

Logo practice: from “turtling” to interactivity

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Abstract

Programming is a subject that is taught by informatics teachers in Hungary, but the same might well apply elsewhere. Even though the government decree stresses the integration of subject areas within project work, it is very difficult for teachers to fulfil these requirements. Their professional ambitions concentrate on concepts of computer science and they do not have adequate experiences in merging other subject areas with their own.

Learning becomes a life long practice if exercised through adequate motivation. If clear-cut programming concepts fail to boost interest by themselves, then inspiring topics of designing interactive stories or games and modelling natural phenomenon might be a more valued approach as they connect better with the everyday experiences and interests of children.

Sleeping Beauty



Figure 1. An example story: Sleeping Beauty

The paper discusses the attitude of teachers and children towards Logo “turtling” and proposes a conversion towards more interactive topics which could tackle the same subject concepts in a different “coat”. This keeps motivation high enough to make learning an enjoyable experience. Networking teachers and learners can provide a helpful environment that boosts creations and develops Communities of Practice.

Keywords

Logo programming; National Curriculum; interactive self-expression; game development

Logo practice within the National Curriculum

Hungarian National Curriculum as of 1995

Since the launch of personal computers into schools way back in 1982 and the introduction of the well debated Hungarian National Curriculum (130/1995 government decree), which became compulsory in 1998, informatics classes were treated mainly as the platform for teaching programming, see *Table 1*. (Turcsányi-Szabó, Ambrusztter, 2001).

	Till end of 6th grade	Till end of 8th grade	Till end of 10th grade
Algorithms	Composing algorithms in text, diagrams and their understanding.	Developing algorithms through text and diagrams. Coding a simple algorithm.	Developing algorithms and coding. Knowledge of a few commands in a programming language.

Table 1. Material to be taught within Informatics – extract (130/1995 government decree)

Although the decree suggested integration into other cultural fields expressing: “Educators of all subjects have to transmit materials taking several common concepts into consideration, among others the craft of learning, thinking, self education, exploration and problem solving using all available tools” (130/1995 government decree). Several publications pinpointed possible areas:

- “Performing events with sequences of pictures and simple animation. Preparation of illustrations that represent change, development, or a phenomenon. ... Construction of text and picture, layout techniques. ... Connection between the context, the message and visual appeal.” (Visual studies)
- “How a movie develops a composition: tools for constructing meaning. Organising visual and sound elements in space and time. Fields of application of movies. ‘Information superhighway’ - interactive media.” (Movie and media Art)

The first author has presented several times at conferences for teachers expressing the need to switch from systematic teaching of programming methodology to design of educational games into which all topics can be integrated together with other subject areas. Yet, it was thought to be a far fetched idea and teachers protested, saying: “Gaming is not for school classes!”.

Hungarian Comenius Logo

Although Logo has been a legitimate choice and the Hungarian version of Comenius Logo was available from 1997 (Turcsányi-Szabó, Kossuth, 1997), it was treated by informatics teachers just as a first programming language “to make children believe as if they were programming”, restricting to basic commands of “turtling” and the turtle hardly ever got a colourful shape. Exceptional activities dealing with animations were highly appreciated by children (Dancsó, 2003), but treated as “just play” by most teachers. Several books on Logo appeared on the market, but most of them emphasised the programming side, even if some connections were mentioned in relation to other topics. Naturally, these could not convince teachers of any other subject areas to dive into programming topics for any reason.

As a consequence of these:

- Children interested in programming would reflect on Logo as being a “childish thing” and consider serious programming to start from something like Pascal.
- Children not interested in programming would rather choose any other topics like word processing or creating presentations, and would not be too successful in programming related areas. A large majority of girls fall into this category.

- Teachers (not professionals in IT) would not take the pain of getting to know Logo.

Hungarian National Curriculum as of 2003

The modified National Curriculum (243/2003. (XII.17.) government decree) came into effect from 2004 September, starting at elementary 1st grade, progressing then on in yearly succession, emphasised titles of integrated new media use and ICT, see *Table 2*.

