PERIODICA POLYTECHNICA SER. SOC. MAN. SCI. VOL. 8, NO. 1, PP. 41–48 (2000)

TRENDS OF LEARNING CONDITIONS IN SECONDARY SCHOOLS

Dániel VÍGH

Department of Technical Education
Budapest University of Technology and Economics
Vocational Training PhD Program
H-1111 Budapest, Egry J. Street 1, Hungary
Phone: +36-1-463-2116 Fax: +36-1-463-1697
E-mail:vigh@eik.bme.hu

Received: March 3, 2000

Abstract

This paper analyzes in detail the trends of learning conditions of secondary school teachers. We will introduce the attitude of secondary school teachers of exact sciences to multimedia teaching software development and we will also show the preferred learning conditions. In this paper the recent knowledge level of teachers in specific fields of information technology will be introduced.

Keywords: multimedia, educational software development, secondary school, internet.

1. Introduction

The on-going world-wide social renewal necessarily brings with it a change in the actual structure of cultures, inclusive of daily behaviors, habits and fads, and also the accompanying life-style and mind-set changes.

This transformation leads to a gradual detachment of an individual's own space... while the individual groups and various strata of societies, mutually interdepending, weave their dense webbings of the most recent societies.

In such a situation, all the available information, interpretation and structuring become an individual responsibility.

On the one hand, the detachment, and, on the other, the need for communication and the integration of technology characterize the civilizations' and cultures' present turbulent transformation. The most obvious result of these two forces is the advent of computers and the internet and their high popularity in Hungarian secondary level educational institutions. This change offers a wealth of new challenges to educators, challenges appearing stronger in some areas than in others. One of the leading challenges is to organize and direct the students' on-going studies via computers in order to attain the most effective result ever thought possible.

The internet's quick entry into schools took the educators by genuine surprise. They truly were not prepared to deal with all the expected problems in an acceptable way.

In vocational training, just like many other areas, the introduction of computer studies offers a myriad of opportunities as an educational tool [1].

2. Of the Investigation

Between 2nd and 9th of April, 1999 a test questionnaire was filled out by teachers of exact sciences working in secondary professional training institutions. After evaluating them, we made the necessary alterations on them.

Between 10th of April, 1999 and 30th of May the questionnaires were distributed among teachers of exact sciences working in Hungarian secondary professional training institutions (technical schools, skilled workers' training schools, specialized secondary schools).

According to the data of the Ministry of Education a total of 16453 teachers of exact sciences work in the various Hungarian professional training institutions. A total of 250 teachers sent back the questionnaires from among the investigated target group.

On the basis of the above data the sampling proportion is $(n/N = 250/16453^{*} \times 100)$ 1.52%, which is a satisfactory proportion for fulfilling the investigation [2].

An e-mail with the request to fill out the questionnaire was sent to all secondary professional training institutions concerned and found on the web side of KFKI [3] (a total of 311 e-mail addresses). With the help of Internet around 200 answers were received that satisfied the requirements of evaluation. Besides, the traditional paper form was also used in this survey.

3. What is the Attitude of Secondary School Teachers of Exact Sciences to Multimedia Teaching Software Development?

On the basis of the answers to the questionnaires returned we can differentiate four groups of secondary school teachers of exact sciences according to their attitude to multimedia teaching software and their development.

Teachers belonging to group I are totally averse to computers and teaching software. Teachers belonging to group II are not averse to computers, they would use and develop teaching software but do not have time, opportunity or knowledge in programming/computer usage to be able to involve computers into teaching.

Teachers belonging to group III would use teaching software if they had time, opportunity or knowledge in computer usage to involve computers into teaching, but they would not write them.

Teachers belonging to group IV have already used teaching software actively but would not write them.

Teachers belonging to group V have already used teaching software and would write them as well, or have already written one.

On the basis of the answers to the questionnaires we have summarized in *Table 1* the percentage of teachers of exact sciences working in secondary professional training institutions belonging to each group.

