# PROCEEDINGS

## of the Union of Scientists - Ruse

## Book 5
## Mathematics, Informatics and Physics

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RUSE

The **Ruse Branch of the Union of Scientists in Bulgaria** was founded in 1956. Its first Chairman was Prof. Stoyan Petrov. He was followed by Prof. Trifon Georgiev, Prof. Kolyo Vasilev, Prof. Georgi Popov, Prof. Mityo Kanev, Assoc. Prof. Boris Borisov, Prof. Emil Marinov. The individual members number nearly 300 recognized scientists from Ruse, organized in 13 scientific sections. There are several collective members too – organizations and companies from Ruse, known for their success in the field of science and higher education, or their applied research activities. The activities of the Union of Scientists – Ruse are numerous: scientific, educational and other humanitarian events directly related to hot issues in the development of Ruse region, including its infrastructure, environment, history and future development; commitment to the development of the scientific organizations in Ruse, the professional development and growth of the scientists and the protection of their individual rights.

The Union of Scientists – Ruse (US – Ruse) organizes publishing of scientific and popular informative literature, and since 1998 – the "Proceedings of the Union of Scientists- Ruse".

**BOOK 5**

**"MATHEMATICS, INFORMATICS AND PHYSICS"**

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# A COURSE FOR PROMOTING STUDENT'S VISUAL LITERACY

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*Abstract: Rapidly evolving technology is changing the way people throughout the world work. It offers unlimited possibilities for creativity and collaboration. Today's environment is highly visual - television, web sites, video, and images, computer screens, signs, symbols, books, magazines, movies, and even body language provide visual messages. Visual information and technology literacy are core components of 21st century educational practice. This paper presents a training course which aims to promote the visual, information and technological literacy of students in the course of desktop publishing.*

*Keywords: visual literacy, information literacy, technology literacy, information technology, education*

## INTRODUCTION

It is difficult these days to find any industry in which knowledge workers do not need significant visual, technology and information literacy skills. The *en*Gauge report on 21st-century skills define literacy as the ability to use "digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society".

- ➢ Visual literacy may be defined as the ability to recognize and understand ideas conveyed through visible actions or images, as well as to be able to convey ideas or messages through imagery [1];
- ➢ Information Literacy is defined as "a set of abilities requiring individuals to recognize when information is needed and have the ability to locate, evaluate, and use effectively the needed information." [3];
- ➢ Technology literacy is defined as the ability to responsibly use appropriate technology to communicate, solve problems, and access, manage, integrate, evaluate, and create information to improve learning in all subject areas and to acquire lifelong knowledge and skills in the 21st century [2].

Peoples have used images to express meaning for thousands of years ago. With the emergence of new information and communication technologies, the idea of educating people for visual literacy arises. During 1960s John Debes introduces the term "visual literacy" and, with a group of academics, hosted the first national conference on the topic. This group after that grew into the International Visual Literacy Association, which held an annual conference and supports a Web portal with links to resources, teaching materials and publications.

There is strong connection between visual literacy and emerging technologies. EDUCAUSE, a leading association, whose mission is to advance higher education by promoting the intelligent use of information technology, has made visual literacy an important part of its agenda. Another international consortium of academics and technologists is the New Media Consortium. The annual report produced by EDUCAUSE and the New Media Consortium, shows how new information and communication technologies will influence higher education.

Visual literacy is related with constructivist learning through the role of individual learner acquiring knowledge by linking new information with past experiences to create a personal process for meaning – making and by interacting with the environment [7]. Technology, particularly the graphical user interface of the World Wide Web, requires skills

for reading and writing visually in order to derive meaning from what is being communicated.

Visual images are becoming the prevalent form of expressing information in the learning and teaching resources, delivered across a range of media and formats [6]. Visual image predominates to the text. The widespread use of images means that visual literacy is crucial for obtaining information, constructing knowledge and building successful educational outcomes. Visual literacy supports a comprehension of visual communication. A lack of awareness of visual literacy affects student's ability to be able to communicate effectively. By understanding the basic principles of visual literacy, learners can produce images that communicate in a more efficient ways.

Visual literacy is the ability to understand, create, and use visual images. Associated with visual literacy are:

➢ Visual thinking - the ability to transform thoughts, ideas, and information into all types of pictures, graphics, or other images that help communicate the associated information.

➢ Visual communication - pictures, graphics, and other images are used to express ideas and to teach students. In order to be effective visual communication, the receiver must be able to construct meaning from seeing the visual image.

➢ Visual learning - process of learning from pictures and media. Visual learning includes the construction of knowledge by the learner as a result of seeing the visual image.

