Practical Teacher Training Through Implementation of Capacity Building Internet Projects

Marta Turcsanyi-Szabo
Informatics Methodology Group, TeaM Lab
Eotvos Lorand University, Hungary
turcsanyine@ludens.elte.hu

Abstract: TEAM Lab at Eotvos Lorand University connects tightly Informatics teacher training to real teaching practices so that: Informatics teachers can get acquainted with methods, topics, and possibilities for integrating ICT into subject areas, while teachers of different subjects would get ideas on forms of applying ICT tools to enhance subject learning. This paper describes a pilot project involving children from tele-houses, learning communities in Hungary using two Web Based Learning materials developed by TEAM Lab and mentored by future informatics teachers. Both materials are based on a constructivist approach and allow different learning styles to emerge. The pilot project has been in progress for two sessions with an "action research" process that aims to build a suitable model extendable to the whole network of tele-houses in order to contribute to the introduction of capacity building through distance education for underdeveloped regions.

Introduction

In Hungary ICT in education started out from computer studies in secondary schools for which a fair number of Informatics teachers have been trained so far. By now there is a strong tendency of shifting from topics of computer science towards the application of ICT in all fields, aiming to broaden the circle towards teachers in all subject areas and the application of innovative methods and resources for the benefit of learning.

There are a fair number of computers in schools, but the teachers themselves are the most conservative about their use in education. And those who had the chance to learn innovative methods of using ICT in education, might as well have wondered off to industry to make a better living. More and more informatics teachers graduate each year from our universities, but less and less of such teachers can be effectively found in educational settings due to the educational sphere being well underpaid in comparison to industry. Thus informatics teacher training in itself requires a lot of investment and at the same time does not accomplish the awaited outcome in providing enough expertise for remote underdeveloped regions and in overall education.

Some parts of Hungary (especially the eastern part) is considered underdeveloped, unemployment scores in some places over 70%, infrastructure not allowing the emergence of new economies, with no educational possibilities above elementary school level, and the only realistic dream of young and old is to find a "way out", mostly in the physical sense.

A tele-house is a multifunction ICT service centre with open profile designed for small villages, in other words it is 'a community telecommunications service house'. Tele-houses in Hungary emerged from active civil initiations resulting in mass movements. At present there are more than 400 tele-houses in operation (www.telehaz.hu). Capacity building in an educational context can be one of the roles that tele-houses can aim to provide services for. A culture leading to distance education needs to be accepted and practiced in order to able future progress in the right direction, possibly leading to distance working as well.

This in itself would provide perspective for the younger generation and their elders in a direct or indirect way. Thus tele-houses could provide a virtual "way out" by remaining physically in the home region allowing a "virtual sight outside" of the stand-still situation to promote connections, seek information, and find economic possibilities, in order to switch the virtual wealth for reality.

This paper describes a pilot tele-house project, which aims to provide a start-out for a possible solution by providing pedagogic framework with theoretical background, Web Based Learning materials and environment, as well as mentoring methods to establish a model that could be further extended to build a network for capacity building in general through tele-houses, schools, and homes. At the same time it also provides a possible solution for informatics teachers to remain in the profession by providing mentoring services at a distance.

Developing Internet Projects within Teacher Training

Teaching with Multimedia [TEAM] Lab at Eotvos Lorand University has been established in 1997 within the Informatics Methodology Group involved with Informatics teacher training (www.team-lab.ini.hu). Its aim is the application, teaching, experimentation, evaluation, research and development of innovative multimedia tools and methodologies for the benefit of effective learning and developing skills. R&D includes the ergonomics and content development of educational applications, authoring tools, Internet and telematic environments, and evaluation of their effects in the learning process. Our main aim is to provide access to our most recent developments through our web pages for practicing teachers as well as learners (allowing teachers to get acquainted with the needs and requirements of innovative learners through K-12), and provide online help for implementation in the learning process. We involve our students in the whole process through course activities where they develop educational materials and introduce them into practical learning situations while performing research on their impact.

