On educational scenarios: case study Inkscape

S. Fiste[1], T. Theofanellis[2]

[1]ΕΠΠΑΙΚ Μυτιλήνης, ΑΣΠΑΙΤΕ
sofifis@hotmail.com
[2]ΕΠΠΑΙΚ Μυτιλήνης, ΑΣΠΑΙΤΕ
timtheof@gmail.com

Abstract

We present ways of implementing educational scenarios, what appears to be the milestones of an educational scenario driven by our experience in teaching and learning about scenarios. The goal of each scenario is to teach the free and open-source graphics software, Inkscape. Its toolbox offers many possibilities for creation but also the advanced approaches to editing vector graphics are taught with the help of the following scenarios making the teaching process simpler, creative and supported by new technologies. All this, using processes supported by modern theories of teaching and learning.

Λέξεις κλειδιά: Educational scenario, Inkscape, Vector graphics.

1. Introduction

In the last fifteen (15) years most of the teacher education held in Greece is focused on educational scenarios. An educational scenario is the description of teaching with a focused cognitive object, specific educational goals, teaching principles, and practices. An educational scenario lasts more than one teaching hour. The scenario forces its designer to focus on aims/outcomes, teaching techniques, tools, and evaluation. There are many ways to present a scenario as there are many ways to share it. Many platforms were created such as photodentro, aesop, mitida, proteas, ifigeneia, there are special sessions in conferences and many teacher web pages or blogs that present scenarios. This sharing and opportunity to evaluate and comment is important as educators share material, but this can go even further, under specific conditions and can lead to the creation of an online learning community.

Scenarios can be implemented through webquest platforms, many slightly different forms to present a scenario, or even specialized platforms.

The term webquest was introduced in 1995 to describe structured student activities in which most of the information they used was derived from the web. Web explorations are scenarios of modules, problems, or issues in which the main role is played by the extraction and processing of information from the web and which are organized in the

form of web pages (Dodge 2001). Webquest is an inquiry-oriented lesson format using a constructivist, inquiry-oriented strategy. Webquest evaluation rubric offers a way to evaluate the objectives. This can be used either for self-evaluation from the students as all the actions of the students are clearly described with many obvious advantages.

Most of the teachers were trained through in-service training of teachers in the utilization and application of digital technologies in the teaching practice (A and B level of ICT teacher training). The training was implemented on behalf of the Ministry of Education, Research and Religious Affairs by the Computer Technology Institute and Press (CTI), and teachers were certified through it.

The latest teacher training (April to June 2021) is an accelerated (crash course) training for teachers in distance learning. The purpose of the action is to utilize the acquired of distance education and to further cultivate the knowledge and digital skills of teachers in pedagogical and didactic approaches, with the support of modern digital media, used in conditions of technologically enriched living education as well as in distance learning. The training program utilized current (teleconferencing) and asynchronous distance learning technologies (eClass and e-Me platform). The trainees were evaluated through an educational scenario both self and by the trainer using an evaluation rubric.

An important aspect of the creation of scenarios is the possibility of sharing their results and ideas in learning communities. Educational scenarios can be reused, exchanged, modified to fit different needs and be improved (Wichmann et al., 2010).

We continue by presenting three (3) educational scenarios on the software Inkscape.

2. Inkscape: The software

Inkscape is open-source software, with several features that make it competitive with similar tools. The term "Free Source / Open Source Software" refers to computer programs whose code is available to users and which allows them to use the software at no cost to the acquisition and use, as is the case with commercial software. Open Source Software is not just a model of software development and distribution, but a more general philosophy based on volunteering and contributing to the community, as well as the power of collective participation and action. Developed by a group of volunteers under the GNU (General Public License). Saves shapes in SVG (Scalable Vector Graphics) format and is available for Windows, Mac OS, and various Unix variants. It has several features and its main advantage is that it is provided for free so there is a lot of support and many users. It provides full support for scalable vector graphics (SVG), so a design can be scaled to any size without losing detail. At the same time, it can use an unlimited number of smaller designs placed with any combination and still be part of a larger set. Designing objects in Inkscape take attributes such as color, fill, border, etc (Learn how to use Inkscape, 2021).

