Capacity building in tele-houses
A model for tele-mentoring

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Abstract: This paper describes the tele-house pilot project designed to serve Hungarian learning communities. In the project participating children are mentored by students in pre-service Informatics courses using distance learning technology. Two web-based learning material collections designed by the TEAM Lab <http://www.team-lab.ini.hu> provide a constructivist approach and allow different learning styles to emerge. The NETLogo component provides self-paced discovery learning with individual guidance while the Creative Communications component provides project-based group learning with collaboration and group mentoring. The pilot project went through two sessions of an Action Research process that aimed to build a suitable model extendable to the whole network of tele-houses and to contribute to the introduction of distance education in order to support under-developed regions of Hungary.

Key words: collaboration, social context, sites of learning, roles and relationships, teacher education

1.   INTRODUCTION

A tele-house <http://www.telehaz.hu> is a multifunction Information and Communication Technology (ICT) service centre. Designed for small villages, the tele-house is "a community telecommunications service house", a physical entity that provides computer and office infrastructure, as well as instruction in organisational and mass communication issues for communities. The tele-house can be economically managed to serve a range of individuals, groups, small communities, and so serves many social needs. The first session was funded by USAID <www.telehaz.hu/hosted/page20>

and in the second year through an application to the Hungarian Prime
Minister's Office for additional funding.

Tele-houses are expected to provide services directly applicable to any
individual within the community, should evolve from local needs and can be
accessed by anyone. The idea for tele-houses in Hungary emerged from
active civil initiatives resulting in large scale projects. A year ago there were
about 200 tele-houses in operation; at present the number has doubled. Since
the government and several civil organisations realise their importance in the
community and provide more funds now, the number will probably double
soon.

Two questions arise immediately: "What role can a tele-house play to
support local economic development, local organisation, services,
connections between small and large regions, and emerging systems (e-
business and working across distances, for example)?" and "How can a tele-
house fulfil those tasks?" In response, we say that tele-houses play a key role
in the development of a region by providing access to remote educational
services.

To facilitate the process, the pilot project established a bond between the
tele-house movement and the TEAM Lab, a university-based research group,
in providing a suitable and extendable environment for capacity building in
partly-isolated regions of Hungary. The project has passed through two
Action Research sessions and has created a model of the learning situation
that could be extended and further researched for improvements. The
resulting spread of tele-houses can provide a widespread solution to
problems of under-development and low-level resourcing. Our guiding
research question not only asks, "Is it possible?" but also, "How and under
what conditions is it possible to help capacity building by remote means in
under-developed regions?"

2.   THE SITUATION

Some parts of Hungary, especially the eastern part, are considered under-
developed. Unemployment in some regions is over 70 percent and the
infrastructure does not allow the emergence of new economies. In the under-
developed regions education above elementary school level is provided only
at nearby cities, and the only realistic dream of young and old is to find a
"way out".

Local courses, with or without ICT provisions, provide only isolated
remedies and spread very slowly. There is little possibility of those local
courses spreading to other regions. Distance learning promises greater speed
and more variety of themes with possible updates later on. But the culture

leading to distance education needs to be accepted and practised in order to enable future progress in the right direction. The ultimate goal would be distance-based work, which would provide motivation for both the younger generation and their elders to remain in their regions and work via ICT-based initiatives.

Tele-houses could provide a virtual "way out" by remaining physically in the home region, allowing a "virtual view outside" the stagnant economic situation in which children live. The tele-houses could promote connections within and between regions, help people seek information and find economic possibilities. At present there is no clear strategy towards the right way of effecting large scale change but tele-houses can be part of a long-term solution.

Currently, tele-houses are open to all, but the services offered, as well as the cost of maintenance, must be considered as far as short- and long-range planning for under-developed regional support is concerned. The positive side of undecided policies results in open doors for all but there is no clear concept of what can happen next. Capacity building in an educational context can be one of the roles for tele-houses to provide, even though they are not conventional forms of education, yet the model could be extended to build a network for such development throughout Hungary.

3.   PEDAGOGICAL FRAMEWORK

Our choice for the tele-houses as the scene of many activities is partly intentional. The sponsors aimed at starting up tele-house activities and children were already actively accessing tele-houses, so we began to give them meaningful activities that could add value to their use of ICT and further their growth in other subject areas. We thought that a non-school situation would help establish a non-compulsory and non-instructional environment where the local helper is not a professional on the subject but is also a learner himself/herself.

