



Deliverable D6.4 Summary

Deliverable D6.4 presents the detailed reports for the Small and Large-Scale pilots carried out as part of the NEWTON Project which have not been presented to date and the cross-analysis of all pilots. Individual overview reports for all pilots were provided in deliverables D6.2 and D6.3 (focused on the pilots which targeted learner with special educational needs). However as some pilots were still ongoing during the completion of D6.2 and D6.3, their **overviews** are presented in this report in **Chapter 3**.

The **detailed reports** of all Small and Large-Scale pilots are presented in **Chapter 4**. It is crucial to note to the reader that **the most important chapter of this report is Chapter 5**. It focuses on cross-analysing NEWTON pilot experiences, investigating key aspects such as NEWTON's impact on knowledge gain for different types of learners, the extent to which NEWTON had a positive impact on students' engagement and motivation, the impact of NEWTON on students' attitude towards STEM and the impact on participating teachers' approach to teaching.

All learners were assessed from various perspectives: gender, educational level, science achievement, age, technology usage, attitude to school and STEM. These aspects were identified following usage of the Pedagogical Assessment Committee (PAC) Toolkit which was used for the majority of the described pilots. The PAC Toolkit facilitated assessment of pilots with a common guideline and set of questionnaires, allowing cross-analysis of pilots from a set of common perspectives.

Chapter 5 presents the **cross-analysis** of NEWTON pilots according to the targeted learners' education level: **Primary, Secondary and Tertiary**. The cross-analysis was focused on three main stages of the PAC Toolkit: **Learner Motivation, Learner Satisfaction and Knowledge Acquisition**. Large-Scale pilots were carried out in each level: Earth Course in Primary Institutions, GAM-LAB in Secondary Institutions and Programming in Tertiary Institutions. At the same time, various Small-Scale pilots took place in each of these three education levels. However, the main focus of this report is on Large-Scale pilots, as these employed more students and a larger combination of technologies. The NEWTON project benefits for each project sub-objective were also assessed. In Primary School's pilots the **Learner Motivation, Learner Satisfaction and Knowledge and skills acquisition** positive results were significantly more prevalent, where students exhibited increased relaxation, confidence, engagement, interest, happiness and enjoyment and decreased their feeling bored, sad and anxious. Primary School students also reported preferring learning STEM subjects with NEWTON, they were more enthusiastic during NEWTON-based lessons and felt more positive finding these lessons more interesting compared to their usual science classes. Knowledge gain was observed for many assessed sub-groups for the majority of the applications, specifically Water Cycle in Nature, Wildlife I and II, Sea-life I and II, Final Frontier I and II, and some of this improvement was exceptionally significant. Only one NEWTON-based lesson exhibited no knowledge gain, Geography. In Secondary Schools' pilots NEWTON content and technologies have also improved significantly learners' motivation, satisfaction and knowledge level. In terms of Knowledge Acquisition in

Secondary Schools, only positive changes were observed and no negative outcomes were recorded. Positive outcomes were also reported in Tertiary institutions, where different locations had different patterns. Regarding **Knowledge and skills acquisition in Tertiary institutions**, only good outcomes were obtained: many subgroups achieved positive changes in many serious games/videos all locations of the Large-Scale pilots. **Teachers' feedback** was also assessed throughout NEWTON pilots, which was positive in all locations and institution levels.

During all NEWTON Small-Scale, Large-Scale, and Pre-pilots, including the pilots reported in Deliverable D6.3, benefits in terms of Learner Motivation, Learner Satisfaction and Knowledge Acquisition were achieved in all 5 NEWTON project sub-objectives. These are detailed in this report.