Two Web Based Learning [WBL] materials are the main focus of this paper: *NETLogo* and *Creative Communications*, which were developed through years of project work at TEAM Lab. Both materials suggest a constructivist approach allowing different learning styles to emerge: *NETLogo* provides self-paced discovery learning with individual guidance, while *Creative Communications* provides project based group-learning with collaboration and group-mentoring. Topics tackled hope to give answer to: "What? When? How? and Why? certain topics should be learned and used?" while invoking activities of modeling, explorations and self expression.

Both WBL materials were introduced into several school settings through K-12 and into a pilot tele-house project which shall be described here. The pilot project established a bond between the tele-house movement in Hungary and TEAM Lab in providing a suitable and extendable environment for capacity building in partly isolated regions in Hungary. The project has so far passed through two "action research" sessions and has set up a model of the learning situation that could well be extended and further researched for improvements to provide a wide-spread solution for the whole network of tele-houses and contribute to the introduction of distance education and work in order to bring up underdeveloped regions.

Theoretical Background of Project

Young children and computers: Although most people could agree with the fact that the Internet could serve well in adult education, there is a severe opposition against the emergence of virtual environments within children's learning (Colleen). However there are also outstanding examples against these fears illustrated by the success of projects lead by Cohen (1987; http://homepage.mac.com/association_mmm/english/project_en.html), where small children were able to overcome better their disabilities and managed to attain quicker and more enhanced learning through mastering the essence of written language and communication with others. Children, through Internet, can

learn without the help of grown-ups about topics of their own interest, which provides autonomy and self-esteem. In some situations, when the younger generation gets to learn first to be fluent with technology, it is indeed experienced that knowledge is actually transferred by children themselves to their parents and family in a natural and effective way.

Issues of the internet: Concerns about Internet use show overuse or misuse might amplify problems, while actually radical changes are needed in pedagogy in order to benefit from use. Rather than just gathering information, the Internet should be used to construct knowledge, learning to learn, developing problem solving skills, opening eyes to the realization of other cultures in order to enrich lives. Furthermore, the impact of Internet on different societies and those with disabilities are significant, thus diminishing disadvantages: (a) distance, local and individual possibilities are over-ruled through the access to different tele-learning and tele-mentoring facilities, providing the chance for all to learn the most; (b) in case of minorities or isolated groups the insight to differences and cultures around the world encourages the sense of self-respect and individual values to help preserve and inspire the willingness to express and publish self-identity, views, and culture – stepping forward from being just a consumer to a provider of information; (c) in case of disabled, the virtual travel experiences of many kinds are facilitated, communication, participation in social activities, learning, e-commerce, financial services, shopping, entertainment are all at their finger tips, which were not accessible previously; (d) and if travel is to be undertaken in reality, the Internet can be used to research places and facilities to ensure easier mobility. Internet access thus provides equal opportunities for all and could make great differences to individuals and communities with respect to their view of the future and their role in society, as well as deletes internal need to override social rules or to flee from community. (Knierzinger, 2002, p 925)

Constructivism: A constructivist approach in terms of Logo philosophy (based on Piaget's theories) is strongly suggested at implementation. Logo is a programming language plus a philosophy of education and this latter is most often categorized as constructivism or discovery learning. "A crucial aspect of Logo spirit is fostering situations which the teacher has never seen before and so has to join the students as an authentic co-learner. This is the common constructivist practice of setting up situations in which students are expected to make their own discoveries, but where what they 'discover' is something that the teacher already knows and either pretends not to know or exercises self-restraint in not sharing with the students. Neither deception nor restraint is necessary when teachers and students are faced with real problems that arise naturally in the course of a project. The problem challenges both. Both can give their all." (LCSI, 1999)

Learning by doing: When children are the authors, designers and creators themselves, they research the topic, identify the relevant data, select supporting visuals, design the layout of text and graphics, determine how the information should be linked, debug problems, consider the nature of the intended audience, solicit feedback about their work in progress, and share their final compositions with others. In this way they learn more about the topic than the one who ultimately uses the finished product. (Druin, 1996)

Learning communities: "The Computer Clubhouse" project (Resnick, 1998) provides a model for all communities to set up clubhouses with meaningful activities for children and youth to develop technological fluency, support learning through design, allow communities to "emerge" over time and produce mentors to guide newcomers, and develop an environment of respect and trust. Yet such clubhouses presume concentrated infrastructure and presence of all sorts of high tech tools as well as different expertise from the very start. Now this is what tele-houses in underdeveloped regions definitely cannot provide from the beginning! But certainly, as time goes by this infrastructure and proficiency could "emerge" and should be sought for. And in fact it could develop an individual flavor for each community by

attracting the special talents and professions present in the area to be active part of the tele-house community.

