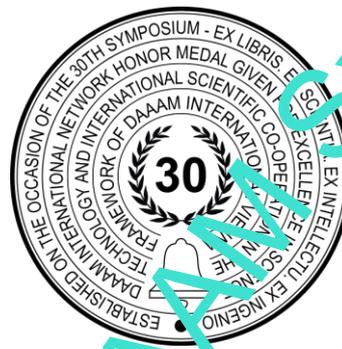


NEW TEACHING AID FOR TEACHING MULTIMEDIA SUBJECT AT SECONDARY SCHOOLS IN CZECH REPUBLIC

Karel Perutka & David Pavlusek



This Publication has to be referred as: Perutka, K[arel] & Pavlusek, D[avid] (2020). New Teaching Aid for Teaching Multimedia Subject at Secondary Schools in Czech Republic, Proceedings of the 31st DAAAM International Symposium, pp.xxxx-xxxx, B. Katalinic (Ed.), Published by DAAAM International, ISBN 978-3-902734-xx-x, ISSN 1726-9679, Vienna, Austria

DOI: 10.2507/31st.daaam.proceedings.xxx

Abstract

The aim of the work was to get acquainted in detail with the framework educational programs for secondary schools and on their basis to create the questionnaire for secondary schools, which will find out which programs are used in schools in the subjects of informatics, in the field of multimedia. From detailed research, the authors received detailed information about the most widely used programs. They are the following ones - Gimp, Zoner Draw 5, Audacity, 3D Paint, and Video Editor. Presentations were created for these programs in a uniform form (for each software separately), which serve as a guide to the use of the program and a set of worksheets, including a longer-term project. Worksheets are created independently of the software, contain thematically defined assignments and evaluation methods. They can therefore also be used independently of presentations. The difficulty is based on questionnaires - according to the number of hours that schools devote to individual topics. After the completion of the presentations, the materials were sent to schools and, based on the feedback (second questionnaire), the shortcomings and inadequacies that were originally in the materials were corrected.

Keywords: Multimedia; Pedagogy; Teaching Aid; Graphics; Worksheets.

1. Introduction

Education is used in the context of morality, behaviour towards oneself and others. It is about the formation of personality traits. The Latin word *eruditio* means education and learning. This term refers to the process of acquiring new skills and knowledge. It is understood as an integral part of education. It is possible to combine these concepts into one and thus understand their broader meaning. In practice, it is important to understand that pedagogy covers and provides education. Mainly, during the last years, it is very important to know how to look for accurate information. Thanks to the technological development of the present, the field of informatics, mainly the multimedia field, is also widely used during educational process. Nowadays, the creation of the majority of advertising (print, audio or audio-visual material) is created digitally.

Multimedia is widely used for creating teaching materials. We can mention the work of Cloonan & Fingeret [7] who focus on surgery. Their paper also nicely describes educational theory and designing teaching materials. Multimedia-

aided English teaching is another area where multimedia software was used. As authors mention, multimedia-assisted English teaching can inspire students' enthusiasm for communication [6]. It is also important to get the feedback from the students if they like multimedia in teaching or not. Such research or study was realized for example in Ireland [3]. They found out that students prefer interactive multimedia as a feasible resource for practical learning. Usage of multimedia technology for teaching and training helps to reach the effective design goals [4]. There was also studied the impact of multimedia presentations on engineering education [5]. Multimedia presentations in engineering education makes the teaching-learning environment better as well as attractive.

There was created a new application to support teaching the multimedia subjects at the secondary schools in the Czech Republic. It is described in the following chapters, and it is based on the work of Pavlusek [1] under Perutka's supervision. It continues in the work of Perutka and Zaoral [2] in different subjects and with a completely new application. Firstly, there is given the information about structure of education in the Czech Republic and about informatics at secondary schools in the Czech Republic. This is followed by the survey monitoring the real situation at secondary schools. After that, the created materials are presented. Finally, the verification of created tasks is presented together with the correction of deficiencies resulted from the questionnaire.

