



Deliverable D3.1 Summary

The NEWTON project aims to offer solutions to facilitate the delivery of STEM subjects to learners from a variety of backgrounds. Because multisensory cues improve memory and attention and increase the cognitive and sensory-motor performance, one of the methods employed in NEWTON consists of adding a multisensory dimension to the learning process. Through multisensory integration, the brain integrates the information from different sensory systems into multimodal representations of the world.

The design and development of the multisensory component with multimodal access implies several steps that we will discuss further:

- Analyse types of multi-modal interaction
- Develop a set of algorithms that enable multimodal access
- Analyse the neurological dimension in using multiple sensory cues
- Design multisensory learning content matching neurological considerations
- Identify the appropriate multimodal technologies to employ
- Choose the suitable hardware and software technologies to effectively deliver the designed content

Over the last decades, multisensory interaction has started to gain more and more attention in various fields. The current human-centred design of multimodal media is focused on optimising the perceptual dimension of time and space by engaging several senses. In this Deliverable, we present a review of multi-sensory and multi-modal systems aimed to help us identify the main aspects that need to be considered in creating an immersive e-learning environment that stimulates learning.

Our starting point is a general overview on human senses and multi-sensory integration with a focus on cross-modal stimulation – an important tool in increasing the levels of presence and the learning performance. Then, we discuss issues related to the workflow Production – Distribution – Rendering. The next section presents aspects related to multimodal interaction and applications and algorithms for multimodal interfaces. Section 6 illustrates different types of multi-sensory devices that can be used in building multimodal systems while last section exemplifies with multi-sensory projects related to e-learning.