Collaborative learning: The form of community learning that is based on individual and group-learning can be described as "collaborative learning". Strijbos (2000) concludes a distinction between "co-operative learning" and "collaborative learning" based on the amount of pre-imposed structure, task-type, learning objective and group size, and develops a classification-model to illustrate, not only, differences between both perspectives, but also, various types of computer support for group-based learning. Strijbos concludes the arising characteristics of "collaborative learning" (as opposed to "co-operative learning") from summarized literature: as a personal philosophy of intra-group interaction (and not a set of structure facilitation group performance) imposed on not too well structured domain (and not well structured domain), where each member equally contributes whilst problem solving (and not having pre-imposed division of labor).

Social constructivist perspective: McCormick & Scrimshaw (2001, p. 37) pointed out that the implementation of ICT should go beyond the narrow focus on computer-student interaction and requires a level of change in practice: making it more efficient or effective, extending it in some way, or transforming it. Emphasizing on level of extending: ICT can extend the reach of the teacher, the learner or both emphasizing the social constructivist perspective. "Rather than simply acquiring concepts (the process of 'internalization' to cognitive constructivists), from situated perspective learners are seen as creating identities by learning to participate in communities. Knowledge, as seen from this perspective, is not constructed as an object acquired by individual learners (in the way cognitive constructivists would argue, but is a social process of knowledge construction. Meaning is created through participating in social activity. From this perspective, there is, not an individual notion of a concept, but a distributed one. The learning process is viewed not as the transmission of knowledge from a knowledgeable to less knowledgeable, but as engagement in culturally authentic activity, participation in a community of practice." (McCormick, 2001, p.37)

WBL Materials

The instructional design principles underlying the two course materials included both objectivist and constructivist learning design models, following the guides of Jonassen and his colleagues: that the initial knowledge acquisition is better served by instructional techniques, based on traditional instructional design, whereas constructivist learning environments are most effective for advanced knowledge acquisition stage of learning (Jonassen, 1993), and the link between learning theories and instructional design practices are underlined by evidence in teacher training (Moallem, 2001).

NETLogo: A Logo course material, which includes self-paced activities and subject microworlds that can be used in different subject areas together with their methodologies (Turcsanyi-Szabo, 2000, p. 387). Diverse starting points and links allow different paths to be taken by learners. The different units provide guidance on how to handle problems, give tasks and projects to fulfill and submit. The material is bundled with a CD containing the Hungarian Comenius Logo authoring tool (Kossuth Publishing Inc., 1997) and a beginner's book (Stuur, 1998). *The basic aim of the material in case of elementary school children* is to be able to utilize modeling as a tool for investigations through problem solving, building structures, debugging ideas and virtual environments. Work should start out by playing with games and educational microworlds, which should be well understood using the provided course material and could then be modified. The process is based on self-motivation with the intention to learn how to learn at own pace. *The basic aim of the material in case of teachers (helpers)* is to be able to utilize and configure educational microworlds for children's needs, to be able to guide children through modeling practices, and be able to design simple microworlds for multidisciplinary use.

Creative Communications: A complex project-based material that integrates subject knowledge and ICT skills to promote creative thinking and expression on an interdisciplinary platform. Project assignments are grouped into themes: *Writing, Narration, Typography, Visual representation, Montage, Motion;* and *Concept maps*. Participants should choose one or at most two themes plus *Concept maps* and should supplement each other's knowledge while producing group-work. Assignments within a theme build on each other touching the use of tools to facilitate authoring, emphasis creativity and self expression, and some require collaboration between the real and the virtual participating communities. *The basic aim of the material in case of elementary school children* is to be able to express oneself and communicate using ICT tools as well as be able to collaborate in real and virtual environments. Work should start by experiments with expressions as well as guides for tools to express with. The process is based on self-motivation with the intention to learn how to fulfill deadlines while doing projects. *The basic aim of the material in case of teachers (helpers)* is to be able to explore ICT tools and their application on different tasks, where the emphasis is not on the tool, but the process of creation itself. They should also be able to integrate assignments with on and off-computer activities that enhance the creative process.

