Title: AHA: A pilot project for evaluating the effect of Augmented Reality in reading and spelling skills of children with ADHD - Parent and Teacher GUIDE

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Dear parent and teacher,

We would like to thank you for choosing to participate in the AHA pilot project and welcome you to the research group!

Your contribution is essential for the activities of this research that has as its purpose the improvement of teaching and learning processes and, specifically, evaluating the effect of Augmented Reality for improving the reading and spelling skills for children with ADHD.

We hope by reading this booklet you will get a better understanding of your contribution to the research activities. The AHA support system presented in these pages allows you to monitor the learning activities of your child and will also provide you with useful information about your child’s behaviour while involved in the AHA Project. We therefore ask you to read the instructions in this booklet carefully because this will assist you to observe your child in a methodical way during the use of the system. The correct assessment of the child’s on-task behaviour will be decisive, which is why we ask you to steadfastly follow the procedure for observing the child’s behaviour in order to provide truthful, reliable and usable data.

Thank you for choosing to contribute to the development and improvement of innovative teaching and learning processes, through the use of the Information and Communication Technologies, and the enhancement of the Irish and International educational school system.

Thanks for all
The AHA research team

ADHD in brief

Attention Deficit Hyperactivity Disorder (ADHD) is a neurobiological disorder characterised by inattention, hyperactivity and impulsivity. The symptoms can be present either as a combined type, which is more common, or in some cases predominant defining one of the two main subtypes of the disorder (inattentive vs. hyperactive/impulsive).

ADHD is a neurobiological condition due to a chemical imbalance in the brain. A low level of dopamine can cause the three primary symptoms of ADHD: inattention, impulsivity, and hyperactivity.

Literature reveals the following characteristics of ADHD among children in Ireland:

- 3-5% children have ADHD
- 30-40% children refer to CAMHS for ADHD
- Co-Morbid conditions: anxiety (34%), learning difficulties (70%), oppositional defiant disorder (40%), conduct disorder (14%), tics (11%), mood disorder (4%)
- Outcome is poor if early intervention does not take place (e.g. early school drop-out, substance abuse etc.)
- 50% of children with ADHD not receiving treatment

Children with ADHD typically have difficulties in maintaining focused attention on cognitive stimuli and often go off-task. As a consequence, their motivation, academic engagement and outcomes are generally poorer than those reported for other children. Moreover, ADHD children are often diagnosed with a comorbid Specific Learning Difficulty (SLD) such as: reading and spelling difficulties (dyslexia), writing difficulties (dysgraphia or dysorthographia), mathematical learning difficulties (dyscalculia), and nonverbal learning difficulties (visual-spatial learning, motor and social skills). Research suggests that common neurophysiological deficits are involved, with impairments in working memory and processing speed.

Specific educational interventions for SLD should be carefully implemented in the case of comorbidity with ADHD. A didactic approach based on alternative cognitive stimuli and highly interactive forms of learning may for instance help children maintain higher levels of motivation and engagement in the classroom activities.

The next session describes the AHA pilot project and explain how the project is focused on the development and integration of existing technologies (an online literacy program and augmented reality) to enhance reading and spelling skills in children with ADHD and investigate whether the combination of such technologies can assist students to stay focused, make fewer mistakes and finish assignments at school as well as homework.
What is the AHA pilot project?

AHA is a pilot project funded by the European Commission Directorate-General for Communications Network Content and Technology for Technologies and Tools for Children and Young People with ADHD. The acronym AHA means ADHD-Augmented. The AHA pilot project investigates the efficacy of Augmented Reality (AR) in strengthening reading and spelling abilities in children with ADHD adopting an evidence-based intervention approach. Specifically, the AHA project involves the integration of a series of AR objects with WordsWorthLearning© Programme (WWL), a web-based educational tool previously created to improve reading and spelling skills in individuals aged 6 years and over, and the Web Health Application for ADHD Monitoring (WHAAM). The integration process produced the AHA web-based service that allows parents, teachers, and other professionals to monitor the behaviour of children engaged in the reading and spelling activities provided by the system. Overall, the AHA project represents an effort to evaluate whether AR can support children diagnosed with ADHD in improving their reading and spelling literacy and sustaining their attention and engagement with the task.

In order to reach the aims of the pilot study, participating children are randomly assigned to three groups:

1) WWL literacy program enhanced by AR contents;
2) WWL literacy program without AR contents;
3) One group without any WWL intervention during the pilot.

