

## 4.2 Augmented Reality (AR)

Augmented reality (AR) refers to a wide spectrum of technologies that project computer generated materials, such as text, images, and video, onto users' perceptions of the real world. It has three characteristics:

1. ,the combination of real-world and virtual elements,
2. which are interactive in real-time, and which
3. are registered in 3D (i.e., the display of virtual objects or information is intrinsically tied to real-world location and orientation)."

AR technology is widely used in many fields, e.g. aviation, medicine, automotive, museology, training, marketing and tourism. AR is also used in areas that are directly or indirectly related to education, e.g. in medical sciences as a tool for medical training and simulation

# ***Pedagogy of the Twenty-First Century: Innovative Teaching Methods***

The new century introduced significant changes in didactics and teaching methods. Pedagogy of the twentieth century differs from the pedagogy of the twenty-first century. Since the beginning of the twenty-first century, there have been many changes in the development of national and world education. The most observable phenomenon is now the Internetization of society and the penetration of digital technologies into learning. The modern generation of schoolboys is known by the name digital, socially digital, and generation Z.

Who are the current students? This is generation Z, also known as the online generation. They grew up in the world of modern technologies, which they consider indispensable tools for expanding knowledge and personal development. Their characteristic features are openness to other people and desire to build social relations. They are not afraid to independently search for knowledge on the Internet and share it with others. Because they are considered to be entrepreneurial and creative, they need education that satisfies their specific needs. An important, stimulating factor for generation Z is contact with peers both on the level of cooperation and competitiveness. When learning, they focus on a fast message and data, preferably in electronic and pictorial form. Generation Z is the force that shapes the approach to education. New delivery modes and new educational environments are being researched, and changes in curricula are a necessary response. With new technological possibilities, these changes will become even more pronounced.

## Twentieth century generation

- Books → reading
- Current step, gradual movement
- Single tasking
- Linear approach
- Perception through reading
- Independence
- Ambiguity
- Passive school, as requirement
- Discussion
- Reality
- External technology
- Fact awareness

## New generation

- Display—visual perception
- Nonlinearity
- Multitasking
- Hyper media
- Iconic perception
- Connection
- Cooperation
- School as game
- Warning
- Fantasies
- Internal technology
- Know how to find something necessary



The overview of modern technologies which can support higher academic education and significantly influence its effectiveness:

### I. Mobile learning (m-learning)

Mobile devices play an increasingly important role in education, especially in university education. Notebooks, smartphones, tablets and e-books offer quick access to information and interaction with other users. Applications for these devices allow their users not only to read content, but also to search for it and create it, which in turn influences students' learning styles and educational preferences. The convenience, flexibility, multimedia possibilities and interactivity of mobile devices make learning very attractive. Many universities have created mobile versions of their websites and prepared teaching materials for mobile devices. Although students still prefer laptops, the popularity of tablets, smartphones and ebook readers is constantly growing, and students are increasingly using them to have access to educational resources.

## 2. Multimedia learning

In today's world, no one denies the power of images - 65% of the population is visual, and the time of image processing by the human brain is only 13 milliseconds (Trafton 2014). In addition, about 30% of the population are audio learners and the remaining 5% of the population are so-called experiential learners - they learn by doing. Becoming aware of diversity in learning styles is the first step to the proper selection of educational means and methods. Basing teaching solely on the text, whether in written or oral form, leads to a rapid weariness of the recipient. The most appropriate approach is to provide materials in a variety of forms (e.g. online textbooks, video lectures, interactive exercises, simulations, animations) to support different student preferences, multimedia learning benefits from the brain's ability to make connections between the verbal and the visual.

### 3. E-textbooks

An e-textbook is a well-structured interactive multimedia learning material that meets different requirements. Besides being an educational resource, it provides various functionalities that allow students to verify their level of understanding, search for content and add notes. Moreover, it is available in many formats and for various devices, and it is published on educational portals. It is fully or partly printable, easy to expand and reorganize. Its multimedia format substantially facilitates the development of knowledge.



## 4.1 Virtual Reality (VR)

The concept of Virtual Reality was created by Jaron Zepel Lanier, an American computer scientist, writer and composer. The most commonly quoted definition of VR is by Steve Bryson and Jaron Lanier (NASA):

“Virtual reality is the use of computer technology to create the effect of an interactive three-dimensional world in which the objects have a sense of spatial presence.”

Thanks to the high computing power of modern computers it has become possible to create realistic, real-time scenes and events and multi-sensory (audio-visual, tactile and even scent effects) user interaction with the computer in order to reflect realism and the maximum effect of immersion into the world of artificial reality.