Implementation

The project was sponsored by USAID (United States Agency for International Development) and IKB (now Ministry of Informatics and Communication) through the project coordinating institution DemNet (Foundation for Development of Democratic Rights) and has established a bond between the tele-house movement and TEAM Lab in providing a suitable and extendable environment for learning in partly isolated regions. The project has gone through two sessions: the first (2001 January - 2001 June) with 5 tele-houses involving about 70 children, the second (2001 September - 2001 December) with 11 tele-houses involving about 150 children. The first session aimed at the least developed eastern regions of Hungary (to investigate introduction under the least favorable circumstances) and the second session involved tele-houses from all over the country (to investigate sustainability). Great efforts were made in attempting to involve gipsy tele-houses (the most in need of capacity building), nevertheless it was not possible to attain the necessary circumstances till the start of the project, so further sessions would be needed to fulfill this aim. Funds were used mainly to provide supplement for necessary equipment, software tools, maintenance and supervision within the existing infrastructure. The tele-houses had to apply for the funds and otherwise provide a fairly good infrastructure from the start.

The local tele-house environment should be able to provide: (1) Multimedia computers, scanner, digital camera, digital drawing-pad, colored printer, laser printer, and CD writer that can be accessed for a fair amount of time suiting children's time schedules. (2) Adequate amount of licenses from necessary software tools (Microsoft Windows and Office, Internet Explorer, FrontPage, Flash, Cool Edit, Corel Print Office, and Comenius Logo), Internet and e-mail facility. (3) Supervision of children's activities by dedicated local helpers, who volunteered to prepare children for the project introducing: basic use of computers, Paint program, writing with Hungarian characters using Word, browsing with Explorer, playing Logo games, and teaching children the basics of e-mailing and saving files. Helpers had to coach children and learn collaboratively together with them throughout. The *global environment* for tele-houses was provided by the Tele-house centre with e-Room (www.eroom.com) as common working space and e-mailing services. TEAM Lab has setup a Trial, Researcher, Mentor, Gallery, WBL, Support, E-mailing rooms for both projects and individual rooms for each tele-house with individual room for all children to upload their work for submission.

Mentors have been chosen from fourth year Informatics student teachers already possessing some practice with children's activities. By that time, students have a broad knowledge base on: different applications, design of educational materials and microworlds, evaluation of ICT tools and their

constructivist use. Tele-mentoring is a two semester course that has been started two years ago, where student teachers learn about the basics of mentoring, learning at a distance, and go through a semester of mentoring a project with a group of children at an assigned tele-house. Mentors are supposed to: (a) visit their assigned tele-house as often as they can, possibly once a month and maintain good contact with all children and local helpers; (b) acquire a fairly good idea of the local situation, individual and group problems, and find ways for motivation; (c) answer letters within 24 hours and provide a fixed weekly slot, where he/she is available for synchronous communication over the phone or network chat; (d) guide each child (group) individually on a path that suits best their personal growth, always comment positively on submitted works to induce further progress and provide continuous evaluation on each child's (group's) progress.