Children in the third group will be provided with one-year free access to the WWL literacy program at the end of the pilot.

The main research questions:

- Do these technologies have an effect on the reading and spelling of students with ADHD?
- Do these technologies have any effect on the learning engagement of ADHD students (i.e. Does gamification of spelling and spelling via augmented objects encourage children’s concentration?)
The AHA Pilot process

The following figure shows the lifetime of the AHA project:

![Diagram of AHA pilot process]

**Student/Parent/Teacher recruitment and registration to the AHA Pilot.** The first step of the pilot process involves the selection of the stakeholders (students, parents, and teachers) to participate in the pilot. The children are assigned to the specific group of the intervention according to the research design, as described in the section “What is the AHA pilot project?”.

**WWL Tasks.** The second step allows children to perform the programmed activities of the WWL literacy program sessions (with or without AR contents according to the research condition), accessing the AHA system with the credentials assigned by the AHA team. A detailed day-by-day timetable of the sessions to be completed is described below.

**Analytics: Monitoring, Reporting, and Data Updating.** These steps involve parents and teachers in an active role for monitoring and collecting behavioural data about their children’s engagement with the WWL task. The session “The instructions guide to perform the child observation” describes in details the correct method to perform the observation of the child’s behaviour. Moreover, data on children’s performance at the WWL activities are automatically collected by specific functionalities of the AHA Monitoring interface side.

**Final Report.** All the data collected during the pilot will be at the base of the evaluation process for producing a final report for parents and teachers that includes the individual child’s outcomes (literacy skills and engagement with the task).

**Data Analytics.** A final report will be produced to inform the EC, and policy and decision makers on the findings about the pedagogical aspects of the AR-based teaching and learning for ADHD students.

The AHA web service purposes

As currently implemented, the AHA web service represents first of all a tool to improve the reading and spelling skills of children diagnosed with ADHD and showing signs of reading difficulties. The service also provides teachers, parents, and other relevant stakeholders, with data related to children’s ongoing acquisition of reading and spelling skills and levels of engagement with the instructional activities. In this way, it provides a comprehensive overview of the individual child’s behaviour with regard to both academic achievements and involvement in the task.

AHA web service is a creative integration of existing technologies to enhance reading and spelling skills in children with ADHD while helping students to stay focused, make fewer mistakes and finish academic assignments.

AHA includes features for:

- Collecting data on child’s reading and spelling performance during the observation sessions;
- Providing a tool (Direct Behaviour Rating) to evaluate the level of off-task behaviour during the observation sessions;
- Showing charts that summarize the child’s progresses in the different sessions;
- Summarizing reading and spelling outcomes.

In order to help children with ADHD to succeed in their learning progression, AHA facilitates teamwork between parents and teachers. Specifically, AHA will satisfy:

**Parents and Teachers to:**

- Improve home-school communication by sharing common aims, digital contents and valuable information on children’s specific learning and behavioural difficulties
- Receive prompt feedback about children’s reading and spelling performance
- Monitor behavioural issues that children show in significant life contexts (school and home)
- Play assistant part in the homework process via digital technology
- Measure the effect of literacy and behaviour performance at school or at home
- Be shown suitable and effective educational strategies and accommodation to help facilitate the learning process.

In the following sections, a brief description of the AHA service and instructions guide on how to use it are presented.
The AHA service provides

1. **The AHA web-based system**
   The AHA system basically includes two interface sides: 1) the AHA Training interface side, and 2) the AHA Monitoring interface side. Users do not need to install any app as the AHA solution is web-based.

2. **The AHA Training intervention** side allows children to access to the WordsWorthLearning (WWL) literacy program activities enhanced by a set of Augmented Reality objects;

3. **The AHA Web monitoring** interface side provides a dashboard with the monitoring facilities that allows teachers and parents to participate in the evaluation process of their children.

The AHA Training intervention side allows children with ADHD to access to the WWL programme with AR contents (accessible from desktop or mobile phone with a camera) designed to attract students’ attention and facilitate the training of their reading and spelling skills.

1.1 **The AHA Training intervention: WordsWorthLearning literacy programme**

WordsWorthLearning is an online literacy programme that has proven to resolve and reduce reading and spelling problems such as Dyslexia, along with additional improvements in comprehension, vocabulary and memory overall.

