level was verified using the Mann Whitney U test ( $U=368.5$ ;  $p>0.05$ ). By the end of the study, the scores obtained by the groups, which received education in line with the MEB and ECDL curriculums, relating to the project activities were tested using the Mann Whitney U test and the results are provided in Table III.

TABLE III  
RESULT OF MANN – WHITNEY U TESTS

Skill	Curriculum	N	Mean Rank	Sum of Ranks	U	p
To use ICT required for the cooperative projects via the Internet	ECDL	20	27.98	559.50	50.50	0.00
	M.E.B.	20	13.02	260.50		

When we examine Table III, we see that there is a significant difference in favor of the group that received education in line with the ECDL curriculum ( $U = 50,500$ ;  $p<0,05$ ). According to this result, when the ECDL curriculum and the MEB curriculum are compared in terms of providing the students with the skills to use the ICT required for the cooperative projects via the Internet, we see a significant difference in favor of the ECDL curriculum.

Furthermore, the curriculums dealt with within the scope of the study were also compared in terms of each one of the skills specified on the evaluation forms and the results are provided in Fig. II. When we examine Fig. II, we can see that there is a slight difference in the scores obtained by the students that received education in line with the ECDL and MEB curriculums in terms of the ability to use word processors, and that the scores relating to the CD technologies were rather low with students that received education in line with both curriculums.

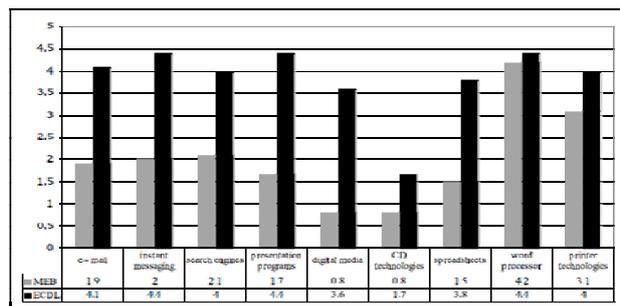


Fig. 2 Curriculum comparison in terms of skills used in project works

#### IV. DISCUSSION

In this study, the basic skills that might be needed by students for implementation of cooperative projects via the Internet were determined and the rate of the MEB and ECDL curriculums to provide the students with these skills was established. While the skills that might be needed by the students for cooperative projects via the Internet were being determined, facilitation of accessing information, communication and cooperative working and cultural globalization through the use of computers as an information and communication tool were focused. It is important to note that the students gain the ability to access information in the shortest time possible using the Internet, make use of the information correctly with the appropriate computer software, and share the information as necessary. It is necessary that the students, who wish to participate in such cooperative projects via the Internet, have these skills, even if they are at a basic level. Consequently, these students that would participate in

such projects should be given education on information technologies, which provide the means to access the correct information, and to process, produce and publish the information. This concept is supported by a study conducted by Kehm, Kastner, Maiworm, Richter, and Wenzel in 2004 on ICT used in Comenius projects or in products created by the end of the projects [2]. Within the scope of the study, starting from the fact that the cooperative project activities are based on accessing information, conducting researches, performing analyses, and sharing information, the study has tried to determine the topics of the curriculum that would provide the students with these skills. Providing the students with the skills of using ICT in accessing the ideas and experiences of people from different communities and cultures rapidly should be among the goals of this curriculum. It should be aimed that students are enabled to use ICT in every field of their lives, and make use of these technologies in every stage of their education.

The curriculums of MEB and ECDL were also compared in terms of the scores obtained by the students with respect to their project activities. It was seen that the ECDL curriculum is more successful compared to that of the MEB in terms of the skills to use ICT in cooperative project activities. This success of the ECDL curriculum can be attributed to the fact that it is an up-to-date curriculum, for it is a certificate program focused on basic ICT and is constantly updated. The fact that the Ministry of National Education has not updated its computer course curriculum, which has been in use since 1999, and the targets set by MEB regarding the computer course, has caused this curriculum to obtain low scores. The Ministry of National Education had declared that the basic goal of the computer course was not learning the computers, but that computers could only be a tool for other disciplines, and consequently decreased the weekly computer course hours, and ceased evaluation of students with grades for this course. Even though the statement of the Ministry of National Education is correct, its application and the timing of the application regarding the matter are wrong. With this study, it has been shown that students have considerable deficiencies in implementing cooperative projects via the Internet without the basic ICT infrastructure. Based on this result, it can be said that computers can be used as a tool for other disciplines upon provision of students with the basic ICT skills. This matter is not limited only to students, but it is also related to teachers' competency in ICT, and schools' ability to provide the necessary facilities. However, the latest studies conducted indicated that teachers and schools are incapable in this respect. In his study, Manoucherhri (1999) stated that teachers' knowledge about how to put ICT to work in education was inadequate [5]. Similar results were indicated in many other studies [6], [7], [8].

Also in this study, the curriculums of MEB and ECDL were compared in terms of each one of the skills used in cooperative projects via the Internet. The areas where the success of the ECDL curriculum was low were digital media devices and sound technologies, while the curriculum of MEB was found to be even more inadequate in providing the skills in all areas, except for the word processing programs. Whereas, according to the study carried out by Kehm,

Kastner, Maiworm, Richter, and Wenzel, 55% of the Comenius projects involved digital camera technologies, 45% Internet technologies, 42% digital videos, and 40% CD technologies. It has been determined that the curriculum of the Ministry of National Education does not have the contents to provide the skills to use ICT, and the sub-components of these technologies, and the same result was shown with different studies. Ozdener and Oztok (2005) observed that the current curriculum was not sufficiently effective in providing the students with the skills to use the Internet efficiently. In the same way, the current curriculum fails to provide the basic skills such as using the web-based search engines, downloading the necessary texts and pictures for using the same in line with their own purposes, etc., and similar deficiencies are also observed in communication with other people via the Internet [9], [10], [11].