The features of group-work coincided with the characteristics described by Strijbos (2000) and mirroring patches of the theoretical aims: (1) The choice of group size was to be maximum 10 person, in order to consider possible dropouts. Children visited tele-houses at one group slot time and several free slots available during the week. Thus children mainly worked in pairs of 2-3 or double that size, where pairs often arose from originally existing friendships or family ties. This also implies that the age of children were variant, mainly between 10-14, but activities attracted all ages, including even a three and half year old child. (2) This also lead to positive interdependence during work, which emerges from the natural ties of everyday. Thus individual problems were first discussed on a peer level with the mergence of social constructivism. (3) Individual accountability was attained through the constant individual submission scheme proposed by the WBL material and the one-to-one communication with mentor, who occasionally provided additional individual tasks. Though peer or small group work was preferred at times! (4) The final group task had to have the form of a presentation that mirrored the fingerprints of all participants so that the efforts of individuals add up group contribution. The Creative Communication WBL material even emphasized this additive nature by the compulsory choice of disjunctive themes and requested a final group task of introducing the whole community through collaborative work. (5) Social inclusion became a natural factor since the goals were alike and it was soon realized that the strength of the group relies on the individual input, which is to be developed for the sake of all. In one of the tele-houses a boy with wheel-chair had also assigned for the activities and he finally did so well, that together with his parents they persuaded a secondary school (situated in another town) to enroll him for further studies, in which he is since then progressing very fine. (6) Local helpers mainly acted as coaches, being themselves natural co-learners, aiming to facilitate constructivist learning through autonomous "student-centred" manner, based on self-pace and individual motivation.

In all tele-houses children could choose which WBL material they wanted to assign themselves to and had to progress through its stages: on individual paths in case of NETLogo, and through predetermined project work in case of Creative Communications. Work initiated from the starting point advised by the mentor, which was in case of NETLogo some games and then either the first course level or one assigned by the mentor in case of advanced children, and the very first project level in case of Creative Communication. Further assistance and coaching was provided my the mentor: individual coaching in case of NETLogo, and group-coaching in case of Creative Communications. The WBL material domains provided adequate freedom of choice and progress, however if a child chooses a topic, he/she was further guided in attempting to fulfill all assignments within.

When problems occurred, children first consulted with peers, and later with local helpers if consultations did not result in a proper solution. In case a problem could not be solved locally, the children then consulted with the mentors. Mentors are experts, who have already mastered the WBL materials and mentoring methods, while helpers are in the process of mastering these. However after a two semester trial period of coaching within their own local community, they might as well be ready to become mentors for

their own community or for a newly joining learning community at a distance. This seems to be a progressive approach in helping the propagation of this movement and also in being able to expand by accepting new WBL materials for learning.

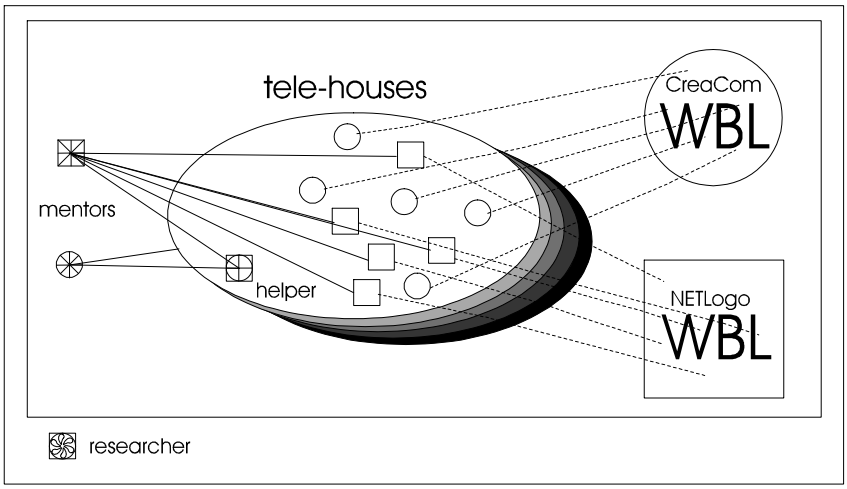

Table 1: Map of interactions and dependencies during the tele-house project work are illustrated

Besides the predefined forms of interactions, some emergent conditions had also effected the features of the learning process, namely the professional and personal ambitions of the local helper(s) and staff at the tele-house. In one occasion a painter, who then emphasized of visual expression, in another a radio technician, who emphasized on expression of sounds, and yet in another situation a school teacher, who then connected the projects with school assignments.

Researchers had a full overview of the process and had to immediately make note on important experiences in order to progress with the "action research" to be able to lead the project to success. The project coordinator (author of paper and head of TEAM Lab) kept the whole project going, while the administrative organizer from the tele-house centre arranged the events to take place.