WordsWorth Learning Limited (WWL) was established in 2008 as a spin-off from a Sole-Trader Speech & Language Therapy Private Practice for remediating reading and spelling problems such as dyslexia. The objective was to create and bring to the market a more affordable digital version of the original remedial literacy programme which was created in 1996 by Rita Treacy and was paper-based. This original Programme was later further developed as an online web-based interactive programme which was launched as the WordsWorthLearning© programme in November 2011.

This online approach is being used today in homes, clinics and schools as an effective and proven methodology to remediate SLDs. Developed a Training Course initially for the paper based Programme and subsequently for the online Programme and more than 500 professionals e.g. Speech & Language Therapists, Teachers, SNA’s and Occupational Therapists have since been trained to use the programme. It is now being widely used in Ireland both by parents at home and in schools and some of the schools have included the programme as part of their mainstream literacy improvement strategy (not just remedial).

The WWL programme was integrated in the AHA system and enriched by Augmented Reality Objects for improving the interaction and exploratory learning of children with ADHD and investigating the effects on their reading and spelling abilities. The programme is composed by the following levels as shown in the Figure below.

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**Figure 3: AHA System**

**Figure 4: WordsWorthLearning Online Dashboard**

**Levels**

**LEVEL 1 – SPEECH SOUNDS**

This programme starts at the very beginning, linking speech sounds or ‘phonemes’ with their letter representations. This is setting a solid foundation for learning literacy skills. When a student is not competent at sound/symbol association, they tend to exhibit reading and spelling difficulties as they progress academically, unless they have excellent visual memory to compensate. In this level each student will learn to associate speech sounds with letters, using the bespoke vowel and consonant charts. This is multisensory learning using auditory, visual, linguistic and kinaesthetic feedback to enhance learning and focus. The additional Augmented Reality elements throughout the programme will...
demonstrate graphically with 3D models, the relationships between letters, sounds and rules, hopefully increasing the engagement, interest and learning for the students with ADHD.

In every level there are instructional videos and interactive exercises to consolidate what is being taught. In addition, a revision questionnaire/s are provided at the end of each level to check their knowledge of the essential concepts taught. When errors occur, the student is provided with a report and guided back to the relevant modules for revision before proceeding to the next level.

LEVEL 2 – SOUND SEQUENCING
This level is particularly important for spelling, using pseudo-words (nonsense words) with blue and green counters in lieu of letters to represent consonants and vowels. Students are taught how to discern each of the individual sounds and the number and order of sounds in a given word. This task focuses on auditory discrimination and sequencing – two essential skills for learning competent literacy skills.

LEVEL 3 – READING AND SPELLING PSEUDO WORDS
The student is required to read and then spell single syllable pseudo-words of increasing complexity. Pseudo-words are used to enforce the concepts that were taught in the previous two levels – where the student has firstly to decode (read) some words and then to encode (spell) some words. This task re-enforces what has been taught previously and also increases their awareness of how sounds are written along with their ability to recognise the number and order of sounds in a given word.

LEVEL 4 – LEARNING 20 MAJOR RULES
This level introduces 20 major rules, 8 rules in detail with interactive exercises and the remaining 12 rules are taught using short videos. These rules are essential to explain the many spelling irregularities that students encounter while learning the English language - where approximately 75% of the words are not spelt as they sound. Some of the rules are widely known, some contain novel variations to known rules and others are totally original and have been developed to retrofit into the English language to explain many of the anomalies within the English language.

LEVEL 5 – READING & SPELLING REAL WORDS
This Level introduces real single syllable words for reading and spelling. From a reading perspective the words are divided into three groups: words with direct sound/symbol association e.g. ‘hat’, words that incorporate the first 8 rules taught (e.g. ‘cake’) and finally more complex and irregular words that incorporate the remaining 12 rules (e.g. ‘ache’) including words with no apparent logic to them (e.g. ‘quay’).

The single syllable words for spelling are divided into Class Levels and incorporate a vocabulary consistent with a school curriculum. Students are taught a ‘visualisation technique’ for learning to spell complex and irregular words to imprint these words in long term visual memory.

LEVEL 6 – SYLLABLE DIVISION RULES
The introduction of syllable division rules helps the student in two ways; to help them breakdown words for reading and also to help to build words for spelling. This Level starts with words containing two syllables and progresses to reading and spelling words with up to 7 syllables in both isolation and in context. There are 9 rules for reading and spelling taught throughout this level. At the end of this Level the ‘ground-work’ (or overlearning) has been completed and an explosion of literacy skills is normally apparent.