2. Structure of Secondary Education in the Czech Republic, Informatics in Secondary School in Czech Republic

2.1. Framework educational program

Framework educational program (FEP) is the group of binding documents that clearly define the framework for the creation of school education programs (hereinafter SEP). When creating school plans, these principles must be guided by pre-school, primary, basic artistic, language and secondary levels of education. These programs are unified rules defining:

- objectives, forms, duration, compulsory content and scope of education
- conditions of course and completion of education
- binding conditions for the creation of SEP
- evaluation of learning outcomes
- creation and assessment of textbooks or textbooks

Conditions are:

- for the education of pupils with special educational needs
- material, personnel and organizational
- occupational safety and health club knows

These documents are managed by the Ministry of Education, Youth and Sports of the Czech Republic and must correspond to the latest findings in scientific disciplines, pedagogy and psychology. In the Czech Republic, these documents were introduced in the form of the Education Law No. 561/2004.

2.2. School educational program

Based on the established rules of the FEP, schools create SEPs, which are educational programs that are adapted to their school. This document must be in accordance with the FEP, as it is its superior.

The SEP is issued by the principal of the school or school facility. They must publish it in an accessible place at the school, where anyone can look at it, create notes or copy it. The content of education is included in selected subjects or modules within the educational program. The SEP for education, for which no FEP is issued, determines in particular:

- Specific goals of education
- Length, forms, content and timetable of education
- Conditions for the admission of applicants, the course and completion of education (including the conditions for the education of pupils with special educational needs)
- Provides a description of material, personnel and economic conditions
- Occupational safety and health, for which education in a particular school or school facility takes place

2.3. Secondary level of education

Secondary education builds on primary education and prepares pupils for the next level, i.e. higher or higher level of education. Or, possibly, for the qualified performance of a profession and work activity. In addition to pupils up to 18/19, secondary education also enables adults to study. High school can be completed in three ways:

Secondary education (fields of category J and C)

After completing 1-2 years of full-time study. The output is only a certificate. For example, a care service (J). In addition, it may be ancillary activities intended for pupils with more severe forms of disability (C).

- Secondary education with an apprenticeship certificate (fields of categories H and E)

The student must attend these fields for 2-3 years in the form of full-time study. Standard apprenticeship, where after 3 years and obtaining an apprenticeship certificate, you can continue your follow-up studies with a high school diploma - category H: salesman / mechanic. In the category of E include fields that are 2- 3 years, have lower demands on general knowledge and prepare graduates to perform simple works (services). These schools are designed primarily for children with special educational needs.

- Secondary education with a school-leaving examination (categories M , L , K and P)

After this level of education, you can continue your studies at a university or college.

M: complete secondary vocational education. It is 4-year preparation for a professional character, e.g. electrical engineering.

L: This category originated from earlier fields of study. The study prepares for a demanding manual occupation or lower management positions. These are mechanics of machines.

K: Grammar schools that are non-professional and prepare for the next level of education. With the proviso that it is further divided into K / 4 - four years, K / 6 - six years and K / 8 - eight years.

P: Conservatories - preparation for artistic professions. Six and eight years of study is conditioned by talent exams. Graduates can use the title DiS or finish it after the 4th year with a school-leaving examination.

2.4. Secondary schools

FEP for secondary schools is divided according to the focus of the school into:

- FEP for secondary schools
- FEP for secondary schools with sports training
- FEP for bilingual secondary schools

Multi-year secondary schools have the opportunity to choose whether they want to create one SEP or two: for a lower level of education and for a higher level.

2.5. Informatics at Secondary Schools (FEP G - Informatics and information and communication technologies)

Information technology (hereinafter referred to as IT) at the secondary school is a smooth continuation of the skills that pupils have acquired by completing basic education. Thus, the necessary literacy to control and work with technology. The task of secondary education is to deepen students' knowledge and skills in the field of IT. Such a way as to be able to creatively use informatics and communication technology, focus on the dynamically developing field of IT, all in compliance with the ethical principles. The student is guided to better process the information obtained using IT, by simultaneously controlling their transformation (modification).