### VISUAL LITERACY COMPETENCY STANDARDS

The Visual Literacy Competency Standards were collaboratively written by the members of the Visual Literacy Standards Task Force (VLTF), using the Information Literacy Competency Standards as a foundational document. In March 2010, the ACRL Information Literacy Standards Committee gave support to the ACRL Image Resources Interest Group's (IRIG) proposal to develop Visual Literacy Competency Standards. The first public draft of the Standards was distributed in February 2011 [4]:

1. The visually literate student determines the nature and extent of the visual materials needed:

➢ Defines and articulates the need for an image;
➢ Identifies a variety of image sources, materials, and types;

2. The visually literate student finds and accesses needed images and visual media effectively and efficiently

➢ Selects the most appropriate sources and retrieval systems for finding and accessing needed images and visual media;
➢ Conducts effective image searches;
➢ Acquires and organizes images and source information;

3. The visually literate student interprets and analyzes the meaning of images and visual media

➢ Identifies information relevant to an image's meaning;
➢ Situates an image in its cultural, social, and historical contexts;
➢ Identifies the physical, technical, and design components of an image;
➢ Validates interpretation and analysis of images through discourse with others;

4. The visually literate student critically evaluates images and their sources

➢ Evaluates the aesthetic and technical characteristics of images
➢ Evaluates the effectiveness and reliability of images as visual communications
➢ Evaluates textual information accompanying images
➢ Makes judgments about the reliability and accuracy of image sources

5. The visually literate student uses images and visual media effectively
  ➢ Uses images effectively for different purposes
  ➢ Uses technology effectively to work with images
  ➢ Uses problem solving, creativity, and experimentation to incorporate images into scholarly projects
  ➢ Communicates effectively with and about images
6. The visually literate student designs and creates meaningful images and visual media
  ➢ Produces images for a range of projects and scholarly uses
  ➢ Uses design strategies and creativity in image production
  ➢ Uses a variety of tools and technologies to produce images
  ➢ Evaluates personally created image products
7. The visually literate student understands many of the ethical, legal, social, and economic issues surrounding the creation and use of images and visual media, and accesses and uses visual materials ethically
  ➢ Understands many of the ethical, legal, social, and economic issues surrounding images and visual media
  ➢ Follows ethical and legal best practices when accessing, using, and creating images
  ➢ Acknowledges image creators and sources in projects and presentations

## PROMOTING VISUAL, INFORMATION AND TECHNOLOGY LITERACY

To produce quality images for print, web, and video, students need to understand essential graphic design principles and the process of creation of digital images [5]. In this course, students learn the basics of visual design, photography and image composition and use:

The purpose of the curse is to demonstrate methods and techniques for integrating and teaching new literacy needs in the classroom:
  ➢ Visual literacy: The course will cover the students' ability to use, construct, analyze and communicate visual information. After the study students will acquire practical skills in graphic design, photography, print and layout design, and production. Students work with real – world projects that help them better understand the essential of visual design. They work in teams or individual. The projects contain activities that require students to share the ideas, to give and receive peer review comments and to rework their products
  ➢ Information Literacy: The course will demonstrate students' abilities to apply information to high – level problem solving and engage in analytical and critical thinking. In addition, the students' will demonstrate the ability to determine the extent of information needed, access and use information effectively and efficiently, evaluate information and its sources critically, and understand the access and use information ethically and legally.
  ➢ Technology literacy
    • Using digital camera and scanner;
    • Using powerful photography tool for complex image selections, realistic painting and drawing, retouching, image correction, color and tone control, image editing and enhancement, etc.;
    • Using powerful tool for precise control over typography and built – in creative tools for designing, create sophisticated page layouts for publishing, interactive PDF documents that include video and sound documents, SWF documents complete with interactivity, animation, sound, and video;
    • Using powerful tool for vector drawing;

- Using text editor.

The course is divided into the following parts:

**Part 1** – Work with images and photography
- Organizing and managing images - managing files and using file – naming conventions, understanding file formats, resolution, and file size, understanding techniques used to create visual hierarchy;
- Image source, copyright issues and fair use guidelines;
- Color enhancement and retouching techniques - color correction and effects;
- Principles of image composition;
- Analyzing and critiquing photographs;
- Using a digital camera too learn the basic of photography;
- Scanning images;
- Working with authoring tool for image editing (Adobe Photoshop) - working with various file formats, retouching photos, adjusting brightness and contrast, levels and colors, cropping, resizing, and straightening images, transforming and combining multiple images.

