Contemporary engineer pedagogic’s project research - using multimedia at technology classes in technical and vocational schools

Jožica Bezjak a *

* Facaulty of Education Koper, University of Primorska, Slovenia

Received October 29, 2009; revised December 7, 2009; accepted January 15, 2010

Abstract

In modern school different levels of teaching, besides gaining knowledge, are becoming more and more important, especially didactics and use of modern teaching technologies. The purpose of our research was to establish the use of multimedia at science classes in spite of only 5 days a year of additional permanent technical education for teachers, granted by law. We were interested in multi-level use of computers at science classes and teachers methodical approaches. The research included all science teachers in technical and vocational schools all over Slovenia. We can conclude that teachers have given the multimedia method more than big advantage over classical methods. Rationalization and efficiency improvement points of view were especially emphasized as the results have improved for more than half according to standard methods. Insufficient knowledge about multimedia and its advantages over classical methods was noticed among science teachers. But teachers gave multimedia big support in science classes and they exposed how necessary is to start using multimedia in future.

Keywords: Project learning; multimedia; teaching science.

1. Teaching science with multimedia

By studying of given literature (1-4) we learned that the way of transferring information with the help of multimedia is audiovisual and it enables motion pictures and two-way flow of information between the teacher and pupils. It combines advantages of audiovisual resources (episcope, video…) which are used in class.

Multimedia enables permanent visual contact between teacher and pupils. Reception of pupils can be constantly monitored by the teacher and multimedia helps him to create separate instructions for himself and for pupils individual. It also makes composing teaching preparations faster and more efficient; it is also possible to upgrade and improve them later.

Motion pictures provides an information which is more realistic and more complete. It is very important because most of occurrences are dynamical. Multimedia makes possible to show video clips and animations. Use of video data makes sense especially to show different material technologies in science classes or particular phases of
process. Video animations provide pupil with quality information when the exact idea of processes or events cannot be directly observed as a result of time, space or financial cause.

In this case the observation can be replaced by a multimedia class. It is specially useful to have a multimedia representation before taking an excursion as we can prepare the pupil and focus his attention in the most important phases of the process. That is not possible to do at the time of excursion because for lack of time or room. A multimedia class is also useful after the excursion. It systematizes and consolidates knowledge.

More demanding and deepen laboratory experiments which are too expensive to do can also be shown at a multimedia class. Some specific parts of experiments can be repeated.

Classic science lessons which has integrated multimedia parts at the right time and place can achieve great results. Everybody learn a lot, pupils and teachers, and they are extremely motivated (4).

2. Research problem

Our hypothesis was that one of main reasons to use multimedia in classes is to make teaching and learning more rational and to improve efficiency at achieving main goals of teaching- so the quantitative and qualitative points of view are linked.

Main goal of our research was to study the practicability of multimedia at science classes in Slovenia and to standardize its advantages over classical teaching methods.

3. Result interpretation

Swift technological progress demands constant attention from teachers, so they must improve their knowledge in both technical and didactical sense. We wanted to find out the teacher’s relation to introduction of multimedia at his subject. Their answers have confirmed most of our presumptions from tables 1 and 2.

Table 1. Answers in technical schools

| A. USAGE OF COMPUTER IN CLASS IS MULTI-LEVEL | Answer s in % |
|----------------------------------------------|--------------|
| 1. media for acquisition new knowledge       | 100          |
| 2. media for procedure simulation            | 70           |
| 3. media for analyzing data at laboratory courses | 75          |
| 4. media for animations and simulations      | 85           |
| 5. media for consolidating knowledge         | 45           |
| 6. media for accessing different sources of information in databank and on internet | 80|
| 7. media for pupils independent researches.  | 60           |

| B. DIDACTIC VIEWS OF USAGE MULTIMEDIA AT TECHNOLOGY CLASSES |
|-------------------------------------------------------------|
| 1. rationalization of education process                     | 70 |
| 2. greater individualization and pupils creativity          | 90 |
| 3. examination                                              | 100|
| 4. greater visualization and concretization of abstract conceptions | 90 |
| 5. material is easily transferable to other media           | 70 |
| 6. economy at work-possibilities for easily supplementing preparations | 75 |
| 7. safety at work                                           | 60 |

| C. METODIC VIEWS OF MULTIMEDIA TEACHING                     |
|-------------------------------------------------------------|
| 1. step-by step method – combination of standard and in multimedia methods | 70 |
| 2. previous independent pupils preparing of material at home | 20 |
| 3. usage of multimedia for demonstration- evident exercise course | 80 |
| 4. work with defined group of pupils at research problems    | 40 |
Table 2. Answers in vocational schools

A. USAGE OF COMPUTER IN CLASS IS MULTI-LEVEL

| Answers in % |
|---------------|
| 1. media for acquisition new knowledge | 70 |
| 2. media for procedure simulation | 70 |
| 3. media for analyzing data at laboratory courses | 55 |
| 4. media for animations and simulations | 80 |
| 5. media for consolidating knowledge | 20 |
| 6. media for accessing different sources of information in databank and on internet | 75 |
| 7. media for pupils independent researches. | 45 |