It may have many applications such as posters, brochures, websites, comics, brochures, wedding invitations, posters, logos, etc. The word Inkscape is created by synthesizing the English words ink and landscape.Ο συγγραφέας πρέπει να χρησιμοποιήσει τις παρακάτω προδιαγραφές για τη διαμόρφωση της σελίδας (File → Page Setup).

3. Educational Scenarios

Below are three (3) teaching scenarios through different applications and philosophies Webquest, Learning Designer, and Computational Thinking. This is an opportunity to reflect and compare these three different types of scenarios.

3.1 Webquest

Title: Designing Vector Graphics with Free Inkscape Software

Grade: Secondary

Theme area of activity: GRAPHIC APPLICATIONS USING PC

Educational Institution: EPAL

Introduction

Title: Designing Vector Graphics with Free Inkscape Software

Course - Cognitive Subject: Graphic Design Applications using PC

Class to which it is addressed: EPAL C 'Graphic Arts

Teaching objectives:

At the end of the unit students should be able to:

- Familiarize themselves with Inkscape Software.
- Understand the use of each Software tool.
- Design Vector Graphics with Free Inkscape Software.

Activities

Familiarize with Inkscape. The students are divided into two groups.

Group 1:

A. Watch a video on YouTube at the following link about Inkscape tools and uses.

https://logosbynick.com/inkscape-tools-and-uses/

B. Watch a video on YouTube at the following link on simple geometric shapes such as squares, rectangles, triangles.

https://www.youtube.com/watch?v=8f011wdiW7g

Group 2:

A. Watch a video on YouTube at the following link about Inkscape tools and uses.

https://logosbynick.com/inkscape-tools-and-uses/

B. Watch a video on YouTube at the following link about shapes such as stars, spirals, polygons.

https://www.youtube.com/watch?v=LEjlKhVnJgU

Process

Group 1:
A. Practice with the tools.
B. Draw 3 geometric shapes triangle, square, circle and fill with color of your choice.
B. Print your designs

Group 2:
A. Practice with the tools.
B. Draw three star shapes, spiral, heart and fill with color of your choice.
C. Print your designs.

Evaluation

Group 1 and Group 2:
A. Perform the matchup to evaluate the extent to which you have learned Inkscape tools.

Star Tool
Spiral Tool
Freehand Tool
Bezier Tool
Calligraphy Tool
Selector
Node Tool
Tweak Tool
Zoom Tool
Rectangle Tool
3D Box Tool
Elipse/Arc Tool
Gradient Tool
Dropper Tool
Connector Tool
Type Tool
Spray Tool
Eraser Tool
Paint Bucket Tool

Fig. 2. Inkscape toolbar to matchup.

B. Fill in the assessment form to check the students' interest throughout the script and if they were interested in using the webquest and the Inkscape program.

		1	2	3	4	5

1	Did you like the lesson planning?					
2	Did you understand this lesson?					
3	How difficult was the exercise for you?					
4	Was the evaluation (matchup) interesting?					
5	Was Inkscape easy to use?					
6	Were the web resources sufficient?					

Evaluation scale

1. Not at all
2. A little
3. Enough
4. A lot
5. Too much

Conclusion

Well done! Please display your prints in the display area of your work.

3.2 Educational Scenario with Learning Designer

- Over the decade (2004-2013) the CSCL international community has significantly promoted: (a) the theoretical framework for understanding the operation of collaboration scenarios; formalization), design, editing, and deployment of tools and environments to support screenwriting. In the process, the specific effort to support screenwriting was combined, and often incorporated, into the more general context of developing technological environments for learning design.

