

Table of contents

Chapter 1	7
A general introduction to virtual reality and augmented reality.....	7
General Introduction	7
General considerations	7
History of VR.....	8
Virtual Reality	9
Augmented Reality.....	10
Mixed Reality.....	11
Types of VR, AR and MR.....	11
Comparison of VR, AR, MR	13
Bibliography	15
Chapter 2	18
The hardware components of VR and AR.....	18
General information.....	18
VR hardware development	19
Use cases.....	22
Microsoft HoloLens 2	22
Meta Quest 2 (Oculus Quest 2).....	24
2.3.3 HTC VIVE Pro 2.....	25
Augmented reality with smartphones.....	26
Peripheral hardware for VR.....	27
Meta Quest 2 Touch	27
HTC VIVE Base Station	27
HTC VIVE Tracker.....	28
VIVE Facial Tracker	28
Virtual Reality Treadmill	28
Bibliography	29
Chapter 3	34
The software components of VR and AR.....	34
General introduction	34
STEAM VR	37
What is STEAM?	37
What is STEAM VR?.....	37
Windows Mixed Reality.....	37

Operating System	38
System requirement.....	38
Hardware	38
How to Install Steam VR	38
Using STEAM VR with Windows Mixed Reality.....	39
Room-scale VR	40
Windows Mixed Reality Portal.....	40
How to install Windows Mixed Reality Portal	41
Running the app if the minimum requirements are not met.....	41
Room-scale with Windows Mixed Reality	42
Simulation	42
MetaStore – Meta (formerly: Oculus) Quest 2	43
Basic user guidelines:.....	43
Basic tutorial:	43
Use cases	44
Bibliography	46
Chapter 4	47
Virtual reality simulation in healthcare education: an introduction	47
Introduction.....	47
Examples of the applicability of virtual reality in medical education	48
Surgical simulations	48
Emergency simulations	48
Preparation for patient care	48
Prevent human error	49
Practicing rehabilitation	49
Practicing the use of medical equipment.....	50
Good practices for the use of VR simulations in medical education.....	50
VR simulation in healthcare - therapeutic uses.....	52
Best practices in the use of VR simulations for medical purposes	53
Basic concepts (AR/VR/XR) and animation environments	56
The types of XR technologies and the depth of simulations they can create	57
Computer Generated Virtual Reality (VR or CGVR).....	57
360° virtual reality video.....	58
Augmented Reality (AR)	58
Smart glasses and HoloLens	58

Modeling interactive (3D) environments.....	59
About 3D modeling in a nutshell	59
Input and/or creation of the 3D environment	61
3D scanning.....	61
Contact scanners.....	62
Optical scanners	62
3D laser scanners.....	63
Furnishing and animation of the virtual environment.....	63
Softwares for 3D modeling and their application possibilities - a brief overview	64
How to start learning 3D design and illustration?	66
Bibliography	68
Chapter 5	70
VR and AR Technologies in gradual medical training, focusing on basic sciences	70
Introduction.....	70
Physiology training.....	71
Biochemistry	73
Cell biology.....	75
Anatomy.....	76
Conclusions.....	79
Bibliography	81
Chapter 6	83
Medical and health care uses of VR and AR technologies - use-case collection.....	83
Introduction.....	83
Wound care	84
Elderly Care and Cognitive Stimulation:.....	86
Postoperative care	88
VR/AR in pathology	90
Pregnancy.....	92
Anatomy education	93
Conclusions.....	95
Bibliography	96
Chapter 7	104
Using virtual reality to improve medical students' communication skills	104
Introduction.....	104
Challenges of designing social environments in virtual reality	104

Enhance compliance by developing Motivational Interviewing skills using Virtual Reality	106
Teaching communication skills using virtual reality	113
Bibliography	117
Chapter 8.	121
How Virtual Reality Can Enhance Computer Science and Programming Education..	121
Introduction.....	121
How VR Can Solve the Issues of Traditional Education Methods.....	121
What Benefits VR Can Offer for Both Teachers and Students	122
Interaction Methods	123
Conclusion	127
Bibliography	
Acknowledgement	128