	1-4th grade	5-6th grade	7-8th grade	9-12th grade
Algorithms	Recognising, composing, and executing simple algorithms. The use of simple authoring tools.	Developing algorithms for a given problem using computer. The use of simple authoring tools.	Design, development and execution of algorithms, or their elements for a given problem using authoring tools, algorithmic abstraction and the theory of stepwise refinement.	Designing, analysing developing, and executing algorithms for a given problem. The use of typical algorithms. The use of authoring tools.
Computer aided problem solving	Practicing problem solving using ICT.	The composition of problems using ICT terms. The general concept of algorithms. Investigation of control instruments in educational programs.	ICT tools and methods needed in solving problems. Investigation of models of random phenomenon and the effect of changing parameters.	ICT tools and methods for solving complex problems. Measurements and simulations, effects of changing parameters, and composition of regularity.
Constructing, editing text & pictures	Using and developing simple music applications and animations.	Editing basic elements (text, picture, music, illustration, animation, film) of a multimedia document.	Preparing multimedia documents with (text, picture, music, illustration, animation, film).	Preparing multimedia documents with (text, picture, music, illustration, animation, film) and modifying existing files.
Media informatics	Knowing the possibilities of ICT use in new media.	The use of internet portals, text and picture based resources.	The possibilities of ICT in conventional media (book, journal, radio, film, TV) and their use in the learning process.	The possibilities of ICT in non-conventional media and their use in the learning process.

Table 2. Material to be taught within Informatics – extract (2003 government decree)

The National Curriculum stresses on integration, project activities, and group work. Besides the government decree, several frameworks of possible subdivision of cultural areas and timing for school deliveries have been published. Besides, schools can develop their own configured

version of curriculum (compliant to the government decree) that suits and serves better the image foreseen by the staff and local community in every topic of the specified cultural areas.

	7-8th grade	9-12th grade
Communication	The reconstruction of simple events (combined in time and space) into picture series. The design and reconstruction of experiences, fictive or heard events into moving images (story-board, animation, interview). Narration.	The reconstruction of complex events (combined in time and space) into picture series. The design and reconstruction of experiences, fictive or heard events into moving images (études). Complex narration.

Table 3. Material to be taught within Movie and Media Art – extract (2003 government decree)

Thus, it could be a matter of choice at the school level: how and with what tools and methods each area (like e.g. Communication in Movie and Media Art, see Table 3.) is tackled.

HÁLogo portal and mentoring



Figure 2. HÁLogo portal – Table of Content page (click on picture to access)

By that time TeaM lab managed to publish HÁLogo educational material initiated by NETLogo project (NETLogo, 1999) and the extended Hungarian version together with its supporting portal (Turcsányi-Szabó, 2004b) was funded by KOMA XLVIII (Educational Modernising Foundation - <http://www.koma.hu/>) as "Embedding computers within pedagogical methodologies" project. The material used the Hungarian version of Comenius Logo to build multidisciplinary educational microworlds and support both their use in different subject areas (even areas like e.g. Language: creating expressions and stories, interpretation of words, language driven movies; and Drama: developing action poetry, moving postcards, story slides, and movies) and their development within informatics classes (Turcsányi-Szabó, 2001). These resources were used both in teacher training and as capacity building in tele-houses, which are public ICT access centres (Turcsányi-Szabó, 2004a), as well as spread in broader scale through tele-mentoring activities of undergraduate students within our teacher training (Turcsányi-Szabó, 2006c).

Our experiences in schools and tele-houses showed that such e-learning materials are very well applicable both in classes and in autonomous learning situations, where some local help is available and virtual mentoring is acceptable.