Table 1. The percentage of each group (in %) among teachers of exact sciences working in secondary professional training. See *Chart 1*

Group I	Group II	Group III	Group IV	Group V
14%	75%	0%	3%	8%

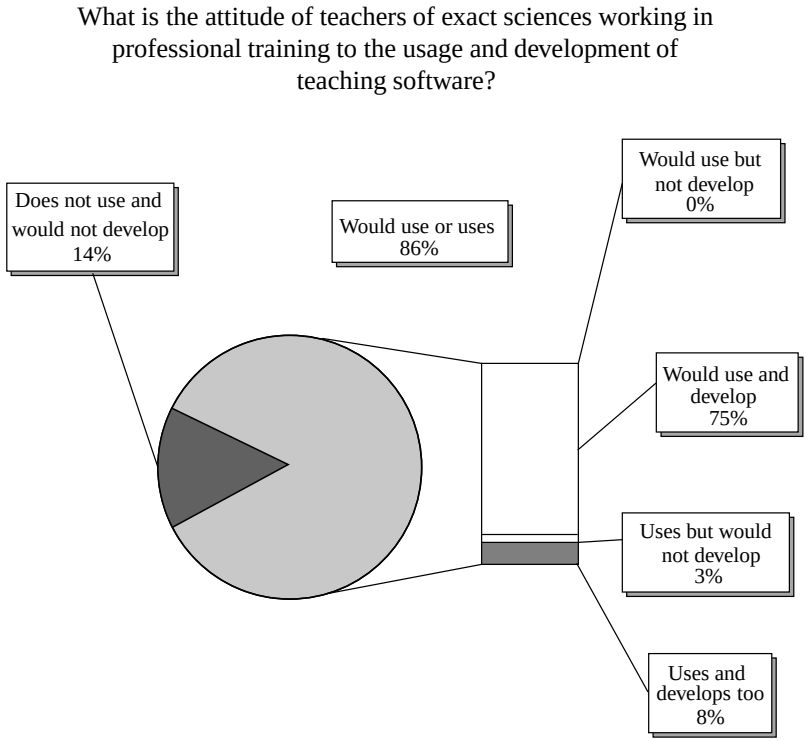

Chart 1.

Table 1 shows clearly that the majority of teachers of exact sciences working in professional training belongs to group II. They *would use and develop* teaching software for their students if they had time, knowledge and opportunity to do it.

In today's teachers training only IT specialists and teachers of computing can acquire the knowledge needed to write teaching software in their subjects that can be

applied sufficiently. The reason for it is evidently the small number of computers for educational purposes and normal usage to serve all the teacher students interested. This problem might be alleviated by the reduction of the price of the computers.

4. Preferred Learning Conditions

In our questionnaire survey we have also examined what learning conditions teachers of exact sciences working in professional training demand from the training where they would like to acquire the knowledge needed to develop teaching software and user-level computer handling. Our assumption when preparing the questionnaire was that answers referring to distance teaching would dominate, however, as practice proved, course-like learning conditions were preferred (See *Chart2*).

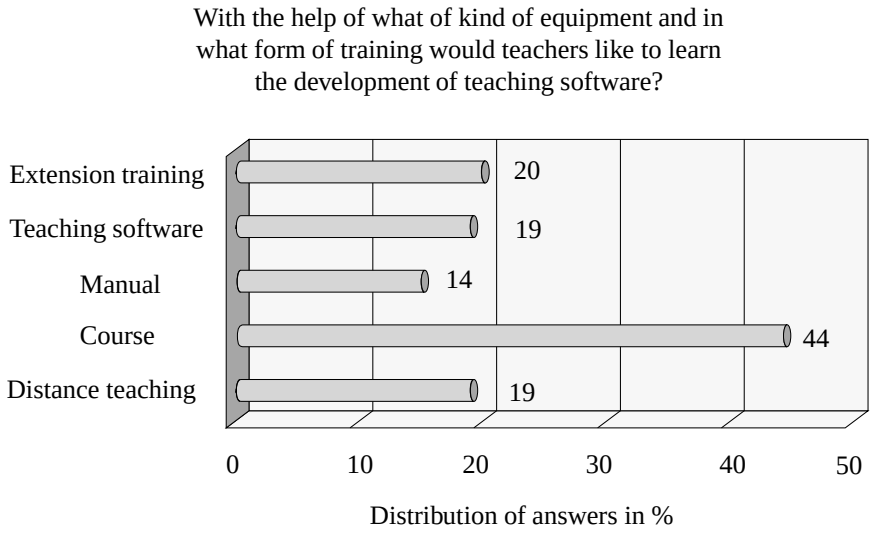

Chart 2.