Educational content:

Digital technology:

- Informatics
- Hardware
- Software
- Information networks
- Digital world
- Maintenance and data protection
- Ergonomics, hygiene and safety of work with ICT

Sources and information retrieval, communication:

- Internet
- Information
- Sharing professional information
- Information ethics, legislation

Processing and presentation of information:

- Publishing
- Application software for working with information

- Task algorithm

3. Survey Monitoring Real Situation at Secondary Schools

The questionnaire survey was conducted in two waves and always using an online questionnaire. First Wave: Approximately half of the responses (7 from 17) was obtained on agreement of the author with teachers. A total of 10 schools were addressed here. In order to obtain a larger volume of data, it was necessary to contact other schools. In this second wave, schools were contacted by e-mail. Specifically, there are another 18 schools. In eight of them, the teachers were so kind as to fill in a questionnaire.

It should be noted that all the addressed schools were from the Zlín Region. Three of them were private schools. Schools were selected according to their fields so as not to address schools where computer science is not taught. These were mainly secondary schools, industrial schools and schools with technically oriented fields of study. Information on which school the answer came from was optional.

The first question was: What is the total number of hours you devote to each area of multimedia in the subject of informatics?

The figure below clearly shows the individual summaries of all areas. Therefore, 2D graphics (raster and vector) are most often taught. At each school, they deal with at least one of them. Audio, video and 3D graphics are not taught in 18% of schools. At seven schools, 41%, they are teaching only some of these three areas (all at three schools) and at the same time to the minimum possible extent. For the remaining schools, it is taught within the hours that can be seen in the chart below.

Only one school provided additional information on this issue: "Teaching 2D (1st and 2nd year) and 3D (3rd and 4th year) computer graphics during all 4 years." This is a chronological continuity of the curriculum. "Vector graphics, audio, video - we insert objects in MS OFFICE". This school uses the advanced capabilities of Microsoft Office.

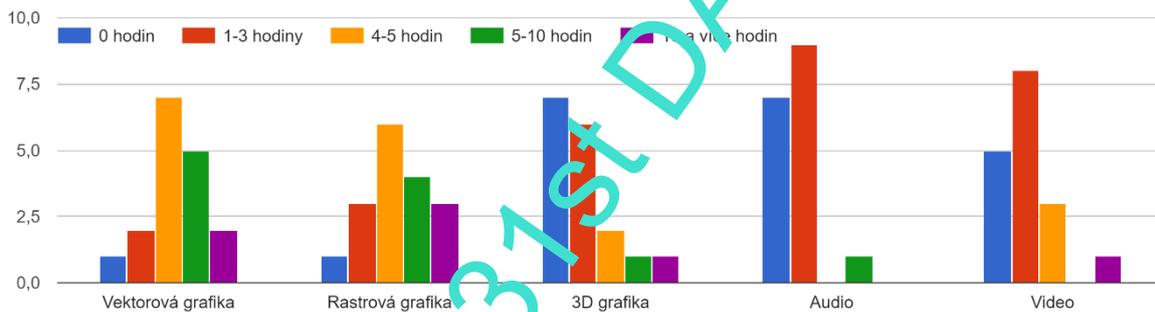


Fig. 1. Number of hours given to specific parts of multimedia at secondary schools

The second question was: Do you use free or paid software to teach computer science at your school?

As it is found out in the first question that 3D graphics, video and audio schools do not teach much, so does the purchase price of the respective programs. These three areas are mostly taught using free software. At RG as the sole, as shown in Figure no. 2 is the most preferred paid software. At VG, the programs are divided almost exactly in half.

Two notes are registered with the comments on this issue: One school uses only paid software with the note "school license" and the other school specified on "Adobe Creative Cloud and Cinema 4D".

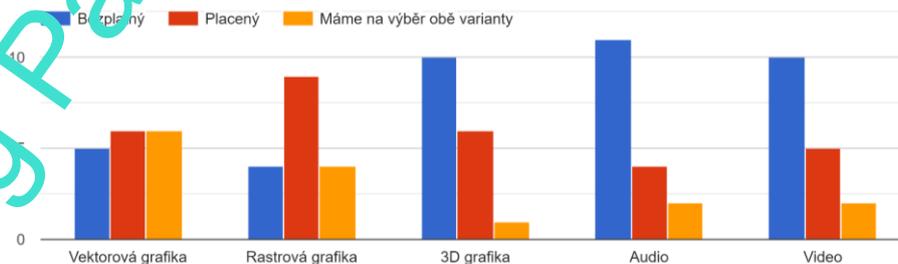


Fig. 2. Usage of Paid (red) or Free (Blue) or Both (yellow) Software at the Selected Schools

The third question was: Please list the names of the programs you use in computer science classes (from multimedia areas).