- The term "learning design" can be approached pedagogically and technologically. From a pedagogical point of view, it is attributed as "learning or educational design" and stresses the systematic effort of the teacher to identify and coordinate efficiently all the factors related to the design of an educational experience (individual lesson, course, etc.). The concept is described as a "general term that includes the process, representation, sharing and evaluation of plans for learning from the lowest to the highest level, ie that of designing a comprehensive curriculum.

Context

Topic: Graphic Design Applications Using PC
Total learning time: 2 hours

Designed learning time: 1 hour and 30 minutes
Size of class: 12
Description: Teaching Inkscape
Mode of delivery: Classroom-based

Aims

- Know what Vector Graphics are
- Familiarize yourself with Free Inkscape Software
- Design Vector Graphics with Free Inkscape Software

Outcomes

Knowledge: Inkscape environment such as the main menu, its toolboxes, its commands, as well as its basic application features.

Application; Create a vector graphic similar to the graphic template chosen by each trainee.

Teaching-Learning activities

Familiarisation with the new software Inkscape.

Read Watch Listen	*10 minutes*	*12 Students*	*Teacher present*	*Face to face (not online)*

Use the link https://logosbynick.com/inkscape-tools-and-uses/ to be informed about Inkscape tools and uses.

Practice	*10 minutes*	*1 Student*	*Teacher present*	*Face to face (not online)*

Practice with the tools

Discuss	*15 minutes*	*4 Students*	*Teacher present*	*Face to face (not online)*

Express your experience, discuss with each of the tools, formulate and solve any questions and concerns you may have.

Produce	*10 minutes*	*1 Student*	*Teacher present*	*Face to face (not online)*

Perform the matchup task to evaluate the extent to which you have learned the Inkscape tools.
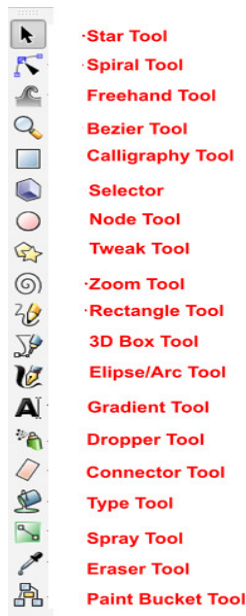
Linked resources

 File: Inkscape-Tools1.jpg

Fig. 3. Inkscape toolbar to matchup.

Design Vector Graphics using Inkscape Software.

Read Watch Listen	*10 minutes*	*12 Students*	*Teacher present*	*Face to face (not online)*

Watch the https://www.youtube.com/watch?v=D_53Cb9aR0c

Investigate	*10 minutes*	*4 Students*	*Teacher present*	*Face to face (not online)*

Use the links and explore initially simple vector graphic shapes and then complex ones like fruits, emojis, and media.

https://www.publicdomainpictures.net/en/view-image.php?image=73296&picture=colourful-shape-icons

https://gr.pinterest.com/pin/385057836866194736/

https://gr.dreamstime.com/illustration/emojis.html

http://clipart-library.com/transportation-cliparts.html

Discuss	*5 minutes*	*4 Students*	*Teacher present*	*Face to face (not online)*

Discuss and chose one graphic

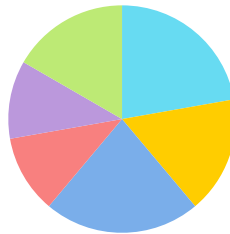| *Collaborate* | *15 minutes* | *4 Students* | *Teacher present* | *Face to face (not online)* |

Divide the design of the vector you have chosen into four steps. Each of you will be involved in the planning of a step, so within 15 minutes your planning must be completed.

| *Produce* | *5 minutes* | *4 Students* | *Teacher present* | *Face to face (not online)* |

Compare your creation with the graphic template you have chosen to evaluate your work.   Fill   in   the   attached   Google   form https://docs.google.com/forms/d/e/1FAIpQLScy2omB4vk-ZFfuiSsuZPGZfGeK1FKCO3tG2nPxu7yXvx2iLg/viewform to evaluate your course, your work, and your classmates.