The visits of mentors to their assigned tele-house were crucial events that could determine the overall relationship of the individuals and group towards the mentor. These occasions had to be fully used in order to get acquainted with each other, develop confidence, establish personal relationship, and evoke the natural notion in learners of wanting to progress. The most straightforward way in developing friendship with children emerged through playing games, which developed close relationships not only to the mentor, but acted as team building bond within the group itself. Many such games have emerged and propagated among tele-houses. While there was also evidence of one of the mentors aiding children with their homework and giving them extra assignments to be able to practice the topics.

A final camping activity took place in one of the schools, where children spent 4 days with one day for special group activities as extensions of the project. To this final program we invited about 40 gipsy children and there guides from different areas to allow them an insight into the project initiating their inclusion. These days spent together with joy, games, swimming, sports, on and off computer activities have managed to merge participants into a coherent group. The group-based activities involved: visual representation (to create the face of a known person on a cardboard using only plants grown in the field), story writing (using given words and expressions), concept maps (starting out from the word "tele-house"), and creating logo representing their newly emerged group (small computer picture that could be printed in color, cut out and pressed into a badge). In the afternoon the community house provided space to show

presentations that were the last assignments of of project work. Children got their rewards, presents and certificates of participation and enjoyed the works of others as well as being proud of their own. The day concluded at a bone-fire and singing. These real life events, games, and real communication have been the basic adhesives of community cohesion and resulted in further continuation through virtual ties.

Conclusions

The project used inductive research strategy including: (1) Separate descriptions of both local helpers and distant mentors about the local situation, the process applied to fulfill the project, the problems encountered, the progress achieved in case of each child or inability encountered explaining possible reasons, and any positive or negative experiences in connection to the project. (2) Pre- and post written structured questionnaires containing inquiry about: individual situation and interest; subject knowledge in ICT; attitudes of using computers and the role of ICT in society; attitudes, behavior and motivation of children towards computer games (being a separate research issue). (3) 30 minute IQ test inquiring logical, visual, and problem solving abilities. (4) Portfolio analysis of submitted work of each learner in comparison to individual situation, abilities, basic knowledge, progress, achievements, test results, and degree of creativity. Data collection included: 70 children in 5 tele-houses taking part in the first session, 150 children in 11 tele-houses (4 being the same as in the first session) taking part in the second session, plus additional 1 elementary and 1 secondary school where the materials were allowed to be used freely depending on the teacher. Early results have been published (Abonyi-Toth, 2001; Turcsanyi-Szabo, 2002; Eglesz, 2002) and empirical data is under publication, while the gallery of submitted work can be accessed online (http://matchsz.inf.elte.hu/telehaz/).

Our approach managed to accomplish the following goals and impact (Turcsanyi-Szabo, 2001 & 2002): (1) Local helpers, mentors and researchers all agreed, that every child has profited in one way or another from project activities. Children living in remote underdeveloped areas succeeded in mastering not only basic ICT skills, but also developed fluency in expressing oneself with different tools, as well as learned the basics of learning at a distance. Most children are confidently using e-mailing as a new form of social communication and realized that not only computer games can be fun, but a whole lot of opportunities are awaiting them through the use of ICT to build their future. A lot of children continued their studies in fields of informatics. (2) Student teachers tele-mentoring children's activities learned: about the needs of children, different methods and tools to develop skills, how to motivate and evaluate, and the different platforms of ICT use in everyday life and expression. This made them understand the values and drawbacks of living in small remote communities and ways of capacity building for possibly improving underdeveloped regions. They are more than eager to continue with their tele-mentoring activities. (3) Increasing interest of the whole community in finding a way for continuation of the project. After project funding ended, we offered continuation of our mentoring, aiming at the ability to produce web pages introducing their local town and community. This ability opened the eyes of the locals to the tools and the possibilities of attracting outsiders to their region. One of the communities established an art school with media studies as a form of continuation, where local artists could scaffold the skills of talented children.

Tele-houses in the most under-developed regions are more than grateful for the possibility, since, as they say, "It is not only our eyes that have been opened, but that of the world too, to see us". We have high hopes that our pilot project can continue as a normal routine, combining pre-service teacher training with practical mentoring for underdeveloped regions, thus providing the missing clue for capacity building in these areas. At the same time we are extending our mentoring for schools in order to introduce innovative learning materials and methods for in-service teacher training as well.