Unfortunately the material appeared a bit too late to be used widely in education:

- Logo phobia was far too strong, which also contributed to the fact that funds were provided for publication of HÁLogo material only four years after its development and six years after Comenius Logo entered schools.
- A lot of school computers switched operating systems to XP, which could not support the existing Comenius Logo versions and Kossuth Publishing was not eager to buy the upgrade of the country licence.
- Although there are around 900 registered members of HÁLogo portal (both children and teachers) the culture of virtual communication was not alive enough to allow the mentors of our teacher training to be able to help with the use of the e-learning materials. Users (probably being too shy within this new media) preferred to just use the portal as repository of recourses and did not ask for help or advice except in very scarce cases.

However, we did experience quite a few incidences of children tackling the material by themselves or with the help of their parents, since the school teacher did not use (or even was not aware of) these materials. This strengthened our beliefs, that such activities should indeed aim at children, who could look for help locally or virtually (through our mentoring services).

Hungarian Imagine

A successful EU project and a local resource development project, as well as four years of hard lobbying was needed till a new Logo version, “Imagine” (Abonyi-Tóth, et al. 2006) appeared officially, this time free for education. The success of the *Colabs Minerva* project (2002-2004) has initiated further development of the course materials developed within *Colabs* project, which guided children in learning how do develop their own projects, to provide a full scale of increasing levels of program development by motivation through games, boosting creativity through artistic expression. It was published both in Hungarian as “Digital Literacy” (Turcsányi-Szabó, 2006a) as well as in English language as “Creative Classroom” (Turcsányi-Szabó, 2006b) by Logotron (see *Figure 3*). These materials are used both in teacher training at ELTE university and is also accessible freely for educational purposes.

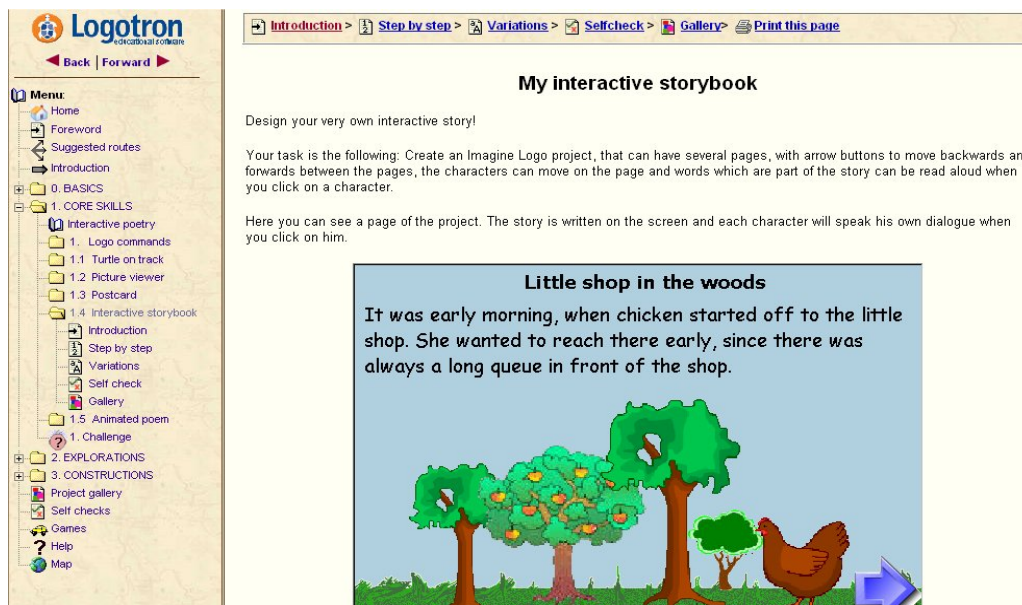


Figure 3. Creative Classroom CD – My interactive storybook unit (click on picture to view demo)

The material consists of three levels (apart from the 0 Basics level, *Core Skills, Explorations, Constructions*), where each level consists of five project approach units (developing projects mainly through direct manipulation) and one Logo approach unit (developing projects through Logo programming). Motivation is always initiated through games and simple, but interesting projects (more than 150) and units contain *step-by-step development, variations* to expand knowledge, *self checks* and a *gallery* containing new projects based on actual knowledge.