**Part 2** – Create logo
- Investigating logos;
- Selecting file formats;
- Understanding and employing design principles;
- Understanding and employing color theory - color modes, color management;
- Creating and editing graphical elements and illustrations;
- Communicating and presenting design decisions;
- Sketching a logo;
- Working with authoring tool for managing and organizing graphics elements and illustrations (Adobe Photoshop).

**Part 3** – Create Business cards
- Evaluating and analyzing business cards;
- Understanding different print formats;
- Applying principles of print design;
- Sketching a business card;
- Creating an original work;
- Presenting a design layout to a group;
- Planning strategies to guide inquiry;
- Working with authoring tool for precise control over typography and built-in creative tools for designing, publishing documents for print (Adobe Indesign).

**Part 4** – Create advertisements
- Understanding different file formats;
- Analyzing and evaluating advertisements;
- Planning strategies to guide inquiry;
- Sketching advertisements;
- Balancing graphics and text;
- Designing for emphasis and usability;
- Creating an original work.
- Working with authoring tool for precise control over typography and built-in creative tools for designing, publishing documents for print (Adobe Indesign) - formatting text (kerning, tracking, scaling, etc.), combining graphic and text, using layers, placing objects, placing text over images

**Part 5** – Create brochures
  ➢ Analyzing and evaluating brochures;
  ➢ Understanding sustainable design principles;
  ➢ Designing interactive Tri-fold layout brochure;
  ➢ Presenting designs to the group;
  ➢ Creating compelling brochure content;
  ➢ Giving and receiving peer review comments;
  ➢ Improving the product;
  ➢ Working with authoring tool for precise control over typography and built-in creative tools for designing, publishing documents for print (Adobe Indesign) – working with frames, placeholder text, columns, character and paragraph styles, wrapping text around objects, applying effects to text, placing objects on page, creating shapes and borders, creating interactive documents

**Part 6** – Create newsletters
  ➢ Analyzing newsletters;
  ➢ Accessing, evaluating, and synthesizing content from multiple sources;
  ➢ Collaborating with other students;
  ➢ Designing a nameplate;
  ➢ Using design techniques to differentiate content and to provoke interest;
  ➢ Designing multi-column and multi-page layouts;
  ➢ Incorporating color and layout consistently;
  ➢ Integrating imagery and text;
  ➢ Providing clear navigation;
  ➢ Working with authoring tool for precise control over typography and built-in creative tools for designing, publishing documents for print (Adobe Indesign) – creating templates, using objects from the library, creating multi-page spreads, transforming objects, managing text flow between frames and columns, adding page numbers, import text from text editor;
  ➢ Working with authoring tool for vector drawing (Corel Draw) – working with the interface, drawing in perspective, comparing vector and bitmap images, using stroke, fill, polygons and paths.

**Part 7** – Create portfolio
  ➢ Planning and conducting research strategies;
  ➢ Understanding and practicing lifelong career skills - job research skills and presenting skills;
  ➢ Defining the goals and uses of a portfolio
  ➢ Organizing and managing content;
  ➢ Designing consistent pages;
  ➢ Creating a Web Photo Gallery (Adobe Photoshop);
  ➢ Working with authoring tool for creating a portfolio (Adobe Indesign)

**CONCLUSION**

The purpose of this paper is to present a course for promoting new literacy needs in the classroom. Pilot project is planned for academic year 2011-2012. Assessment will include components such as evaluation of skills in visual, information and technology literacy, a survey about student's learning outcomes, collecting examples of student work for further comparative analysis, and review. After the pilot, the experiences and findings will be used to further improvements of the curriculum.

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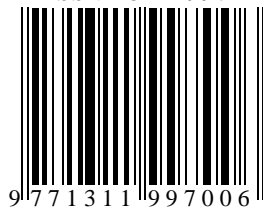# КУРС ЗА ПОВИШАВАНЕ НА ВИЗУАЛНАТА ГРАМОТНОСТ НА СТУДЕНТИТЕ

**Валентина Войноховска**

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*Резюме: Бързо развиващите се технологии променят начина, по който хората работят предоставяйки неограничени възможности за креативност и сътрудничество. Средите за работа днес са високо визуални. Телевизията, уеб сайтовете, видеото и изображенията, компютърните екрани, знаците, символите, книгите, филмите и дори езика на тялото имат специални послания. Визуалната, информационната и технологичната грамотност са основните компоненти на съвременната обучаваща практика. Тази статия представя курс на обучение, който е насочен към подобряване на визуалната, информационната и технологичната грамотност на студентите в курса по предпечатна подготовка.*

*Ключови думи: визуална грамотност, информационна грамотност, технологична грамотност, информационни технологии, обучение*