Parallel to the rapid developments in education technologies, the curriculums could serve to their purposes only if they are open to technological developments and are easily adaptable to innovations. Another dimension of the technological developments is the changes in the job descriptions of teachers and consequently in their relevant roles. It is obvious that developments have no end. The important point is that teachers and curriculums that will educate our students are able to keep up with these developments.

## APPENDIX A

<b>Project Plan - Beautiful Istanbul</b>	
Subject	Carrying out a joint project using a variety of ICT
Scenario	Students take photographs in different places of Istanbul, and information relevant to these areas is collected via the Internet. This information is shared with other students and a joint report is prepared and printed out. The work is then transformed into a presentation and is copied onto a CD-ROM along with the report.
Start / End Date	03-20-2006 / 05-19-2006
ICT to be used	e-mail, instant messaging, word processor, presentation program, digital media devices, printer and CD technologies.
Products	Presentations and a report relating to the subject and a CD to be prepared by the project group.
<b>Process</b>	<b>Things To Do</b>
Students meet each other	The application teacher provides the students with the e-mail addresses of other students that constitute the working group.
Selection of the study subjects	Students communicate with each other using instant messaging programs and each student selects his/her subject.
Data collection	Students search information about the areas related to their own project on the Internet.
Photographing	Students take photographs of the area and transfer them to their computers.
Information sharing and communication	Students bring their completed works together.
Reports	Students prepare a report containing the information on which they worked.
Printing	Students print the report out.
Preparation of Presentations	Students prepare a unified presentation.
Recording on CD-ROM	The prepared presentation is recorded on a CD-ROM.

## APPENDIX B

<b>Project Plan – Knowing Each Other</b>	
Subject	Carrying out a joint project using a variety of ICT
Scenario	Students prepare a survey and collect data of other students relating to the survey. Students share their results after they input their data to a spreadsheet via e-mail. This data is converted to a chart and students write an article about the results. The charts and report are printed.
Start / End Date	03-20-2006 / 05-19-2006
ICT to be used	e-mail, instant messaging, word processor, spreadsheet, digital media devices, printer and CD technologies.
Products	Charts and a report relating to the subject and a CD to be prepared by the project group.
<b>Process</b>	<b>Things To Do</b>
Students meet each other	The application teacher provides the students with the e-mail addresses of other students that constitute the working group.
Determining of the survey	Students communicate with each other using instant messaging programs and prepare a survey together.
Data collection	Students collect information about their schoolmates related to their project.
Transferring data	Students transfer the data to a spreadsheet program.
Information sharing and communication	Students bring their completed works together.
Preparing charts	Students prepare a chart containing the information on which they worked.
Reports	Students prepare a unified report containing the information on which they worked.
Printing	Students print the report and chart.
Recording on CD-ROM	The prepared presentation is recorded on a CD-ROM.

## REFERENCES

- [1] Socrates - Application Guide, European Commission, Luxembourg, 2000, pp 6-9.
- [2] B. M. Kehm, H. Kastner, F. Maiworm, S. Richter and H. Wenzel, "Interim Evaluation of the Action COMENIUS of the SOCRATES II Programme in Germany Final Report," National Evaluation of the Action Comenius of the SOCRATES II Programme in Germany, Germany, 29 April 2006.
- [3] Curriculum of computer lesson from 4<sup>th</sup> to 8<sup>th</sup> grade, MEB Journal of Communiques 2492, Ankara, Turkey, 1998, pp 1030-1046.
- [4] R. Sutherland, "Designs for learning: ICT and knowledge in the classroom," *Computers & Education*, vol. 43, pp 5-16, 2004.
- [5] A. Manoucherhri, "Computers and school mathematics reform: Implications for mathematics teacher education," *Journal of Computers in Mathematics and Science Teaching*, vol. 18, no. 1, pp 31-48, 1999.
- [6] C. Cope and P. Ward, "Integrating learning technology into classrooms: The importance of teachers' perceptions," *Educational Technology & Society*, vol. 5, no. 1, pp 67-70, 2002.
- [7] D. Galanouli, C. Murphy and J. Gardner, "Teachers' perceptions of the effectiveness of ICT-competence training," *Computers & Education*, vol. 43, no. 2, pp 63-79, 2004.
- [8] G. Jedskog and J. Nissen, "ICT in the Classroom: Is Doing More Important than Knowing?," *Education and Information Technologies*, vol. 9, no.1, pp 37-45, 2004.
- [9] N. Özdenler and M. Öztok. (2007). Comparison of the Turkish and British Curriculums in terms of Computer Literacy. *National Education Journal*. 33(167). Available: <http://yayim.meb.gov.tr/dergiler/167/index3-oztok.htm>
- [10] A. Baki and Z.H. Tatlı, "Comparison of Primary Education 2nd Grade Computer Education Program with the EU Standards", in *Takev Primary School Symposium on Primary Education in Turkey's Process of Integration into the European Union*, Turkey, 2006, pp. 63.
- [11] N. Özdenler and R. Bıyık. (2007,07). Development Of A New Curriculum For Computer Education And Comparison With The Current Curriculum Of The Turkish Ministry Of Education. *TOJET*. 6(3). Available: <http://www.tojet.net/articles/634.htm>