List of information received:

- Raster graphics:
PhotoFiltre - 1, Pixlr - 1 x: an online tool, Paint - 2, Adobe Photoshop - 3 (+ 1 CreativeCloud : not further specified program), Zoner Photo Studio - 5 x, GIMP - 6 x
- Vector graphics:
Adobe Illustrator - 1 (1 + CreativeCloud : not further specified program), CorelDRAW - 4 x, Inkscape - 4x, Zoner Draw - 4x
- 3D graphics:
SketchUp - 1x, Cinema 4D - 1x, Adobe Premiere - 1x (+ 1x CreativeCloud: no program specified), 3D Painting - 3x
- Audio: Audacity - 3x
- Video: Shortcut - 1x, Windows Movie Maker - 3x

The programs that are most often used for teaching computer science at high schools are:

- GIMP - raster graphics
- Zoner Callisto - vector graphics (at VG 3 software is represented to the same extent, but SW from the company Zoner is numerous represented at RG, where it is not selected so it is selected for VG processing)
- 3D painting - 3D graphics
- Audacity - audio
- Photos - Video editor - video (since this software is no longer supported in Windows 10 and available for download directly from the manufacturer, so this program is processed, which is a direct successor. SW is available as part of Windows. Completely free of charge (included in the price of the operating system). The program offers the same functions as the predecessor Media player, but is extended by modern 3D tools and effects.

To this question were obtained supplemented notes: "We have a Computer Graphics course that I teach, I use Adobe Photoshop, Illustrator, InDesign there." However, the teacher did not list these programs in the box for 4 questions. It was not possible to say with certainty whether it was not some form of optional subject. Photoshop would theoretically achieve the same representation as GIMP. And the second note was: "The video editors used are constantly changing approx. every 2 years". This was the school that currently used Windows Movie Maker.

4. Created Materials

From the subject of informatics, teaching materials are focused only on multimedia areas. Of the raster graphics, schools use SW Gimp the most, of vector graphics it is Zoner Callisto 5, of 3D graphics: 3D painting, schools use Audacity the most for audio editing and the Video Editor (Photos) for video editing.

4.1. Presentations

All materials were prepared in the same form of PowerPoint presentation. PowerPoint is chosen for its wide compatibility on all platforms and free use options.

All presentations have many features in common. They are based on:

- Method of control / interaction
- Basic theory
- Download link / other instructions
- Environment program:
Navigation bar
Toolbar
- Teaching materials
Worksheets
Project
- Video tutorials

Each presentation is created in an interactive form - on each slide there are buttons for quick movement around the presentation, as can be seen in the following image, where the navigation bar of the presentation (the lower part of the slide of the presentation). There are arrows in the navigation bar that move to the previous / next tool and two houses. A house with the same colour is a return to the tool menu and the one with a different colour is a return to the home page.



Fig. 3. Main Structure of Created Materials – Presentations in MS PowerPoint

4.2. Worksheets

According to the results of the questionnaire survey, which say how many hours are devoted to individual topics, the number of worksheets and their complexity is created. For graphics programs there are worksheets of three and for audio and video there are two. Worksheets are taken as a control (test) for a maximum of one lesson. Students have 2-3 weeks to develop projects, with the proviso that the project is not just about working with a given program, but usually must obtain the source data themselves. Make a video, record audio or take a picture.

Each worksheet contains two tables. In the first is an assignment from the teacher and in the second the student writes documentation. Part of the assignment is a verbal description of the requirements, information to be developed and the method of evaluation. Worksheets of the vast majority have 10 points (with some entering the opportunity to get bonus points for extra work done) and projects over 30 points and can also have bonus points. In some cases, bans are also defined for which points are deducted. In presentations, there is always room to attach sample work, which each teacher can upload himself and thus additionally correct the difficulty of the assignment.