Representations of the learning experience

	Learning through	minutes	%
	Acquisition (Read, Watch, Listen)	20	22
	Investigation	10	11
	Discussion	20	22
	Practice	10	11

Collaboration	15	17
Production	15	17

	minutes	%
Whole class	20	22
Group	50	56
Individual	20	22

3.3 Educational Scenario and Computational Thinking

This implementation was created using the teaching technique of Computational Thinking. Nowadays, many applications and techniques are available on the Internet, intending to increase human productivity. But for a graphic designer to be able to properly use the applications and techniques of a computer, he must have specific abilities-skills.

One skill is to use basic applications such as free Inkscape software. These skills are described as technological literacy.

Another skill is an in-depth understanding of how a computer system works, which is described as computer fluency.

Although technological literacy and computational skills are necessary, they are not sufficient for a person to be able to understand in depth the dynamics developed by the human brain during computation, to increase his creativity.

A professional must have a set of mental and logical skills that he can use in fields such as economics, art, science, humanities, and social sciences (Perkovic et al., 2010). This set of critical abilities was named Computational Thinking (Wing, 2006).

Students are asked to draw a complex vector graphic using Inkscape software when they are in the computer lab, so in the theoretical part of the lesson, they prepare to be able to make full use of the time available to them for application.

A photo with the original graphic is shared and the students are encouraged by the teacher to approach the topic by following the 4 characteristic steps of Computational Thinking.

Step 1: They must visually decompose the complex vector graphic presented to them and simplify it by recording the shapes of which it is composed.

Step 2: They must recall knowledge they have acquired and identify in similar formations graphic similarities in terms of the creation process that will follow.

Step 3: They need to focus on the graphic elements that will lead them to the completion and not on unnecessary details.

Step 4: They should record step by step the process they will follow, matching the individual graphic shapes with the corresponding tools they will use on the Inkscape platform.

With Computational Thinking, they will have been allowed to devise exactly what to say to a computer to do they will have become functional in their way of thinking, at which point they will achieve the objectives of the lesson.

4. Suggestions

From the previously mentioned training courses and the seven (7) years of experience in the pedagogical training program for further training and specializations of two semester's duration, we make the following suggestions.

When designing a scenario Gagné suggests a series of events and that can be used as a guideline. Gagne's research suggested that all learning is based on previous learning and that there is a hierarchy to learning and that, when placed in sequence, learners move through each step in the process of acquiring new information and skills (Donohue, 2021). The nine events of instruction are in conjunction with Bloom's Revised Taxonomy and mean to help educators design scenarios that are engaging and meaningful (Gagné et al., 1992). When the steps are completed in sequence, learners become engaged in the learning process and retain the information or skill being taught, allowing them to benefit from learning opportunities (Donohue, 2021).