The nature a of tele-house implies the freedom of access on a community basis and not on the basis of being affiliated to a school by definition. So the tele-houses provide freedom to attend with friends and family members. That way the tele-houses take on the flavour of social engagement. We do believe that the same situation could be established in schools, especially in the form of an after-school activity club.

Our basic philosophy for the design of our pedagogical framework is to use the Logo philosophy. We use different authoring tools for multidisciplinary creations and self-expression. We want to involve children in playful learning to motivate them with the non-compulsory tasks that

engage them in autonomous, self-paced learning. For this we provide a playful explorative environment so they can engage themselves with themes of their own liking.

Within the different themes we offer them convergent and divergent assignments for "learning by doing" in order to engage them in a more active role of progressive learning and creative expression (Turcsányi-Szabó 2000). We offer the children several tools and encourage them to express themselves in their own individual ways.

At the same time we also provide tools for more analytic, systematic and constructive thinking through games that interest them. The tools introduced in the learning environment are not only intended to determine "what" is to be learned. The expressive nature and the freedom of fulfilling the assignments indicates "why" they need to learn. The focus is not on learning tools but showing what is possible with the tools if one is persistent enough to keep on learning. That approach, in the long run, might give children ideas for future work.

The project aims to encourage "collaborative learning" in a community based on individual and group learning. A community-driven activity seems to be a realistic approach in case of tele-houses. It results in individual and collaborative learning with both online and offline activities, and enhances real-time communication. Since learning goals are aimed at the younger generation, it is highly recommended that the balance of activities emphasise real life collaboration with some necessary elements implemented online.

The transfer effect of such learning is intended to progress in two directions: Participants learn the way to work in a distance learning situation and the dissemination of knowledge gained can be communicated to the rest of the community. The learning materials provide both individual and project-based learning situations that apply in both learning and working situations. In some cases, when the younger generation first learns to be fluent with technology, knowledge is actually transferred by children to their parents and family in a natural and effective way.

4.   EDUCATIONAL SETTING

The educational setting is based on the local environment as well as maintenance and support from the university-based central project site, the attitude of local helpers, the attitude of the distant mentors, the projected aims of developed web-based learning materials (WBL) — which will be described below — as well as the strategy used. The project is continuously monitored by researchers to provide evaluations and advice on necessary modifications between Action Research sessions.

4.1   Tele-houses

The tele-house project provides the necessary equipment, software tools, maintenance and supervision for the communitites' existing infrastructure. Tele-houses had to apply for the funds to provide a workable infrastructure from the start. The tele-houses operate from a tele-house centre with an e-Room <www.eroom.com> as common working space equipped with an e-mailing service.

The mentors are experts who have already mastered the WBL materials and mentoring methods, while local helpers are the ones responsible for local activities. Mentors have been chosen from fourth or fifth year pre-service Informatics students. The mentors' roles are to:

– visit their assigned tele-house as often as they can, a minimum of twice towards the beginning of the project;
– acquire a fairly good idea of the local situation, individual and group problems, and find ways to motivate children;
– maintain good contact with all children and local helpers;
– answer letters within 24 hours;
– guide each child individually on a path that suits best personal growth;
– always react and comment positively on submitted works and induce further progress;
– provide a fixed weekly slot where he/she is available for synchronous communication over the phone or network chat;
– provide continuous evaluation on each child's progress.

4.2   Design of WBL courseware

The two WBL materials, NETLogo and Creative Communications, were developed in the TEAM Lab at Eötvös Loránd University in Budapest and are designed to support both individual and collaborative project-based group learning. The materials enable capacity building of ICT skills through different applications, and allow for the exploration and development of multidisciplinary skills and creativity.

4.2.1   NETLogo

NETLogo is comprised of three parts. The first part is an objectivist Logo course leading learners step-by-step to master the Comenius Logo environment through context-driven tasks and assignments. The material should be user-driven, self-paced, and also coached by the local helper and/or distant mentor. The second part contains constructivist microworld modules dealing with different themes. Learners' individual interests and

proficiency guide the children as they move through the Logo course. In both parts, each unit is divided into several streams.