While “Creative Classroom” (which is now published on CD) is expected to be more widely distributed through a Learning Management System (LMS), “Digital Literacy” (which is now distributed through an LMS), called SDT (SchoolNet Digital Repository) is expected to have more effective use when published on a CD too. The reason is probably based on the fact, that while the schools in the UK are already functioning through the use of LMS technology (and require all learning materials to be integrated in this way), Hungarian schools are happier to access such locally, as technical facilities are not yet so perfect in all schools and the virtual *Zone of Proximal Development* (Vygotsky, 1978) is not yet a code of practice. Also, the LMS used in public education is not a perfect solution for all types of learning materials developed for K12. So, while the same material published on CD (based HTML technology) provides a highly interactive workbook of resources, SDT is less easily accessible for all age groups and needs more clicks to access individual LOs (Learning Objects), which thus become less coherent as a whole (see Figure 4.).

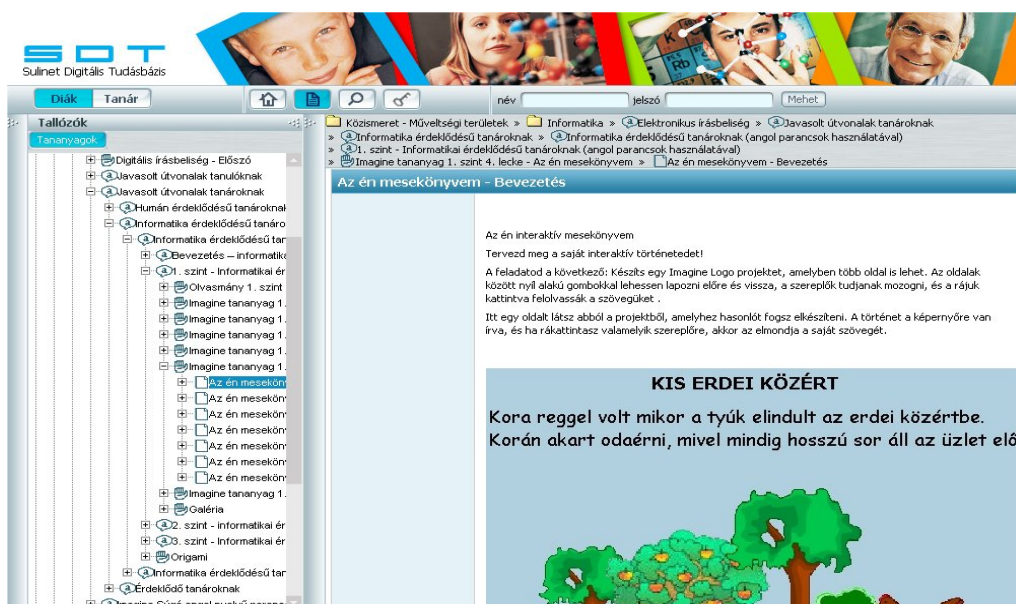


Figure 4. SDT Digital Literacy course – My interactive storybook unit (click on picture to access)

Teachers were happy to have free access to Imagine and the course material, but were unable to select suitable sets of activities that fit into the amount of hours allowed in their course work for a defined topic. We have set up the Imagine portal to give help for teachers and children in finding their way through activities with Imagine (Abonyi-Tóth, 2006), which now has more than a thousand registered users and their number increases rapidly. The portal summarises news about Imagine, projects launched, resources available and a networking area to upload projects, comment and develop dialog in the community. However this is mainly aimed at grownups and concentrates on general issues. Children would need a more focussed approach.

We have produced several such theme oriented portals for children, which concentrate mainly on visual representations and boosts creativity, like “Telling you in pictures” portal (Abonyi-Tóth, et al. 2005), that allows communication of smaller children through visuals; and “Logo

brushstrokes” portal (Rónai, Vörös, 2007), which motivates the creation of Art pieces, using some mathematics and Logo coding.

