Five years experiences with the Finnish mathematics web magazine Solmu

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Why a web magazine? Finland has made massive investments in equipping schools with computers and Internet connections. To take advantage of these we started in 1996 a mathematics web magazine called Solmu (means a knot). The address is http://solmu.math.helsinki.fi

Practical arrangements; finances and labor

So far the labor has been volonteers, university mathematicians from the Helsinki area. Contact persons have been recently collected from most mathematics departments in the country. They write themselves and recruit people to write in Solmu. Internet work and graphic design are paid for. Papercopies are made in a simple, cheap way so that the overall cost is low. A permanent part-time worker would be very welcome, but so far financially impossible. We get money at the moment from a private foundation. Finnish Cultural Foundation has supported some of our activities related to Solmu. Ministry of Education assisted Solmu from spring 1997 to fall 2001 during the LUMA -project. The project ends 2002 and the resources of the final year are directed to evaluation of the project etc.

Papercopy is also handy

Net is the main publication forum, but a part of the material is published also as a papercopy and sent to schools who have asked for it, also to some people involved and supporting Solmu. Papercopies are also used to make Solmu better known, they are for ex. spred at the science Center Heureka.

What does Solmu contain?

Solmu contains files related to mathematics on a broad perspective. According to a recent study, upper primary teachers and secondary teachers like to read general articles on the importance of mathematics for their own enjoyments and to improve their mathematical education for ex. about history of mathematics.

Very popular is a link collection for upper secondary schools, since it is well organized in terms of short descriptions of the contents of the links and how and in which context to use them. Teachers do not have time and energy to work out such collections of links themselves but are happy to use them occasionally if they are well enough structured and worked out for them.

Solmu contains mathematical problems, solutions are also given (but separately). The Hungarian way of asking for solutions to be sent to be checked by their mathematics magazine KöMaL does not work in Finland but problems are popular for individual work and also teachers use them.

Solmu contains also a large file on women, mathematics and information society, which I wrote (Solmu 4/1998-1999). This includes in the part called tilastoja (means statistics) some interesting figures on women in mathematics and a map of Europe colored to indicate the percentage of women among tenured mathematicians at university level, originally I prepared the map for the video of European Women in Mathematics. Later on the material on women, mathematics and information society was offered to a publisher who hesitated a little due to the Internet publishing, but then decided to publish a revised version as a book. It seems that for larger files the two means of publishing do not disturb each other - the audiences might be somewhat different and those who like to have a book will buy it, some after being introduced to it in the web. It helps that the price is reasonably low, though.

Solmu also contains a series of ideas of teaching geometry with the assistance of the web. Question and answer service is provided.

Articles on the results of international mathematics achievement comparisons are also published. After TIMSS we took a big edition of papercopies (Solmu 1/2001), distributed a copy to each parliamentarian - no idea if and what they read - but the copy has a picture illustrating that Finland had almost the least amount of mathematics lessons in the TIMSS comparison. One weekly lesson for some grade was added to mathematics afterwards.

International collaboration

Some years ago I got interested in Hungarian ideas of teaching mathematics. This led to an active collaboration with Hungarian mathematicians and teachers. The role of Solmu has been instrumental. Translations from Hungarian have been made - fortunately a colleague of mine had studied Hungarian as a hobby and got interested in the project. The goal of the translations is to bring in ideas of Hungarian mathematics teaching. The translations are collected in Solmu´s address in the net. For spreading them Solmu an ideal way since it is easy for us and free for anybody interested. The content of translations have been Hungarian mathematical problems - interesting for Finns due to their

different mathematical approach. Also files on how to teach mathematics starting from preschool have been included. Notes form didactical courses given for teachers from primary to secondary level have been taken and submitted to Solmu. In some cases files have been modified just by changing the language and keeping the original illustrations.
When starting to bring in ideas from Hungary with no resources, Solmu has provided a possiblity to accumulate files little by little as resources have been obtained. The biggest problem was to cope with the copyrights, in the beginning nobody seemed to be able to give the adequate wording for an internet copyright agreement. It was very frustrating to call all sorts of experts and to get nowhere with the simple concrete problem.
Without Solmu the spreading of translations would have been impossible, no publisher is willing to take too much risk before knowing there is a market, hence non-commercial net publishing in Solmu was the only - and quite good - solution.
Current information on courses for teachers and other activities and contact persons´ addresses are also placed in Solmu and updated.
Solmu has collaboration agreement with Hungarian KöMaL and British Enrich. We can translate each others´ material and publish it.
Lately an EU -project called M-buttons, a multilingual mathematics context help for school level, started. The intention is to offer for pupils a possibility to "surf" with mathematics concepts. The countries involved are: England, Denmark, Poland, Slovakia, Lithuania, Hungary and Finland. The Finnish mirror will be located at the site of Solmu.

Primary experiment

The Finnish and Hungarian (so called Varga method) primary teaching of mathematics are quite different. In Finland the aim has basically been to concentrate on numbers and learn fast to do calculations. The Hungarian approach uses tools and builds up the basis for mathematical concepts in a concrete manner introducing mathematics in a much wider manner than only numbers. Pupils´ skills are activated on a broad basis. In 2000 two groups of Finnish primary teachers interested in Hungarian ideas started in different parts of Finland to experiment teaching year 1 mathematics applying Hungarian ideas after taking a course given by Hungarian teachers. The course consisted of only year 1 mathematics. In 2001 the same was repeated for year 2, a new group joined and started with year 1 course. In 2002 year 3 course was given. The notes of these courses and related practice sheets were published in Solmu tu support the experiment and spread information. The textbooks have been translated into Finnish with permission of the copyright holders. The agreement is to use them only for the experiment, so the books cannot be published in the net; related files in Solmu is a solution for the problem. For the teachers and pupils it would be of course much more convenient to have textbooks, but for that aim a commercial publisher should get convinced of the market prospects.

Problems In addition to being forced to rely on volunteers as for labor due to lack of resources, there are other problems:
Informing about the existence of Solmu in the media is almost impossible. It is possible to get the address of Solmu in only for ex. when writing an article on the primary experiment. The media has had hardly any interest for Solmu. The general attitude for mathematics is: nothing interesting for the media, something difficult, dry, engineer-like, which has lost its importance after the computer has become easily available. All journalists I have talked to have felt the need to tell how they did in mathematics at school. It seems to be a distribution into two groups- those who dislike and those who like mathematics. Also the small number of mathematically well-educated journalists makes the probability to encounter one almost hostile to mathematics big.
It is also quite demanding to make good Internet files to assist teaching and learning of math. Not many people have all the various skills needed, good ideas, knowleddge on how and where to use the computer profitably. Of course good mathematical understanding and strong, large knowledge of the subject itself is essential. Such people are so rare that they are extremely busy - and tend to be recruited by the industry. It also takes a lot of time to make for example illustrations - and to use these material in classroom needs small groups and lot of skilled guidance.

Profits of a webmagazine

- Internet is good for accumulating database
- It is freely available when and wherever, an easy and cheap distribution channel - once the technology has been purchased anyway
- It is easy to update (this is also a problem, since constant updating is needed and ofter forgotten)

Wishes for the future

- Solmu would need more stable financial grounds and part-time worker
- We have started a database on ecological applications of mathematics, but these need a lot of work and collaboration with people in other fields.
- In general a database with good applications of mathematics - not trivial and not too complicated - would be very much needed. Here international collaboration of mathematicians would be useful, to collect good cases together.