B. DIDACTIC VIEWS OF USAGE MULTIMEDIA AT TECHNOLOGY CLASSES

| Answers in % |
|---------------|
| 1. rationalization of education process | 60 |
| 2. greater individualization and pupils creativity | 65 |
| 3. examination | 30 |
| 4. greater visualization and concretization of abstract conceptions | 80 |
| 5. material is easily transferable to other media | 55 |
| 6. economy at work - possibilities for easily supplementing preparations | 80 |
| 7. safety at work | 40 |

C. METODIC VIEWS OF MULTIMEDIA TEACHING

| Answers in % |
|---------------|
| 1. step-by-step method – combination of standard and in multimedia methods | 80 |
| 2. previous independent pupils preparing of material at home | 5 |
| 3. usage of multimedia for demonstration - evident exercise course | 70 |
| 4. work with defined group of pupils at research problems | 20 |
3.1. Interpretation of part a from table 1, 2:

The table shows that teachers have confirmed our presumptions, except for points 5 and 7. These answers are lower because of unsuitable software on pupil’s home computers.

Answers to the additional question for point 1, regarding the time of remembering certain knowledge, also confirm our presumptions (chart 1 a, b).

Figure 1 a, b. Remembering of certain knowledge based on different courses (4)
3.2. Interpretation of part B from table 1,2

Our general claims about advantages of multimedia over other communication systems have seen similarly valued.

On additional question to point 7, whether they are acquainted enough with safety rules at working behind computer (monitor filters, Low radiation monitors, correct positioning of computers in classrooms…), only 30% answered that they have heard something about it.

3.3. Interpretation of part C from table 1,2

Results of these questions were expected, especially of matter 2 and 4, as they are depended on pupils home computer software and hardware.

Teachers especially exposed the statement that we can show demanding technological processes and experiments with multimedia and they can gradually go from less to more demanding teaching material, which also helps to observe pupils comprehension.

4. Conclusion

As computers improve our every day life, multimedia also brings many advantages in teaching process. Mainly it improves transfer of information on a teacher – pupil relation and raises motivation.

Based on our research we can conclude that main advantages of multimedia method of teaching are: faster transfer of information, draws attention and interest of pupils, which improves remembrance, it makes complex contents more understanding, teaching material can be deepen and later upgraded, it enables to change the dynamics of shown material and to transfer a part of material to other media, it can bring dangerous tests, experiments and processes into our classroom and make them plain and understandable.

All that has big influence on pupils results in technical schools which have improved for as much as 50%, especially by worse pupils.

Answers about insufficient multimedia knowledge are really interested (table 2, part C). Both science teachers and pupils in vocational schools answered similar. However they all gave big support to multimedia classes in future.

References

Collin, S.: Kako deluje multimedija, DZS, Ljubljana, 1995.
Erickson, J. F., Vonk, A. J.: Computer essentials in education, Mc Graw- Hill, New York, 1994.
Hay, K. E.: Student as multimedia composer, Computer Education, 1995, vol. 23.
MELEZINEK, A.: Anerkennung als Techniklehrer für Europa: Das Register Europäischer Ingenieurpädagogen ING-PAED IGIP®. in: Melezinek, A. (Hrsg.) Interdisziplinarität und Internationalität der Klagenfurter Universität: Die Klagenfurter Ingenieurpädagogische Schule®, Leuchtturm Verlag, Alsbach/Bergstraße, 1995.
Bezjak, J.: Multimedia, CD, Klagenfurt, 2007.
Bezjak, J.: Project lerning-from idea to product, Ljubljana, 2007.
BEZJAK, Jožica. Multimedia. Klagenfurt: Fakultät für Kulturwissenschaften, 2003. 1 optični disk (CD-ROM). [COBISS.SI-ID 5285961]
BEZJAK, Jožica. Project learn work : from idea to product. Klagenfurt: Fakultät für Kulturwissenschaften, 2003. 1 optični disk (CD-ROM). [COBISS.SI-ID 5285705]
BEZJAK, Jožica. Die Ausgewählte Kapitel aus der Didaktik der Technik I. Klagenfurt: LVM, 2009. 76 str., ilustr. ISBN 978-961-6397-09-4. [COBISS.SI-ID 243731456]
BEZJAK, Jožica. Ausgewählte Kapitel aus der Didaktik der Technik II. Klagenfurt: LVM, 2009. 95 str., ilustr. ISBN 978-961-6397-10-0. [COBISS.SI-ID 243838976]
BEZJAK, Jožica. Contemporary forms of pedagogic - PUD-BJ. Klagenfurt: LVM, 2009. 66 str., ilustr. ISBN 978-961-6397-12-4. [COBISS.SI-ID 245921280]
BEZJAK, Jožica. Project learning of model PUD-BJ - from idea to the product. Klagenfurt: LVM for Verlag S. Novak, 2009. 74 f., ilustr. ISBN 978-961-6397-11-7. [COBISS.SI-ID 245920768]