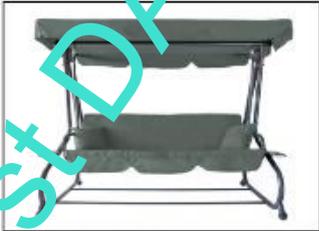
5. Verification of Created Tasks and Correction of Deficiencies Resulted from Questionnaire

The purpose of task verification is to find out in practice how well the materials are prepared and what needs to be corrected. The content of the teaching materials is based on the results of the questionnaire in Chapter 3, which was used to determine that the teaching materials are created for the programs Gimp, Zoner Callisto 5, 3D Painting, Audacity and Video Editor (Photos). From these results, the difficulty and number of tasks were also deduced - for worksheets and projects. The level of detail of the software presentation is always the same - limited to all applicable tools and each individual program is presented in the same comprehensive form.

This research is divided into two parts. So one questionnaire was for teacher and the other for students. The questions are basically very similar, but for teachers the emphasis is on evaluating the technical side, the adequacy of the chosen difficulty of the tasks and whether the speech is appropriate and sufficient. For students, the emphasis is more on their own impression of the presentation. So as they enter which part of it suits them best (text instructions or video-tutorial) whether they found everything, what is needed and scale values of subjective perception of the chosen difficulty and quality.

All those who have already cooperated in some way in the elaboration of the mentioned previous questionnaire are primarily addressed. In this way, teachers access these materials and, in addition to evaluation, can also start using them in their own teaching. A previous survey shows that three quarters of teachers are interested in these materials. However, in order to obtain a larger number of evaluating respondents, it was necessary to contact a total of 528 schools, as the initial return was only 6%. The total number of addressed schools is based on the sum of all secondary schools operating in the Czech Republic and secondary industrial schools (379 secondary schools and 149 industrial schools).

Střední škola – informatika – Rastrová grafika – Pracovní list č.2

Název práce	Úprava fotografie
Zadání	<ul style="list-style-type: none"> - Na obrázku máte vyznačené 4 oblasti, které musíte opravit. - Vlevo dole: 2 oblasti, ze kterých odstraníte plevele. - Okno na chalupě odstraníte jako by tak žádné nebylo. - Místo střechy vzadu naklonujete stromy. - Poté odstraníte z oblohy mraky a celou ji zesvětlíte a dáte do pěkného modrého nádechu.  <ul style="list-style-type: none"> - Poté odstraníte z obrázku houpačku vzadu a vložíte ji s přijatelnou perspektivou na libovolné místo tak, aby nešlo poznat, že je přidělaná. 
Informace ke zpracování	<ul style="list-style-type: none"> - 40 minut na zpracování a odevzdání - Odevzdat 2 soubory: <ul style="list-style-type: none"> - Dokumentace - Měslečný obrázek
Způsob hodnocení	<ul style="list-style-type: none"> - Úprava nebe (3 body) - Houpačka (3 body) - Kvalita retuše (4 body)
Jméno studenta	
Třída	
Školní rok	
Použité nástroje	
Další informace	
Vypracování	

Vyučující: **David Pavlůsek**

Fig. 4. Sample Created Worksheet

Due to the COVID-19 crisis closure of schools at the time of elaboration, it was not possible to address students from the authors' own practice. So students could not evaluate within the school teaching, only willing students participated, who were evaluated from their home environment after appropriate training, what is required of them. Only those students who were adequate for the assessment could evaluate - they already master the given subject matter and can assess it. Data retrieval is again using an online form from Google.

List of questions for teachers:

1. Which teaching materials do you evaluate?
2. Please rate processing quality (1: worst - 5: best)
3. In your opinion, do the worksheets adequately meet the level of secondary school (primarily grammar schools and technical fields)?
4. Please comment on the speech - the quality of passing information, how to work with the program tools and understanding worksheets.
5. Will you use these materials for your teaching purposes?
6. Do you think that interactive PowerPoint is a suitable tool for software presentation and task assignment, due to its extension and possibilities of free use (Android, iOS, web application).
7. Please make an overall assessment. How the presentation affects you, what interested you the most, whether the chosen methods are suitable and, if so, what you would recommend for a change?
8. What school do you teach at?

List of questions for students:

1. What material did you work with?
2. Please rate (1: worst - 5: best)
3. Please rate the worksheets (1: unacceptable- 5: everything is fine)
4. How do you like this way of presenting a new curriculum and assigning tasks?
5. Please write your own review. What did you like and, on the contrary, what did you mind / miss the most?
6. Was everything sufficiently clear and comprehensively explained for you?
7. Which form of presentation did you work best with?
8. Did you find instructions for everything you needed for teaching purposes?