The Summary stream describes the unit, the concepts, primitives of the Logo language and activities the children can engage in. The Task setting stream provides the children with several task assignments and processes for solutions. The Self-check stream provides questions or tests, and there are problems to be solved and submitted. The Self-check stream also provides a place for "Reflection", afterthoughts of the children once they have worked through the course (Turcsányi-Szabó 2000).

The WBL material includes a CD-ROM containing the Comenius Logo authoring tool (Turcsányi-Szabó 1997) and a beginner's book (Stuur and Turcsányi-Szabó 1998). Many subject microworlds have a connection with the Creative Communications activities to promote creative ideas, expressions and artistic works.

The third part of NETLogo contains guidance for teachers/mentors/helpers on how to coach learners to progress with microworld exploration and construction. It provides diverse starting points and links to allow different paths to be taken by learners. The different units offer methods for handling learning problems as they occur. The units also give tasks and projects that tele-house users must complete and submit. An analysis and evaluation of the implementation of material in different learning settings is also provided.

The basic aim of the material in the case of elementary school children is to help them master modelling as a basic tool for investigations that call for problem solving, building structures, debugging ideas and working in virtual environments.

The basic aim of the material in case of teachers (helpers) is to enable them to use and configure educational microworlds for children's needs, to be able to guide children through collaborative modelling practices, and be able to design simple microworlds for multidisciplinary use. NETLogo creates one type of learning environment and its complement, Creative Communications, solves the problem of helping children learn and use currently available software packages that they must master to compete both within and outside their regions.

4.2.2   Creative Communications

The Creative Communications component of the tele-house project is made up of two parts. The first part is a collection of courses that guide users in the use of the existing software tools — Microsoft Windows and Office, Internet Explorer, FrontPage, Macromedia Flash, Asymetrix Cool Edit, and Corel Print Office. Instruction is also provided on how to compose photos,

how to retouch digital photos, how to design a presentation, how to search the Internet, Netiquette, etc. The material should be user-driven (depending on the themes to be tackled), self-paced, and coached by the local helper and/or distant mentor.

The second part of Creative Communications consists of several project units grouped according to themes such as writing, narration, typography, visual representation, montage, motion; and concept maps. Children must choose one theme but the concept maps unit is compulsory.

Each unit is divided into streams. There is an Introduction (with a description of the unit, concepts, and ideas for connecting thoughts). The Practice stream provides several exploratory tasks and ideas for expression within the theme. The Assignments stream gives assignments where the tele-house participant must create and submit materials s/he has produced.

The Self-check stream asks what new topics have been learned, what was interesting, problematic, boring, hard, easy, and what wishes the child might have for further assignments. The Reflection stream asks for afterthoughts once the projects have been completed. Project units can be worked on individually or through local collaboration, and have strict deadlines to allow the global processing of others' work in a next unit. The final unit requires the design and implementation of a presentation introducing the whole local group and should be done collaboratively to use knowledge mastered through progress within different themes.

The basic aim of the material in case of elementary school children is to enable them to integrate subject knowledge and ICT skills while promoting critical thinking and creative expression on an interdisciplinary platform. The process is based on self-motivation with the intention that the children will learn how to collaborate in real and virtual environments, and be able to fulfil deadlines.

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. The teacher/helpers should also be able to integrate assignments with on- and off-computer activities to enhance the creative process. But learning to use tools expressively is only a partial aim. Learning to work with those tools in a group is an essential solution for under-developed regions in Hungary.

4.3 Group learning strategy

The group-based working method has the following characteristics:
– Choosing group size with a maximum of ten users took care of possible dropouts. Children visit tele-houses at one group slot time and several free

slots are available during the week. Thus children mainly work in pairs of two to three or, in some cases, a larger group where pairs often arise from originally existing friendships or family ties.

– Positive interdependence develops during work, emerging from the natural ties of everyday activities. Thus individual problems are first discussed on a peer level.

– Individual accountability is attained through the constant individual submission scheme proposed by the WBL material and the one-to-one communication with mentor, who occasionally provides additional individual tasks, though peer or small group work is preferred at times!

– Final group tasks must be a presentation that mirrors the fingerprints of all participants so that the efforts of individuals add up to group contribution. The Creative Communication WBL material even emphasises the additive nature by the compulsory choice of different themes.

– Local helpers are advised to act as coaches who facilitate constructivist learning that should take place in an autonomous "student-centred" manner based on self-pacing and individual motivation.