Similarly, the “Digital Literacy” course material is huge and it is difficult to have an overview of activities and isolate the necessary resources for activities, it is not really suitable for the SDT environment. Besides, a more focussed set of activities needs a portal to activate constructions through networking by allowing a real Community of Practice (CoP) to develop for the specified age group and defined themes. E.g. developing stories is a topic that is very much enjoyed by the 10-14 age group (both girls & boys) and it is a perfect topic to get into the basics of Imagine.

Self expression through stories

A lot of courses within the Informatics teacher training program are at master’s level as non-compulsory electives, which mainly relate to developing e-learning materials and running projects in public education (Turcsanyi-Szabo, 2006c). In case of the course dealing with authoring tools for children, the assignment for student teachers is mainly to develop modelling activities for different disciplines practicing constructivist pedagogy and giving interesting examples for children to start out with. Thus, in case of Imagine, student teachers had to develop stories themselves for the Gallery area, giving children ideas to develop themselves.

Imagine Story Portal

The story portal was first developed by Mátyás Szőke as assignment work for Telementoring course, which was later redesigned by the second author (Paksi, Turcsányi-Szabó, 2007) to run a research project as Ph.D. work, see *Figure 5*. The aim of the portal is to:

- Motivate the use of the existing “Digital Literacy” course material in SDT, putting Imagine into practice and evaluating its effect in school use.
- Compose a minimum set of course activities that can be tackled in any school setting extended by individual learning, which would later lead to more complex modelling.
- Providing 10-14 years old children to experience creative constructions through self-expression and quality work by developing interactive hypermedia stories, poems, games.
- Provide a portal where one can find examples (to get an appetite for creation), course material (to learn how to do), upload area (to create and publish own works), communication possibilities (to network with peers, authors and audience).
- Introduce children to activities with Imagine by teachers at school and strengthen their competencies to lead them on to autonomous learning phase, using the portal area, where they can find learning materials and also seek help if needed.



Figure 5. Imagine Story Portal – Gallery (click on picture to access)

The scope of the course material

The minimum set of course materials were put together by the second author and a trial activity with the lower age group was also conducted to see how it works and what might be missing, after which it was uploaded to the portal's course area. We had to make sure that this is indeed a minimum series of activities that would allow a child with basic computer knowledge to possess the competency needed for developing an interactive story on basic level, after which he/she can catch further bits of tricks from the SDT Digital Literacy course material to enhance own creations. Thus it is intended as a starter, which is enough for creative self expression, which could later be developed further into modelling techniques.

Interactive story competition

A competition for 10-14 aged children was finally launched in mid May, which seeks for Interactive story compositions developed with the Imagine authoring tool and we shall repeat this competition in autumn to see how it might work in school time within school classes.

Case studies

Imagine stories – initial classes

The second author teaches at the Radnóti Miklós, which is a practice school of ELTE University. There, he had a chance to try out the starting course materials after which he put together the final resources present in the portal. He taught in two classes, with 18 children each 10 years of age, mixed boys and girls. Children already possessed knowledge of basic computer use and out of the 36 children 10 had already some Comenius Logo classes in their previous school.

When they first heard that they will be dealing with the turtle, they became very disappointed, believing that there will be again “drawing pictures, fence, house, ...” like in their previous school all year. This illustrates well the attitude of this age group towards drawing algorithms.

Both classes had some activities with word processing and drawing before the Imagine topic appeared. All activities were related to stories: they either had to finish a story in a different way or start one from scratch using 10 words that were previously proposed by them. They then illustrated the story using the picture editor. It was a natural line to go over to Imagine and create stories that can not only be seen, but also heard (using the Hungarian Text-to-Speech and multimedia features of Imagine).