5.1. Evaluation by teachers

A total of 528 schools were contacted, of which 379 are grammar schools and 149 industrial / technical schools. Based on the comparison of the FEP, the required level should be comparable and thus its evaluation. A total of 26 responses were received. Due to the COVID-19 crisis situation that took place in the Czech Republic during the preparation of this questionnaire survey, it is necessary to take into account a certain deviation from quality towards quantity. This is mainly due to the fact that it was not possible to contact schools in a more personal way, but it was necessary to contact schools by e-mail. This loss of quality can be caused by communication noise or other circumstances.

78% teachers received an evaluation of the visual impression of the presentation. When comparing values, which are intended only for individual programs and are best evaluated the material for Video Editor and 3D Paint - quality 88 %. The individual points that were designated for evaluation have a total deviation from the minimum to the maximum of only 8%. The point of visual impression is close to the second best position. 5 out of 22 teachers saw large gaps in the complexity of the SW presentation, which should be filled. However, according to the added information, it is rather an extension that would be appropriate to fit the teaching (materials). The quality of the materials was determined by the value of 70%. The most complex respondents received material for video editing - 83%. It is a very simple program, which is not so extensive compared to other processed ones. And the presentation contains all the options that the program offers. Worksheets have the highest ratings. The overall rating is 78%. Which is the first place with projects halved. Not a single overall rating fell below 80%, and Zoner Callisto 5 is the best at 86%. So this is one of the best processing. The projects themselves are also a part of worksheets. Coincidentally, and also because the projects are conceived in the same way as worksheet, their individual evaluation is exactly the same except for 3D Painting (82.36.3->80.80 and 83%) and they reach a total of 78%, which is the maximum of the whole work. The percentages correspond to the materials in the order in which they were listed in the introductions.

5.2. Evaluation by students

Here is a list of all answers received:

1. "I really liked it."
2. "Graphic style."
3. "I will only find valuable Worksheets and Project - I find the tasks interesting and great to practice the subject. The presentation itself and video tutorials are prepared at a low technical level (the tutorial for Audacity does not even have cut unsuccessful experiments), incomprehensibly and methodically bad - I do not know what is the motivation for inserting video into the presentation - but it does not work in practice (not at all on school computers), the division of material into theoretical knowledge and practical tasks is relatively unfortunate - the

acquisition of theoretical knowledge must be integrated with the practical work of students. The materials do not come to me pedagogically - they are more reminiscent of the documentation of the program and it is very difficult for a high school student to orientate in such materials - it is necessary add it instructive (calmly solved) tasks and divide the material into smaller pieces that make sense in themselves. WI cannot imagine using presentations and video tutorials either as a basis for teaching or as a material for self-study."