LEVEL 7 – PREFIXES & SUFFIXES
The final Level introduces two-syllable and complex prefixes, suffixes and common word endings, many with Greek, Latin and French origins. Students are taught to understand the rules relating to their origin and also to recognise these prefix and suffix ‘chunks’ as units, which eventually become embedded into their sight vocabulary and visual memory using specific flashcards and Augmented Reality models.

1.1.1 The WordsWorthLearning (WWL) Lesson Plans
All students will have to complete Level 1. If it is recommended on their Literacy Assessment Report that certain Levels of the programme should be omitted, you will have to contact David Ross on 01 266 9144 to move the programme forward to the required point. You will have to provide:

- the student’s name
- the e-mail address being used for the account
- the Level to which the programme should be opened

Here’s some tips for how to work through the WordsWorthLearning literacy programme and for using the Augmented Reality (AR) elements:

- Always proceed at the pace recommended in this schedule, it’s important that the students understand the concepts, so going too quickly can be counterproductive.
Just tick off the days as you proceed through the programme.

- Sometimes younger students will need to go a bit slower and that’s OK.
- When indicated click the Multiple-Choice Questionnaire button at the top of the screen and let the student answer the 10 questions,
- Then print the report and revise any modules that might be indicated before moving on to the next section.
- Click the “levels” button at the top bar to get back to where you were in the programme.

The Vowel and Consonant charts are used throughout the programme and they introduce the AR elements to bring 3D examples of the letters and sounds. AR is also used for the rules, prefixes and suffixes to make learning them more interesting all the way through the programme. You can find below the recommended schedule for the complete programme:

### LEVEL 1: Vowel & Consonant Charts

- Level 1 may appear to be “too easy”, particularly for older students BUT, **it is imperative that they learn all the “speech sounds”** before moving on.
- Aim to do about 15 minutes a day, no more.
- Remember to keep referring to the Charts and activate the AR objects to help enforce learning throughout the programme.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 1 to 4</th>
<th>watch the videos (Note: this is an introduction for teachers, parents, facilitators and also older students or adults that are doing the programme on their own)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 5 to 20</td>
<td>watch the videos and activate the <em>AR models</em></td>
</tr>
<tr>
<td>DAY 3</td>
<td>Module 21 and Module 22</td>
<td>– watch the videos &amp; do the interactive exercise</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 23 and 24</td>
<td>watch the videos and activate the <em>AR model</em></td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 25 to 28</td>
<td>watch the videos</td>
</tr>
<tr>
<td>DAY 6</td>
<td>Modules 29</td>
<td>do the interactive exercise and familiarise yourself with the Vowel &amp; Consonant Charts. <strong>Level 1 Multiple-choice Questionnaire</strong> – student should answer all 10 questions, then you should print the report and revise any modules that are indicated before moving on.</td>
</tr>
</tbody>
</table>

### LEVEL 2: Speech Sound Sequencing

This level deals with the number, position & order of speech sounds and as it involves using green and blue counters to represent vowel and consonant sounds, it may be too complex for younger children (those under 8 years), if you find this is the case, there is a ‘skip’ button available to let you move on to level 3*. You can print the counters, they are in the “materials” section.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 1 and 2</th>
<th>watch the videos and do the exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 3 and 4</td>
<td>do the interactive exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 5 and 6</td>
<td>do the interactive exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 7 and 8</td>
<td>do the interactive exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 9 and 10</td>
<td>do the interactive exercises</td>
</tr>
<tr>
<td>DAY 6</td>
<td>Modules 11 and 12</td>
<td>do the interactive exercises</td>
</tr>
<tr>
<td>DAY 7</td>
<td><strong>Level 2 Multiple-choice Questionnaire</strong></td>
<td>– student should answer all 10 questions, then print the report and revise any modules that are indicated before moving on (* Unless the Skip to Level 3 button has been used)</td>
</tr>
</tbody>
</table>

### LEVEL 3: Reading and Spelling Rubbish Words

This level should be done over a two week period. Remember to have the charts and AR marker available for this task as the student will need to refer back to them if experiencing difficulties.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 1 to 4</th>
<th>watch the videos and do the interactive reading exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 5 and 6</td>
<td>do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 7 and 8</td>
<td>do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 9 and 10</td>
<td>do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 11 to 14</td>
<td>watch the videos and do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 6</td>
<td>Modules 15 and 16</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 7</td>
<td>Modules 17 and 18</td>
<td>do the interactive spelling exercises</td>
</tr>
</tbody>
</table>
AHA: ADHD Augmented