In order to be able to create interactive stories the following were considered as necessary knowledge: *drawing tools, inserting background, creating new turtle and configuring it, giving new shape to the turtle, using text-boxes, inserting new pages and jumping to pages, inserting new buttons and learning about their properties, changing the shape of the button, adding events to turtles and buttons.*

The starting class had to introduce Imagine to let children see the types of projects that can be developed with this authoring tool. So, the demo games were played, where boys mainly preferred logical and technical games and girls spent time with those programs that allowed creating drawings. However, both boys and girls enjoyed the *Control game*, so it was a natural task to ask children to draw backgrounds for the game (see Figure 6.). This task allowed the introduction of the first four knowledge items, which were learned at need, since children requested bits of tricks to produce quality works. By the end, everyone used backgrounds drawn by peers played each other’s games and discussed the quality and motivation of products.

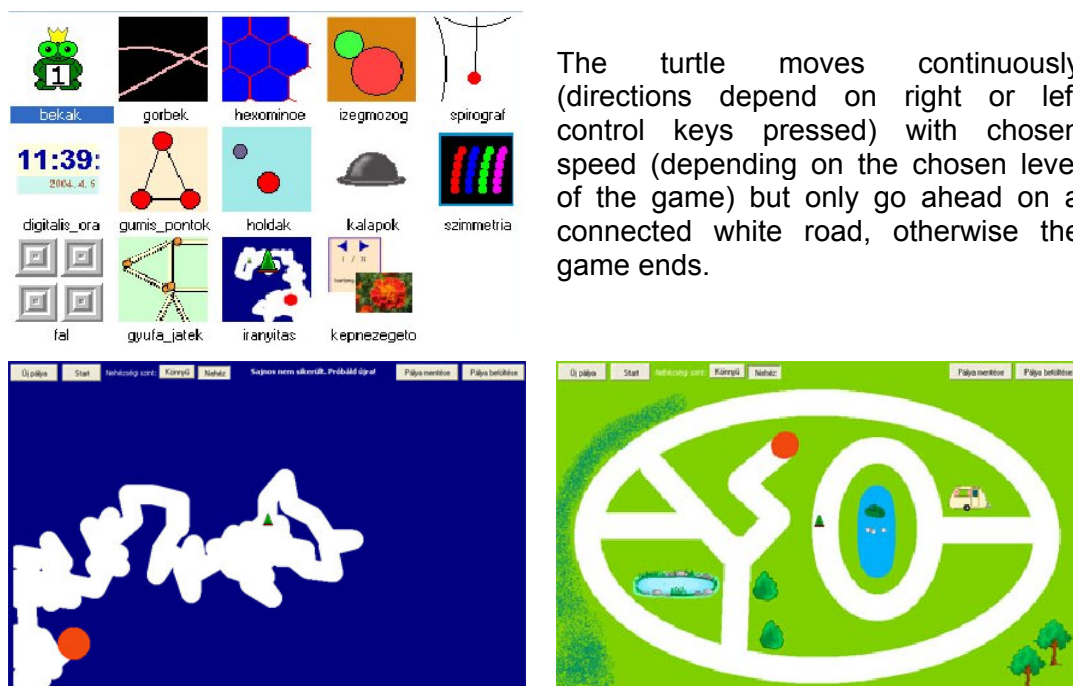


Figure 6. 1st row Demo games – Description of Control game – 2nd row backgrounds for Control game

As a next step (in order to stabilise this knowledge), children had to create a similar game, but instead of using control keys, they had to create buttons to control the turtle. This seemed at first for children to be a drawback, due to the use of buttons, but later they realised that this was more, as they produced the game itself (not just the background) by themselves.

The next step was to access the *1.1 Turtle on track* project within “Digital Literacy” course. This turned out to be a disaster as it took the whole class exactly 25 minutes to access the very same page due to it being deeply embedded within the course structure and the user interface did not allow a clear view of navigation (see Figure 4.). It was immediately concluded that the course material has to be extracted and presented in a more straightforward way for easy access.

The next two classes dealt with the two unit projects: *Turtle on track* and *My interactive story book*. Some children were at first bothered, why they need to do exactly as the step-by step instructions say, but it later turned out to be helpful not having to ask the teacher how to produce a new trick, since it was all written there. These last two classes allowed to finish introduction of the list of prescribed knowledge bits necessary for creating interactive stories and even gave

some time for defining events that would make the turtles move upon a click. So, children were satisfied to see that they are able to create an interactive storybook of their own interest.