References

Cohen, R. (1987). *Les Jeunes enfants, la découverte de lécrit et l'ordinateur*. PUF, Paris.

Colleen, C. & Miller, E. (Eds). Fool's Gold. A Critical Look at Computers in Childhood, Alliance for Childhood, www.allianceforchildhood.net/

Knierzinger, A & Turcsanyi-Szabo, M. (2002). Internet, Education and Culture: Should we care?, in Watson, D & Andersen, J. (Eds.), *Networking the learner, Computers in Education*, (pp 925-932). Kluwer Academic Publishers.

Jonassen, D.H., & McAleese, T.M.R. & Duffy, T.M. (1993). A Manifesto for a constructivist approach to technology in higher education. in Duffy, T.M. & Lowyck, J. & Jonassen, D.H. (Eds) *The design of constructivistic learning environments: Implications for instructional design and the use of technology*, Heidelburg, FRG: Springer-Verlag. http://cad017.gcal.ac.uk/clti/papers/TMPaper11.html

Kossuth Publishing Inc. (1997). *Hungarian Comenius Logo (Localisation of Blaho, A & Kalas, I & Tomcsanyi, P. Comenius Logo, University Bratislava, 1995)*.

LCSI (1999). *Logo Philosophy and implementation*, Logo Computer Systems Inc..

McCormick, R. & Scrimshaw, P. (2001). Information and Communications Technology, Knowledge and Pedagogy, in Leach, J. & Wiske, S. (Eds.), *Education, Communication and Information*, (pp. 37-57). Vol. 1, No.1, Routledge, 2001.

Moallem, M., (2001) Applying Constructivist and Objectivist learning Theories in the Design of a Web-Based Course: Implications for Practice, *in Educational Technology & Society* 4(3).

Resnick, M. & Rusk, N. & Cooke, S. (1998). The Computer Clubhouse: Technology Fluency in the Inner City, http://llk.media.mit.edu/papers/1998/clubhouse/

Strijbos, J.W. (2000). A classification model for group-based learning, EURODL Online Journal, 2000, http://kurs.nks.no/eurodl/shoen/strijbos/strijbos.html

Stuur, A. & Turcsanyi-Szabo, M. (1998). *Comenius Logo játék és programozás* (Comenius Logo games and programming), Kossuth Publishing Ltd.

Turcsanyi-Szabo, M. (2000). Subject Oriented Microworld Extendible environment for learning and tailoring educational tools - a scope for teacher training, in Benzie, D, & Passey, D. (Eds), *Proceedings of ICEUT 2000* (pp 387-394), IFIP, Beijing.

Druin, A & Solomon, C. (1996) Designing Multimedia Environments for Children, John Wiley & Sons, Inc.

Abonyi-Toth, A. & Turcsanyi-Szabo, M. (2001). Developing multidisciplinary skills through a Web Based Learning environment implemented for tele-houses (2001) in Auer, M. (Ed) Proceedings of the ICL2001, CD, ISBN: 3-933146-67-4

Turcsanyi-Szabo, (2002). Capacity building in tele-houses: A model for tele-mentoring, in Marshall, G. & Katz, Y. (Eds), Proceedings of IFIP WG 3.5 Learning with Technology in School, Home and Community (pp 267-273), Manchester, UK.

Eglesz, D. & Kiss, E.O. & Izso, L. Fekete, I., (2002) in Marshall, G. & Katz, Y. (Eds), Proceedings of IFIP WG 3.5 Learning with Technology in School, Home and Community (pp 267-273), Manchester, UK.

Acknowledgements

Here we would like to thank all the local helpers, for their tremendous energy in coaching the activities in their local community; the mentors, for keeping contact with children and local helpers to aid them and also for evaluating children's work; the researchers, for implementing and evaluating questionnaires and tests; the organizers of tele-house centre, for the smooth flow of events; DemNet, for managing the funds; and last, but not least, USAID, IKB, the sponsors, for providing the necessary funds to facilitate the project. Without them and the full collaboration of participants, this project could not have been successful.