



# Deliverable D3.3 Summary

Deliverable 3.3 presents the NEWTON Learner Model, personalisation process as well as the NEWTON multi-sensorial, multi-modal and adaptive solutions that support adaptive educational multimedia content delivery and mulsemmedia-enhanced access to educational resources. The document is structured in three main sections that cover user modelling, personalisation and adaptive solutions for multimedia, mulsemmedia and multi-modal learning in the NEWTON project.

Existing research on user/learner model in terms of information considered for user/learner profile/model and methods to model this information are presented. Special consideration was given to information considered for learners with special educational needs, learner affective features and multi-sensorial related characteristics. Various approaches used for defining and modelling the learner related information were also researched.

A detail presentation of the learner-related characteristics considered in the NEWTON Learner Model is provided. Learner-related information is classified into different categories including: profile and pedagogical based characteristics, multi-sensorial, multi-modal and affective-based characteristics. For each of the characteristics considered in the NEWTON Learner Model the category it belongs to, brief description, data collection method and file type associated with it are provided and will be reflected in the NEWTON platform implementation. A high level description of the Learner Model implementation into the NEWTON platform is also provided.

The personalisation focuses on recommending learning content/resources based on learner characteristics described in the Learner Model. The personalisation can be performed at learning\_system or course-level, or specifically at a content-level. Examples of learning systems that offer personalisation and how the personalisation is performed are presented and discussed. NEWTON addresses both course-level personalisation (e.g., by tailoring and recommending learning contents based on information from the Learner Model), and content-level personalisation (e.g., by having personalised learning loops and feedback inside standalone contents such as virtual labs or educational games). A description of the NEWTON virtual lab learning resources and game-based learning resources that support content-level personalisation is provided highlighting the type(s) of content-level personalisation offered. The course-level personalisation mechanism applied in NEWTON is also presented.

In order to create an immersive e-learning environment that stimulates learning with multiple media elements engaging three or more human senses and allows content adjustment in existing delivery environment, a novel adaptive multimedia streaming solution and innovative adaptive mulsemmedia-enhanced delivery solution have been designed and implemented in the NEWTON project. A detail description of the adaptation principle, algorithms applied by these solutions and mechanisms that support the adaptation is provided in this deliverable.