**LEVEL 4: The 20 WordsWorthLearning Rules**

- This is the introductory level for the 20 programme rules and the students are not expected to remember the rules off by heart at this point.
- The Rules come up over and over again, in different ways, as the programme progresses and the student learns them through overlearning (i.e. practising newly acquired skills to make them automatic).
- Small amounts of practice daily gets the best results and keep using the AR to enhance learning. This Level will take 3 to 4 weeks to complete.
- Some of these rules have additional AR models to enhance learning*

| DAY 1 | Modules 1 to 3 (Silent ‘e’ rule) watch the video and do the interactive reading and spelling exercises and activate the *AR model |
| DAY 2 | Modules 4 to 6 (’x’ rule) watch the video and do the interactive reading and spelling exercises |
| DAY 3 | Modules 7 to 9 (’qu’ rule) watch the video and do the interactive reading and spelling exercises and activate the *AR model |
| DAY 4 | Modules 10 to 12 (’y’ rule) watch the video and do the interactive reading and spelling exercises do the interactive reading exercises and activate the *AR model |
| DAY 5 | Level 4 Multiple-choice Questionnaire (Part 1) – student should answer all 10 questions, then print the report and revise any modules that are indicated before moving on |
| DAY 6 | Modules 13 to 20 (Alternative spelling of vowels rule) watch the videos and refer frequently to the Vowel & Consonant Charts |
| DAY 7 | Modules 21 and 22 (Alternative spelling of vowels rule) do the interactive reading and spelling exercises |
| DAY 8 | Modules 23 to 25 (’y’ rule) watch the video and do the interactive reading |

& spelling exercises

| DAY 9 | Module 26 to 28 (’c’ rule – Part 1) do the interactive reading and spelling exercises and activate the *AR model |
| DAY 10 | Module 29 to 31 (’c’ rule – Part 2) watch the video and do the interactive reading and spelling exercises |
| DAY 11 | Module 32 and 33 (’c’ rule – Part 3) watch the video and do the interactive spelling exercise |
| DAY 12 | Module 34 and 35 (’c’ rule – Part 4) watch the video and do the interactive spelling exercise |
| DAY 13 | Module 36 and 38 (’c’ rule – Part 5) watch the video and do the interactive reading and spelling exercises |
| DAY 14 | Modules 39 to 41 (’g’ rule) watch the video and do the interactive reading & spelling exercises activating the * AR model |
| DAY 15 | Level 4 Multiple-choice Questionnaire (Part 2) – student should answer all 10 questions, then print the report and revise any modules that are indicated before moving on |
| DAY 16 | Module 42 and 43 (’t’ before ’ch’ and ‘silent letter’ rules) watch the videos |
| Day 17 | Module 44 and 46 (’ch’ as ’k’, ’que’ & ’gue’ rules) - watch the videos and activate the * AR model |
| DAY 18 | Module 47 and 48 (’ph’ as ’f’ and ’short vowels as long’ rules) watch the videos |
| DAY 19 | Module 49 and 51 (’ea’ as ’e’, ’-gh’ & ’-ve’ rules) watch the videos |
| Day 20 | Module 52 and 53 (SLF and –le, -el, -ll rules) watch the videos and activate the * AR model |
| DAY 21 | Level 4 Multiple-choice Questionnaire (Part 3) – student should answer all 10 questions, then you should print the report and revise any modules that are indicated before moving on |
### LEVEL 5 (Part 1): Reading Real Words (Using Rules 1 – 20)

- The focus is on reading real single-syllable words.
- Refer to the rules in Level 4 if there are difficulties with some of the words given.
- Refer back to the charts and AR models if experiencing difficulties

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 1 to 8 (Group 1 - words with NO rules involved)</th>
<th>watch the video and do the interactive reading exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 9 to 16 (Group 1 continued)</td>
<td>watch the video and do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 17 to 24 (Group 2 – words using rules 1 to 8)</td>
<td>do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 25 to 31 (Group 2 continued)</td>
<td>do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 32 to 39 (Group 3 – words using rules 9 to 20)</td>
<td>do the interactive reading exercises</td>
</tr>
</tbody>
</table>

