“A Guide to Learning Independently” rests on the premise that it is possible for a person to change the way they approach their learning; and it is directed to an individual a student because it is the individual who must write essays and report, pass the exams and organise himself in order to be successful in the tertiary education system. The book offers techniques to help you do what is expected of you by your teachers. But rather than providing a guide which only sets out to help you jump successfully through the hoops held by other people, we still argue that your learning should be centred on you and your purposes for learning.

The book contains 16 chapters, such as "You", "Planning When and How You Study", "Becoming an Independent Student", "Learning and Remembering" and etc. They are logically connected, consistent and fully disclose every aspect of learning. In which the essence is reflects and demonstrates the importance of learning process as a whole. In the book physical, emotional, cultural, social and technological aspects of learning are highlightened.

Reflecting, and at the same time informative style of the book allows students to perceive presented material in the accessible form. However, this book can't be used as the textbook, but rather acts as additional manual on self-development of schoolboys of the senior classes and students of the first years of education.

Result of successful development material ability of the students will serve to understanding of own readiness for learning, concentrate on study, formulate effective strategies for remembering information, use and evaluate research material, understand and make the best use of lecture, participate confidently in discussion groups, competent oral and written speech. Readiness of students to apply the given skills will speak not only of their establishment as independently students, but also as competitive person.

Е. А. Сыропятов

AUGMENTED REALITY TECHNOLOGY – THE FUTURE OF EDUCATION

Nowadays, our educational institutions are frustratingly outmoded in terms of teaching students. The entire process of giving lectures, taking notes, reading facts from books, and taking final exams is a throwback to institutions of learning dating back to the Renaissance. Remarkably, very little has changed today: with notable exceptions, the vast majority of university professors continue to bore students with ineffective, non-interactive approaches to education that result in little more than the professor's notes becoming the students' notes without passing through the minds of

either. True learning is experiential. Humans learn best by doing, not by reading or listening to lectures. The more senses are involved (sound, sight, touch, emotions, etc.), the more powerful the learning experience. That's why today's best teachers are those pioneering individuals who take the effort to engage their students in meaningful activities that reach students at multiple levels.

In this sense, augmented reality appears as an emerging technology that promises to make «educational immersion» available to practically everyone. Augmented Reality (AR) is a technology that permits to overlay computer graphics onto the real world. Unlike immersive Virtual Reality, AR interfaces allow users to see the real world at the same time as virtual imagery attached to real locations and objects. In an AR interface, the user views the world through a handheld or head mounted display (HMD) that is either see-through or overlays graphics on video of the surrounding environment. AR interfaces enhance the real world experience, unlike other computer interfaces that draw users away from the real world and onto the screen.

Through the use of advanced technology an empty space is turned into a very rich educational experience. AR interface is a visualization technology that can take advantage of the limitations offered by other visual means of communication for learning. Traditional methods of learning spatially-related content by viewing 2D diagrams create a sort of cognitive filter. This filter exists even when working with 3D objects on a computer screen because the manipulation of the objects in space is made through mouse clicks.

The main hardware components for augmented reality are: processor, display, sensors and input devices. These elements, specifically CPU, display, camera and MEMS sensors such as accelerometer, GPS, solid state compass are often present in modern smartphones, which make them prospective AR platforms.

A key measure of AR systems is how realistically they integrate augmentations with the real world. The software must derive real world coordinates, independent from the camera, from camera images. That process is called image registration.

Image registration uses different methods of computer vision, mostly related to video tracking. Many computer vision methods of augmented reality are inherited from visual odometry. Usually those methods consist of two parts. First detect interest points, or fiduciary markers, or optical flow in the camera images. First stage can use feature detection methods like corner detection, blob detection, edge detection or thresholding and/or other image processing methods.

The second stage restores a real world coordinate system from the data obtained in the first stage. Some methods assume objects with known geometry (or fiduciary markers) present in the scene. In some of those cases the scene 3D structure

should be precalculated beforehand. If part of the scene is unknown simultaneous localization and mapping (SLAM) can map relative positions. If no information about scene geometry is available, structure from motion methods like bundle adjustment are used. Mathematical methods used in the second stage include projective (epipolar) geometry, geometric algebra, rotation representation with exponential map, kalman and particle filters, nonlinear optimization, robust statistics.

Augmented Reality appeals to constructivist notions of education where students take control of their own learning, and interact with the real and virtual environments. In learning situations that are partly virtual like AR, students can manipulate objects that are not real, and learn tasks and skills. The benefit with AR learning is that there are no "real" errors. For example, if a firefighter learns how to fight various types of fires, or a surgeon learns laparoscopic surgery in an augmented reality situation, there are no real consequences if mistakes are made during training. These types of training provide opportunities for more authentic learning and appeal to multiple learning styles. Augmented Reality applications that can enhance textbooks too have the power to engage a reader in ways that have never been possible. A field trip to a museum or historic locale with a group of classmates, using AR applications can provide each student with his/her own unique discovery path.

An interesting view on augmented reality in education can involve games with students. Augmented reality games position players as participants in a complex system while drawing on players' emotional and cognitive relations with the environment to create designed experiences for solving complicated problems exhibiting robust phenomena. This type of augmented reality would engage students in their learning experience in education. Students would view the activity as a game which would further enhance the instruction and critical thinking skills of the students.

Another augmented reality game having valuable educational value is River City. This game was developed by a group of professors at MIT. The information for the River City can be located at: (http//muve.gse.harvard.edu/rivercityproject/). The game involves working in groups of three, with each student using a PC linked to a local-area network. Each student controls an avatar placed in a stimulated American river town in the late 1800s. The town is facing a health crisis, and the students' goal is to find out why the residents of River City are getting sick, and what can be done to help them.