The groups can be characterized with the following percentages: obligatory extension training 20%, individually with the help of teaching software 19%, individually with the help of a manual 14%, course *44%* and distance teaching 19% (with a sufficient number of consultation hours). Both the data and the texts show that teachers would like to acquire the knowledge within a course. This surprising result might be explained by the fact that nowadays courses provide the learning conditions preferred by those in question. Teachers in question find the acquiring of programming knowledge efficient if the following learning conditions exist: comprehensive material, fast transfer of knowledge, personal contact, sufficient explanations to the questions arising on the spot, the teacher should have a computer

at home, sufficient time and equipment to practise and the course should be held by an expert.

As to the efficacy of courses one of the answer givers has the following remark: 'At the beginning of the year I completed a course just like this one under the title 'Internet and computer in teaching chemistry'. I have learned a lot. This practical knowledge cannot be acquired so efficiently either by distance teaching or from a manual.' However, the practice is different elsewhere: 'Even today I impart my knowledge in information technology to my colleagues in a home-course form. In this way I can adjust teaching to the real practice of the teachers.'

A summarizing answer is also useful to be quoted: 'The opportunity of personal talk with the teachers is highly necessary, so distance teaching, the only manual-based help and the teaching software alone are not sufficient. Extension training (on the basis of my experience till now) means a lecture held to a big crowd and we could only see computers on the projector. The course-form might be the most sufficient.'

When processing these data we wondered how strong the relation was between where the teachers first got acquainted with computers and which form of teaching they consider the most appropriate to acquire the knowledge needed to develop teaching software. This is the association investigation of relations.

The results have shown that the relation between these two points is loose, since the measure of the Cramer-type association coefficient, that shows the strength of the relation and can fall between 0 and 1, was 0.1086 [4].

5. Recent Knowledge of the Teachers in Specific Fields of Information Technology

Now that we can see the required learning conditions, let's look at how wide the knowledge of teachers of exact sciences working in professional training is in computing (Internet and programming).

First, we shall outline the answers related to Internet knowledge. 92% of teachers of exact sciences working in professional training know at least one Internet application. Internet knowledge was examined by six topics. These are the following: WWW (World Wide Web), Telnet (distant machine access), E-Mail (electronic mail), FTP (system of rules of software forwarding), IRC (Internet chatting) and DNS (Domain Name Server, ordering the name and number of the computer). The results of how well the Internet applications are known are summarized in *Table2*.

It can be clearly seen from the results that a fair number of teachers is fully aware of the notion of electronic mail (E-Mail) and WWW which is heartening, however, it is regretful that only 25% of the teachers in question are aware of the notion of Internet chatting (IRC) used by most students. We consider it important because without knowledge the teacher cannot realize why a student is not paying attention to his/her lesson. It is not surprising that the notion of DNS is not well known because its knowledge is only useful to system masters. The knowledge

Table 2. The percentage (in %) of how well the Internet applications are known by teachers of exact sciences working in professional training institutions. See *Chart 3*