### LEVEL 5 (Part 2): Spelling Real Words

- The focus is on spelling real single-syllable words and is ‘age’ appropriate for Primary Classes 1st to 6th.
- Each class has 3 levels of difficulty i.e. ‘easy’, ‘medium’ and ‘hard’ words.
- Select the appropriate start and end point for the student relative to their Class.
- When a student reaches their level of ability (e.g. reaches a point beyond their age or class) then you can use the ‘skip to Level 6’ option to move on.
- This section also introduces ‘flashcards’, explaining and demonstrating how to make and use them. They really help the student to anchor a word in long term memory.
- Refer back to the rules in Level 4 if there are difficulties with some of the words given.
- When you have established a baseline of errors for Level 5, you can work on these and at the same time - progress to Level 6.
- Refer back to the charts and AR models if experiencing difficulties

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 62 to 64 (1st Class HARD words)</th>
<th>do the interactive spelling exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 76 to 78 (2nd Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 89 to 90 (3rd Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 91 to 93 (4th Class EASY words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 94 to 96 (4th Class MEDIUM &amp; HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
</tbody>
</table>

### LEVEL 5: Spelling Real Words (CLASS 4 Students ~ 9 to 10 years old)

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 62 to 64 (1st Class HARD words)</th>
<th>do the interactive spelling exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 76 to 78 (2nd Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 89 to 90 (3rd Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 95 to 98 (4th Class HARD &amp; 5th Class EASY words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 99 to 101 (5th Class MEDIUM &amp; HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
</tbody>
</table>
### LEVEL 5: Spelling Real Words (CLASS 6 Students ~ 11 to 13 years old)

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 62 to 64 (1st Class HARD words)</th>
<th>do the interactive spelling exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 76 to 78 (2nd Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 89 to 90 (3rd Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 95 to 96 (4th Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 100 to 101 (5th Class HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 6</td>
<td>Modules 102 to 104 (6th Class EASY, MEDIUM &amp; HARD words)</td>
<td>do the interactive spelling exercises</td>
</tr>
</tbody>
</table>

### LEVEL 6: The 9 Syllable-Division Rules for Reading

- This section teaches the student how to break-down words into their syllables. Remember to enforce that every syllable must have a “working vowel”. There are 9 syllable-division rules to be learned.
- This section enhances their understanding of the spelling rules and use the AR models will help to increase learning.
- Refer back to the charts and AR models if experiencing difficulties

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 24 and 25 (Rule 1: Compound Words)</th>
<th>watch the video and do the interactive spelling exercise</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 26 to 28 (Rule 2 and 3: Prefixes &amp; Suffixes and ‘Y’ Rule)</td>
<td>watch the video and do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 29 and 30 (Rule 4: VC/CV pattern)</td>
<td>watch the video and do the interactive spelling exercise and activate the *AR model</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 31 and 32 (Rule 5: V/CV pattern)</td>
<td>watch the video and do the interactive spelling exercise and activate the *AR model</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 33 and 34 (Rule 6: VC/V pattern) watch the video do the interactive spelling exercise and activate the *AR model</td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>DAY 6</td>
<td>Modules 35 and 36 (Rule 7: VC/CCV pattern) watch the video do the interactive spelling exercise and activate the *AR model</td>
<td></td>
</tr>
<tr>
<td>DAY 7</td>
<td>Modules 37 and 38 (Rule 8: V/V pattern) watch the video do the interactive spelling exercise and activate the *AR model</td>
<td></td>
</tr>
<tr>
<td>DAY 8</td>
<td>Modules 39 and 40 (Rule 9: VC/CCCV pattern) watch the video do the interactive spelling exercise and activate the *AR model</td>
<td></td>
</tr>
<tr>
<td>DAY 9</td>
<td>Level 6 Multiple-choice Questionnaire (Part 2) – student should answer all 10 questions, then you should print the report and revise any modules that might be indicated before moving on</td>
<td></td>
</tr>
</tbody>
</table>

**LEVEL 7: Prefixes, Suffixes & Common Word Endings**

- This part of the programme focuses on recognising ‘chunks’ that are common at the start or end of a word.
- Each reading and spelling module contains 10 words that have either prefixes or suffixes.
- You can click the ‘flashcard’ or ‘AR’ button to see an example – you should make a copy of the flashcard (or make your own) for the prefix or suffix that the student finds difficult.
- This is a very important stage of the programme that pulls together everything that has been taught.
- In this first group the more complex or troublesome prefixes and suffixes have an *AR model to enhance learning.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 1 to 22 (Reading words with prefixes) watch the video and do the prefix reading exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 23 to 43 (Spelling words with suffixes) watch the video and do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Modules 44 to 64 (Reading words with prefixes) do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 65 to 84 (Spelling words with suffixes) do the interactive spelling exercises</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DAY 5</th>
<th>Modules 85 (Reading sentences with words containing up to 3 syllables) do the interactive reading sentences exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 6</td>
<td>Level 7 Multiple-choice Questionnaire (Part 1) – student should answer all 10 questions, then you should print the report and revise any modules that might be indicated before moving on to the next module</td>
</tr>
</tbody>
</table>