Tele-mentoring takes place on an individual level in case of the NETLogo material and on a group level in case of Creative Communications, while mentors continuously provide help for local helpers.

The visits of mentors to their assigned tele-house are crucial events that can determine the overall relationship of the individuals and group towards the mentor. The occasions should be used so the mentors and children get to know each other, develop confidence, establish personal relationship, and evoke the natural notion of wanting to progress further.

Mentors develop friendships with children by playing games in order to develop close relationships, not only for themselves, but to act as a team-building bond among the group itself. A four-day camping session, joining children from all tele-houses, was also realised after the first session. The real life events, games, and real communication have been the basic adhesives of community cohesion and resulted in further continuation via virtual ties between children and tele-house helpers.

4.4   Research method

Although the project was originally planned to last ten months — from September till June, the actual project lasted only during a six month session — December 2000 till June 2001 with a four-day camping event in July ending the session. That schedule allowed an in-between evaluation in March after which some changes could take place to adjust the problems arising within the Action Research session. The second session took place

from September 2001 till December 2001. Portfolio analysis of the children's work generated during the session is still under way.

Data was collected from 70 children in five tele-houses taking part in the first session as well as from 150 children in 11 tele-houses. Four of the telehouses taking part in the second session were also present in the first session. We also collected data from an additional elementary and secondary school where the materials were allowed to be used freely depending on the teacher.

Researchers maintain an overview of the process and immediately take note of conditions and resulting experiences to add to their research assignments within the Action Research process to lead the project to success. The project co-ordinator, Marta Turcsányi-Szabó, keeps the whole project going, while the administrative organiser from the tele-house centre attends to local technical issues.

The project uses an inductive research strategy including:
– Separate descriptions are compiled by both local helpers and distant mentors about the local situation, the process applied to fulfil the project, the problems encountered, the progress achieved in case of each child or inability encountered with an explanation of possible reasons. Note is made of any positive or negative experiences in connection with the project.
– Pre- and post-written structured questionnaires enquire about individual situations and interests, subject knowledge in ICT, attitudes about using computers and the role of ICT in society. The questionnaires also assess attitudes, behaviour and motivation of children towards computer games, which is a separate research issue.
– A 30 minute IQ test assesses children's logical, visual, and problem solving abilities.
– A portfolio analysis of the submitted work of each learner in comparison to individual situation, abilities, basic knowledge, progress, achievements, test results, and degree of creativity provides information on what has been accomplished.

5.   OUTCOMES

The pilot project did provide valuable feedback for future methods and tools needed. It also provided a possible model for e-learning in tele-houses using distant mentoring.

Our approach managed to accomplish the following goals:
– Children living in remote under-developed areas succeeded in mastering not only basic ICT skills, but also developed fluency in expressing

themselves with different tools and they learned the basics of learning at a distance.
- Children realised that computer games not only can be fun but that many opportunities are awaiting them through the use of ICT as they plan for their future.
- Student teachers tele-mentoring children's activities learned about the needs of children and the different methods and tools that can develop skills. They also learned how to motivate and evaluate, and learned about the different platforms of ICT use in everyday life and expression. The project made them understand the values and drawbacks of living in small remote communities and the ways capacity building can improve under-developed regions via ICT.

A few months after project closure, the following impacts can be seen:
- Tele-houses presented children with their certificates of participation at a town meeting, which increased the interest of the whole community in finding a way for continuation.
- 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.
- A physically impaired boy, who participated in both sessions, is now continuing his secondary studies at a distance.
- Surprisingly large numbers of participants choose Informatics themes in their secondary studies.
- Most children are confidently using e-mailing as a new form of social communication and were able to make good progress in an Internet Challenge game that we launched for schools.
- 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.
- 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."

It is now up to the tele-house movement as well as government sources to decide on any further continuation of tele-mentoring processes. In the wake of the outcomes, however, the participants are very hopeful that the process will have a continuation.

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BIOGRAPHY

Márta Turcsányi-Szabó received a Ph.D. in mathematics (Informatics) and is an associate professor at the Eötvös Loránd University, Informatics Methodology Group. Her research field includes application systems, design principles of educational programs, and the integration of computers into the creative learning process. She is head of the TEAM lab which is involved in evaluation, research and development of educational multimedia tools. Marta is a member of IFIP's Working Group 3.5.