The next step is to determine the learning objectives. The "Learning designer" platform helps educators specify the teaching aims and outcomes as they are categorized according to Bloom's (1994) taxonomy of educational objectives (picture 1). Learning designer offers a visually structured approach to learning design.
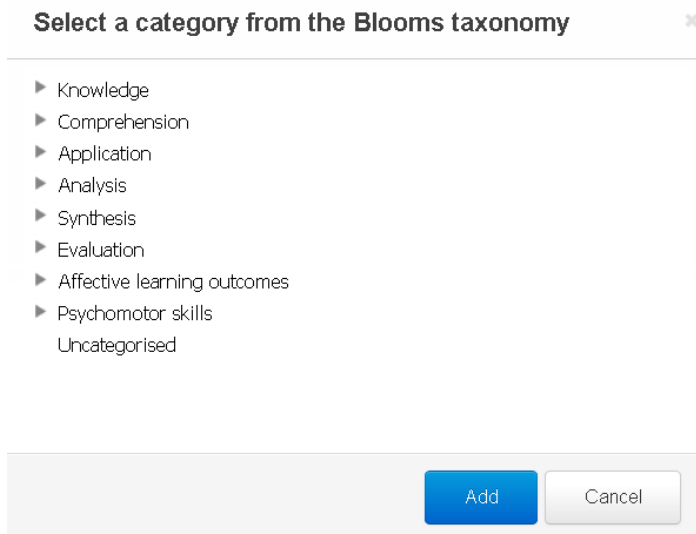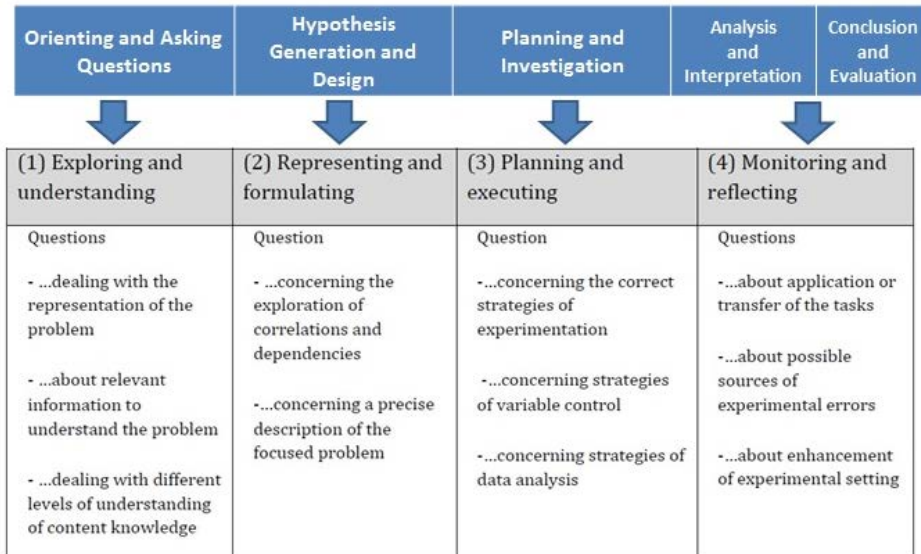
For example in the evaluation category, the appropriate verbs are suggested and this may be very helpful.
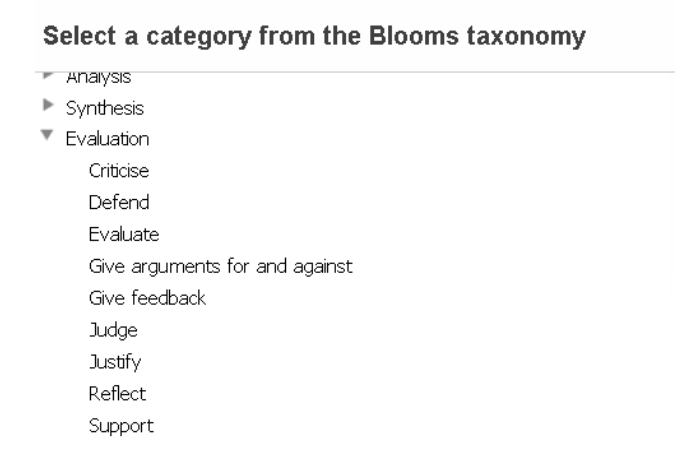
The platform that can be useful for science subjects is the "Open discovery space" as it offers many tools and ideas such as the presentation of the correspondence between the problem-solving processes and the stages of inquiry. The ODS aims to provide social features for building and sustaining web-based educational communities and communities of best teaching practices from European schools (Nikolas et al., 2014). Educational communities are a common model for teacher development, but simply bringing teachers together does not ensure community development. Van Es (2012) offers a framework for the development of a teacher learning community. Such a

community can serve as the place to share, discuss and finally improve educational scenarios.