In the next classes, children could create their own stories. They realised the importance of planning at the beginning, before starting out any project work, so that it would be designed properly and smoothly developed.

After these classes, one of the most interesting tasks emerged: drawing animations. Logomotion was used to produce different shape series that would suit the developing stories and children used their full creativity in producing different creations, having great fun all the way.

Later, children accessed the *Imagine Stories Portal* and enjoyed looking at the stories in the gallery, which gave them further ideas for their own creations. They realised that written text can be spoken as well, so that was their next challenge to make their texts interactive and be spoken out. They registered on the portal and learned how to install Imagine, to be able to install it on their own computer at home and show their parents their own creations.

By now all children are fluent with Imagine story creation and can produce simple animations with Logomotion.

Other Logo activities

“Evaluation of educational software” is another course at ELTE teacher training, which deals with the formative and pedagogic evaluation of educational software with respect to the National Curriculum where we often use educational microworlds and portals for evaluation that have been developed by our students in previous semesters or are parts of running projects. This year – among others – various types of Logo environments and activities have been chosen for evaluation as case studies, adding the following short comments as summaries:

- As little as 2x2 hours of activity with guidance was enough for a 10 year old girl with absolute minimum knowledge on computers (max. 15 minute daily emailing, no interest, no motivation, no knowledge of other applications) to be able to produce a 4 page interactive story with animation within Imagine. She used the course material on the *Interactive Story Portal*, finishing it alone, which developed after all the motivation to do so.
- Scratch (<http://scratch.mit.edu/index.html>) not only allows novice programmers to get acquainted with programming through game development, but also highly motivates those that already know how to program well. A good example of this is the level of motivation the two future teachers Péter Bernát and Marcell Balaton (who are both males and excellent programmers) had by also producing the Hungarian Scratch pages (Bernát, Balaton, 2007) and made their experiment (on purpose) with secondary school boys who are good programmers of at least the Pascal programming language. The networking possibility on the portal seemed to be also among the main attractions of activities.
- Secondary students (at first being disappointed to do anything with Logo) after a few hours of introductory activities joined in with great motivation to tackle problems using StarLogo (<http://education.mit.edu/starlogo-tng/index.htm>) & NetLogo (<http://ccl.northwestern.edu/netlogo/>). In both cases it seemed to be very helpful to be able to gain knowledge from an existing network and teachers found great interest in continuing to use the environment next semester too (even though both tools are only in English language).

Conclusion

It seems that inadequate practices of teachers putting only “turtling” into school activities has somehow degraded Logo into a childish thing. Why degrade Logo, when there are plenty of different variations that allow lots of interesting features to explore different subject areas, enjoy gaming, and self expression, which are all perfect subjects for learning about algorithms and programming and can be easily extended to more enhanced topics of modelling.

Exploring interactivity in an object oriented environment can be easily extended from the simple metaphors in game development (where there are actors that have defined behaviours) to more complex models, based on real life experiences.

In case of the English language cultures it is easy to choose from several resources, but much less options are available in case of less popular language areas, like Hungarian. We should make good use of localised products and developed learning materials through constructivist learning environments, which can develop effective CoP that are self-motivating and can very well increase the learning curve to produce effective communities of learners.

References

Abonyi-Tóth A., Bodnár E., Turcsanyi-Szabo, M. (2005). "Telling you in pictures" – communication bridging languages, Proceedings of Eurologo 2005, pp. 307-312, 27-30 August, Warsaw, Poland. <http://eurologo2005.oeiizk.waw.pl/PDF/E2005AbonyiEtAl.pdf>

Abonyi-Tóth, A. (2006) Imagine portal, at <http://imagine.elte.hu/>, TeaM Lab.