WWW	E-mail	Telnet	FTP	IRC	DNS
85	81	36	43	25	16

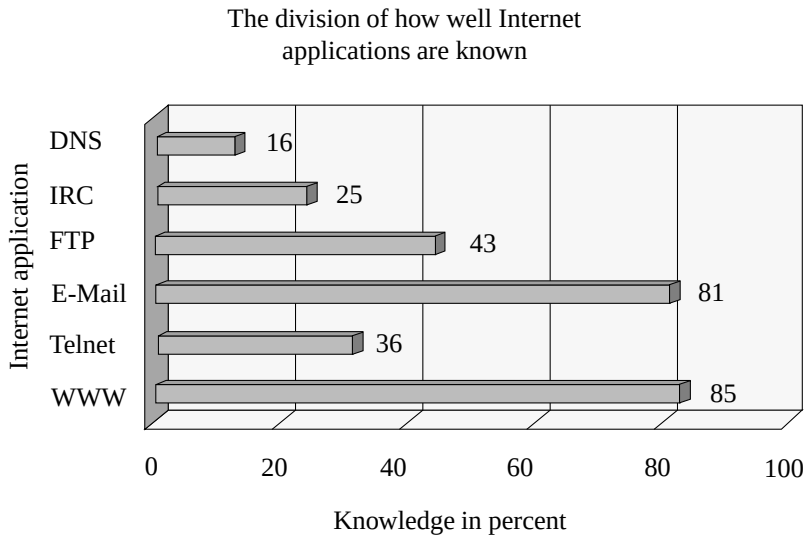

Chart 3.

of the notion of distant machine access is not crucial either because where the system allows it, a great number of people know it. The number of people knowing of the notion of FTP is also small, although this is the vehicle by which teaching software and other software can be forwarded on Internet. In knowledge of the above mentioned results we assume that teaching the notion of FTP and IRC should be included into the materials about Internet prepared to teachers.

The answers given to the other group of questions of our survey have shown that 63% of the teachers of exact sciences working in professional training is experienced in at least one programming environment. *Table 3* shows the percentage of how well each programming environment is known among the teachers of exact sciences working in professional training who are experienced in at least one programming environment.

We can see from the data that more than the half of those who are experienced in at least one developing environment, know PowerPoint presentation making software and HTML language. Knowing this, we can make a proposition concerning

Table 3. The percentage (in %) of how well programming (developing) environments are known among the teachers of exact sciences working in professional training institutions who are experienced in at least one programming language

Power Point	HTML	Pascal	Delphi, Visual C++	Macromedia	Toolbook	Other
70	54	27	18	5	2	9

the development of teaching software that only provide new information: we should develop the software in PowerPoint and then save it in HTML format so that it could be used directly from Internet. PowerPoint should not be needed to run the teaching software. This solution integrates the advantageous characteristic features of both environments (PowerPoint and HTML). The content and formal elements of the new information giving software can be done easily and fast by PowerPoint, however, to get a platform-independent software we have to save it in HTML format (PowerPoint can only do it from the 97 version).

In this way we get teaching software which is appropriate to direct Internet application and spreading.

Another group of software of the developing software seems to be the most suitable for those who would like to make more difficult calculations (Neobook, Toolbook). These software products do not require the complex knowledge of any of the programming languages and with their help we can also make teaching software that can be run directly from Internet.

On the basis of the above we can conclude that the most appropriate form of training for teachers who are already active teachers and would like to get acquainted with computers and software development should be created in the way that it meets the requirements of the following preferred learning conditions:

- the material should be comprehensive and contain all the necessary basic knowledge,
- the transfer of knowledge should be fast,
- there should be a personal contact between the teacher and the student,
- the questions arising on the spot should be explained sufficiently,
- the student could practise at home (the teacher should have a computer at home),
- there should be sufficient time and equipment to practise,
- the course should be held by an expert.

Nevertheless, we have to admit that the transfer of knowledge is not worth anything if the student is not motivated enough to acquire the knowledge. Therefore, the motivation of the students while they are learning should always be kept in mind.

We were delighted to experience during our survey that the majority of teachers would like to include teaching software into teaching and they would like to

acquire or have already acquired the knowledge needed to prepare software. The results of our survey further support the fact that developing environments needed to make teaching software strongly converge to some developing environments (program language) that will be determinative in the future [5].

References

[1] ÁDÁM, K. – KÖNCZÖL, T. – RACSKÓ, P. – TÖRÖK, P.: *A SULINET helye, szerepe a közoktatásban*. Budapest, MKM Informatikai Igazgatóság, 1998. (http://www.sulinet.hu).
[2] HUNYADI, L.: *Statisztika*. Budapest, Aula, 1997.
[3] http://www.kfki.hu/edu/iskola.koz.html
[4] FÜSTÖS, L. – KOVÁCS, L.: *A számítógépes adatelemzés statisztikai módszerei*. Budapest, Tankönyvkiadó, 1989.
[5] STEINMETZ, R.: *Multimédia: Bevezetés és alapok*. Budapest, Springer Hungarica, 1998.