**LEVEL 7: The 2-Syllable Suffixes**

- This part of the programme focuses on 2-Syllable suffixes, SO, each word ending will have 2 working vowels.
- The reading and spelling modules contain up to 10 words with these suffixes.
- You click the ‘flashcard’ or ‘AR’ button to see an example – you should make a copy of the flashcard for each suffix.
- In this second group, most suffixes have an *AR model to enhance learning.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 86 to 88 (2-syllable suffixes) watch the videos</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modules 89 to 97 (2-Syllable suffixes) do the reading exercises</td>
<td></td>
</tr>
<tr>
<td>DAY 2</td>
<td>Modules 98 to 107 (Reading words with suffixes) do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Module 108 (Reading 30 sentences with 4-syllable words) do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 109 to 117 (Spelling suffixes) do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 118 to 127 (Spelling suffixes) do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 6</td>
<td>Level 7 Multiple-choice Questionnaire (Part 2) – student should answer all 10 questions, then print the report and revise any modules that might be indicated before moving on</td>
</tr>
</tbody>
</table>
LEVEL 7: The Complex Suffixes

- This part of the programme focuses on complex suffixes from the Greek and/or Latin language.
- The reading and spelling modules contain up to 10 words that have these suffixes.
- You click the ‘flashcard’ or ‘AR’ button to see an example – you should make a copy of all flashcards shown.
- In this third group, all suffixes have an *AR model to enhance learning.

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Modules 128 to 134 (Instructional videos /-tion/ suffix) watch the videos Modules 135 to 140 (/-tion/ suffixes) do the reading exercises</th>
</tr>
</thead>
<tbody>
<tr>
<td>DAY 2</td>
<td>Modules 141 to 154 (Words with suffixes) do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 3</td>
<td>Module 155 (Reading 30 sentences with 5-syllable words) do the interactive reading exercises</td>
</tr>
<tr>
<td>DAY 4</td>
<td>Modules 156 to 161 (/-tion/ suffixes) do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 5</td>
<td>Modules 162 to 175 (Spelling suffixes) do the interactive spelling exercises</td>
</tr>
<tr>
<td>DAY 6</td>
<td>Level 7 Multiple-choice Questionnaire (Part 3) – student should answer all 10 questions, then you should print the report and revise any modules that might be indicated before moving on</td>
</tr>
</tbody>
</table>

It is advisable for the student to revisit the Multiple-Choice Questionnaires regularly for Levels 1, 4, 6 and 7 and to revise them if there are still some difficulties. THIS PROMOTES OVERLEARNING & AUTOMATICITY.

1.1.2 AUGMENTED REALITY CONTENTS

The children have available a set of interactive AR contents for receiving teaching prompts for improving their reading and spelling learning experience with the vowels, and consonants. Particular reading and spelling rules have special AR flashcards available in specific levels of the WWL programme.

The Augmented Reality contents of WWL are composed by the following tools:

- A unique AR WWL marker
- A set of interactive Augmented Reality charts for consonants and vowels
- A set of 65 Augmented Reality flashcards
The Augmented Reality marker represents a picture usable for activating the visualization of different AR objects. The child has to hold their mobile device with the camera on over the black and white marker for visualising the augmented reality object.

**Interactive Augmented Reality charts**

The Vowel and Consonant charts are used throughout the programme and they introduce the AR elements to bring 3D examples of the letters and sounds. AR is used all the way through the programme for the rules, prefixes and suffixes to make learning more interesting.

Clicking on one of the vowel pictures (icons) will open the camera. If the child is using a mobile device, the child can now point the camera at the provided WWL marker to view the Augmented Reality object. If the child is using a computer with a screen and a front camera, lift the marker to the screen camera to visualize the virtual object on the screen.