4. "I think I've already indicated the answer to this question in the previous points. Do you want students to do the task only once or to use the acquired knowledge in other subjects, in life? They are high school students, computer science in this form scares them (at least according to my experience), engage your imagination, give tasks in which they will be able to choose what techniques they will use, let them not make an invitation for an invitation, but for a specific event and then choose the best one together., is better for Inkscape vector.
5. I don't expect you to redo the whole work now, it's not that bad, but if you take a little of my criticism into your teaching practice, my mission is fulfilled :) Heads up, computer scientists who can be interested are few."
6. "They are very nice and detailed, but I prefer a more constructivist approach to teaching. When, for example, I teach in Corel Draw, then after some introduction of the program we go straight to practical things - drawing a logo, etc., and thus the children gradually learn all the tools. I know from practice that such detailed information and a description of each graphic editor tool in the presentation is not entirely useful, but just my opinion."
7. "I was surprised by the size of the 1080p file, but the quality is there!"
8. "Content-accurate, the methods are reasonable."
9. "The presentation is well developed, the descriptions of the program's tools are understandable. Interactivity gives speed when returning to the material already covered and a great overview. "
10. "Maybe an even smaller version?"
11. "There are no sample tasks with procedures for independent work of students "
12. "Presentation OK. The evaluation of worksheets is very general and will, in my experience, be problematic for pupils (evaluation of fulfilled competencies is very difficult). "
13. "Nothing "
14. "I would expect a more ambitious task for my diploma thesis, but you will see after starting school "
15. "Presentations and assignments are nicely done, it's a beautiful teaching material. Not only the form of video-tutorials and sound quality suits me. I would imagine that the tutorial would be a form where you can move well on the parts that the student specifically needs. This way, if he forgets a part, he has to go through the whole tutorial. (Again, I'd rather point out that I haven't had a chance to test in Microsoft Office, so if that's possible, everything's fine.) "
16. "There are many more graphics programs (including OpenSource ones), such as InkScape. In addition to Zoner Callisto, it would be appropriate to show this SW as well. Photos are too easy to create a video, but I know that there are not many Online or Open source tools. I miss the creation of Animation (gif) - either using an online tool or a simple Pivot (which is more suitable for elementary schools for its simplicity) "
17. "All right "
18. "Graphic level - too colourful, at primary school level, not usable on the projector "
19. "It's great, you must have inspired me to do tasks that I didn't invent myself. It will definitely be very useful as a preparation for your lesson. Unfortunately, for distance learning, because every other program that students have to download at home is an unsolvable problem ... Unfortunately, the reality. Good luck with your work"
20. "I liked the practical examples in video sequences inserted directly into the presentation, on the other hand, its loading often gets stuck due to this, even with sufficient connection capacity."
21. "Idea - concrete work with specific audio files, images ... "

5.3. Correction of Deficiencies Resulted From Questionnaire

The evaluation showed that the most negative responses are determined by:

- colour contrast of the text
- text size

And the following were adapted and enlarged:

- frame sizes for text description

All the grey lyrics, which were originally chosen for a nicer impression, have been replaced by the classic black, which stands out much better.

6. Evaluation of the created solution

The created solution became the part of new modern educational aids according to the modern strategy of teaching that implements the lectures and practices in the attractive form.

The issue of the paper was to solve the problem – to find something to increase the knowledge of multimedia at the secondary schools in the given curricula. It is important to understand the functionality, and it is also important to have the basics of 2D and 3D graphics in purpose to finish successfully the studies. The contents of the created materials are now limited to practice and test the knowledge of the chosen software/programs.

7. Limitations and plans

Although the paper has reached its aims, there were some limitations. Because the created materials are new, they were verified only by a small group of students who were attending the classes. Therefore, it is necessary to use it for some years to generalize the result and to find what to improve and enlarge. Future work is divided into several parts. Firstly, it is necessary to use the materials for more years in purpose to evaluate them from the users' point of view. Lately, there will be realized necessary correction based on the experience with these materials.

8. Conclusion

The main goal of this work was to create sets of tasks for high schools in the field of multimedia, which will consist of a presentation of software and worksheets.

Software presentations are created using as interactive PowerPoint presentation, in which the individual parts are interconnected with links for quick movement. These presentations can also be run via phone / tablet and are used for theoretical learning of the program. Each tool is described separately, including video tutorials. Presentations are supplemented by the navigation and the fundamental theorem and the concept, which is useful to know. Worksheets and projects are part of the presentation, but also attached separately. There are at least 3 sheets for each course, the difficulty and number of which are derived from a questionnaire survey. Each sheet contains the exact requirements for elaboration and each step / part of the task is scored separately. Worksheets are not tied to presentations, so they can be used separately.

The request for evaluation of the quality of materials was to be divided into two parts: evaluation from teachers and from pupils. However, due to the closure of all schools during the creation of this thesis, only evaluation by teachers had to be carried out. 22 answers were obtained (out of 528 addressed). Respondents could rate all materials or only selected ones (depending on which they viewed). A fairly comprehensive survey has shown that Zoner Callisto 5 for vector graphics, along with a video editor and 3D hanging paint, is the best rated software. In the assessment of individual parts of materials were high regard evaluated worksheets and projects that received a victory with nearly 80% of overall quality (appearance, difficulty, quality of workmanship).

Finally, deficiencies in the materials were removed. Above all, it was a matter of clarity of the text (colour and size). Some comments were made about the instability of use on the projector, but these materials are directed as a personal help to the bench for better and faster learning to control the new curriculum.

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