Orienting and Asking Questions	Hypothesis Generation and Design	Planning and Investigation	Analysis and Interpretation	Conclusion and Evaluation
⬇	⬇	⬇	⬇	
(1) Exploring and understanding	(2) Representing and formulating	(3) Planning and executing	(4) Monitoring and reflecting	
Questions - ...dealing with the representation of the problem - ...about relevant information to understand the problem - ...dealing with different levels of understanding of content knowledge	Question - ...concerning the exploration of correlations and dependencies -...concerning a precise description of the focused problem	Question -...concerning the correct strategies of experimentation -...concerning strategies of variable control -...concerning strategies of data analysis	Questions -...about application or transfer of the tasks -...about possible sources of experimental errors -...about enhancement of experimental setting	

The important thing is to utilize the aspect of the above mentioned types of scenarios as they all have their strengths and learn to participate in online learning communities and learn by sharing, discussing, and exchanging ideas.

5. Conclusions

Three (3) teaching scenarios have been implemented that push for a new way of teaching. They were created to guide teachers clearly and can be applied independently or in series, based on the learning process followed and the cognitive level of students in each class. The method recommended through these scenarios creates a pleasant atmosphere, attracts the students' attention, and pushes them to experiment and create their action plans (project). All the platforms presented have their strong points, each educator who creates scenarios can choose the one he prefers or any other that may suit him. The important thing is to share and exchange ideas on their scenarios so educators will improve by their peers.

As for learning Inkscape, once the student has mastered the basics of using Inkscape, he could deepen his knowledge by taking lessons that are available in writing, on video, in guides, or through the available MOOCs. At the same time, he can participate in online learning communities asking and exchanging good practices.

Bibliography

Bloom, B.S. (1994). Bloom's Taxonomy. University of Chicago Press, Chicago.

Dodge, B. (2001). Five rules for writing a great WebQuest. Learning and Leading with Technology, 28(8), 6–9.

Donohue, D. (2021). Applying Gagne's Nine Levels of Learning in the Training Classroom Retrieved in 15/7/2021 from url: https://www.firefighternation.com/firerescue/applying-gagnes-nine-levels-of-learning-in-the-training-classroom/#gref

Gagné, R. M., Briggs, L. J., & Wager, W. W. (1992). Principles of instructional design (4th ed.). Forth Worth, TX: Harcourt Brace Jovanovich College Publishers.

Halpern, D. F., & Hakel, M. D. (2003). Applying the science of learning to the university and beyond: Teaching for long-term retention and transfer. Change, 35(4), 36-41. https://seaver-faculty.pepperdine.edu/thompson/projects/wasc/Applying%20the%20science%20of%20learning.pdf

Learn How to Use Inkscape. Retrieved in 9/6/2021 from url: https://inkscape.org/learn/

Nikolas A., Sotiriou S., Zervas P., Sampson D. (2014) The Open Discovery Space Portal: A Socially-Powered and Open Federated Infrastructure. In: Sampson D., Ifenthaler D., Spector J., Isaias P. (eds) Digital Systems for Open Access to Formal and Informal Learning. Springer, Cham.

Perkovic L., Settle A., Hwang S. and Jones, J. (2010). A Framework for Computational Thinking across the Curriculum, Proceedings of the 2010 Conference on Innovation and Technology in Computer Science Education, 123--127.

UPnet (ΧΗ). Ελεύθερο Λογισμικό Ανοικτού Κώδικα. Υπηρεσίες τηλεματικής Πανεπιστημίου Πατρών. Ανακτήθηκε στις 05/05/2021 από url: https://www.upnet.gr/software/opensource/

van Es. E. A. (2012). Examining the development of a teacher learning community: The case of a video club. Teaching and Teacher Education, 28(2), 182-192.

Wichmann, A., Engler, J. & Hoppe, H. U. (2010). Sharing educational scenario designs in practitioner communities. ICLS '10: Proceedings of the 9th International Conference of the Learning Sciences 1, 750–757. Chicago (USA).