© Abonyi-Tóth, A., Turcsányi-Szabó, M., Windisch, J. (2006). „Magyar Imagine” (Hungarian Imagine), English original (© Blaho,A., Kalas, I., Salanci, L., Tomcsányi, P.) downloadable from <http://www.sulinet.hu/>

Bernát, P. Balaton, M. (2007) Hungarian Scratch pages, at <http://scratch.inf.elte.hu>, Team lab.

Colabs Minerva project (2002-2004) web page: <http://matchsz.inf.elte.hu/Colabs/>

Dancsó, T., (2003) Talent improving with the help of Logo pedagogy - ICT as reflected by interschool competitions, Proceedings of Eurologo 2003, 27-30 August Porto, Portugal.

Rónai, O., Vörös, V. (2007) Introduction, methodological analysis and experiences of Logo brushstrokes portal, ELTE Masters thesis and portal: <http://www.ecsetvonas.ini.hu/>

Paksi, A., Turcsányi-Szabó, M. (2007) Imagine Story Portal, at <http://meseportal.ini.hu/>, Team Lab.

© Turcsányi-Szabó M., & Kossuth Publishing Co., (1997) "Comenius Logo 3.0", original version (© Andrej Blaho, Ivan Kalas, Peter Tomcsányi), Kossuth Publishing Co.

Turcsányi-Szabó, M., Abonyi-Toth, A (1999). NETLogo teacher training material - Microworlds, A CD product of NETLogo MM1020 project (NETLogo – <http://www.netlogo.org> – not accessible any more).

Turcsányi-Szabó, M. (2001) "Subject Oriented Microworld Extendible environment for learning and tailoring educational tools", Informatika Vol 1 No 37, pp. 16-27, Matematikos ir Informatikos Institutas, Vilnius.

Turcsányi-Szabó, M., Ambrusztter, G. (2001) "The past, present, and future of computers in education – the Hungarian image", International Journal of Continuing Engineering Education and Life-Long learning., UNESCO, Volume 11, Nos 4/5/6., pp. 487-501 https://www.inderscience.com/search/index.php?action=record&rec_id=413&prevQuery=&ps=10&m=or

Turcsányi-Szabó, M. (2004a) „Informatics teacher training in Hungary: building community and capacity with tele-houses”, ed. A., Brown & N., Davis, World Yearbook of Education 2004: Digital Technology, Communities & Education, pp?277-288, RoutledgeFalmer

ed. Turcsányi-Szabó, M., (2004b). "HÁLogo portal" (Hungarian NETLogo portal with e-learning material), ELTE University TeaM Lab. Accessible at <http://kihivas.inf.elte.hu/halogo>

ed. Turcsányi-Szabó, M. (2006a). "Digitális Írásbeliség" (Digital Literacy e-learning material), Sulinet Digitális Tudásbázis (Schoolnet Digital Repository), <http://sdt.sulinet.hu/>

Turcsányi-Szabó, M. (2006b). Creative Classroom CD Logotron Ltd, Cambridge, http://www.logo.com/cat/view/creative_classroom.html

Turcsányi-Szabó, M. (2006c). Blending projects serving public education into teacher training. In Kumar, Deepak; Turner, Joe (Eds.) Education for the 21st Century - Impact of ICT and Digital Resources, IFIP 19th World Computer Congress, TC-3 Education, IFIP series Vol. 210, pp. 235-244, Springer. <http://www.springerlink.com/content/k8q6107r3gu60838/>

Vygotsky, L. S. (1978). Mind in society: The development of higher psychological processes. Cambridge, MA: Harvard University Press. Published originally in Russian in 1930. <http://www.marxists.org/archive/vygotsky/works/mind/>

130/1995 Government Regulation the National Curriculum, in Hungarian Gazette, Official paper of the Republic of Hungary 1995. No.91.

243/2003. (XII.17) Government Regulation the National Curriculum, on web page of the Ministry of Education: <http://www.okm.gov.hu/main.php?folderID=391&articleID=1478&ctag=articlelist&iid=1>