**AR Flashcards**

The AR flashcards are similar to the AR vowel charts but operate with a reduced functionality. Their goal is to enhance one particular lesson. Certain pages will have a “View in AR” button. By clicking this, the camera on your device (tablet, phone or laptop) will open. You can scan the provided WWL marker to view the AR content. The virtual model will automatically play a set animation when the marker is detected. Unlike the vowel content, you will not hear a sound accompanying the flashcards, and you will not be able to click on the model and make it rotate.
TUTORIALS

The WWL Programme contains 104 Tutorial Videos, that contain all the lessons necessary for each Level, explaining to the Teacher/Parent and the student what the lesson is about. They are available automatically, can be replayed and must be watched before proceeding to do the reading and spelling exercises. Watching the video in advance prepares the Teacher/Parent for what is coming next. We have also provided an extra level of information online for the Teachers, Parents, Facilitators to give them a deeper understanding of the WWL Programme and how it is used in Private Practice. This is basically an extract from a full day Training Course that is run onsite in WWL Offices.

The picture of the web page below appears when you click the ‘Tutorials’ button and from there you can access more information about how AR is used and extra information relating to each of the levels.

![Figure 10: WWL – Training Videos](image)

LEARNING MATERIALS

The WWL Programme Learning Materials can be accessed via the “Learning Material” button at the top of the logged in web page. As can be seen from the picture above, it provides access to printable copies of the following:

- The recommended daily step-by-step schedule of work for completing the programme and includes additional information about each of the 7 levels. Parents and teachers usually print the schedule and tick off progress as they go through the programme.
- The WordsWorthLearning Vowel Charts contain visual information about all the vowel sounds used in the programme. Students find it useful to have a printed copy for reference. The charts are also visible on the screen when working through the programme and are also used as part of the AR process.
- The WordsWorthLearning Consonant Charts contain visual information about all the consonant sounds used in the programme. Students find it useful to have a printed copy for reference. The charts are also visible on the screen when working through the programme and are also used as part of the AR process.

![Figure 11: WWL – Learning Materials](image)
QUESTIONNAIRES

The WWL Programme Multiple-Choice Questionnaires can be accessed via the “Questionnaire” button at the top of the logged in web page. As can be seen from the picture above, it provides access to the Questionnaires for all seven levels of the programme. Some of the levels have more than one Questionnaire. They are automatically signalled for completion at appropriate stages during the programme. They each consist of 10 multiple-choice questions with four suggested answers. A report is automatically generated on completion with suggested areas of revision before moving on in the programme. It is rare that a student will get all correct first time and it is recommended that the student revises the areas indicated on the report which can also be printed. The following is an example of a completed report:

1.2 The AHA Web monitoring interface side

The AHA Web monitoring interface side allows teachers and parents to follow their child’s ongoing activities of WWL literacy program. They can access to a dashboard for accessing to the functionalities for:

- visualizing their initial and final level of reading and spelling skills;
- accessing to the reading and spelling achievements;
- making the child’s behavioural observation using the measurement tool available by the system for evaluating the level of WWL tasks engagement;
- accessing to the statistical summaries of a) the effect of the intervention on children’s reading and spelling skills, and b) levels of off-task behaviour.

WHAT TO MONITOR: "OFF-TASK" BEHAVIOUR

For the course of the AHA intervention, you (as a teacher at school and as a parent at home) are asked to observe your child’s off-task behaviour during WWL sessions:

1. **Off-task behaviour** is your child’s overall off-task behaviour. It is defined as your child being not oriented toward and/or not engaged in his/her tasks in WWL modules (such as: watching videos, reading, spelling, speech sounds exercises, etc.)

You are also asked to observe the following categories of off-task behaviour:

a. **Off-Task Motor (OFT-M)** refers to when your child is engaging in any type of motor activity that deviates his/her attention from WWL tasks or interferes with his/her completion of WWL tasks.

Examples:

- Turning around in one’s seat, oriented away from the WWL instructions;
- Fidgeting in one’s seat (i.e., engaging in repetitive motor movements for at least 3 consecutive seconds);
- Manipulating objects not related to the WWL tasks (e.g., playing with a paper clip, throwing paper, twirling a pencil, & folding paper);
- Out of seat behaviours;
- Drawing or writing that is not related to the WWL tasks.

b. **Off-Task Verbal (OFT-V)** refers to audible verbalisations that are not permitted and/or related to WWL tasks.

Examples:

- Making any audible sound, such as whistling, humming, forced burping;
- Making unauthorized comments or remarks;
- Humming or talking to peers about issues unrelated to the WWL tasks.

c. **Off-Task Passive (OFT-P)** refers to when your child is passively not attending to WWL tasks for a period of at least 3 consecutive seconds.

Examples:

- Quietly waiting after the completion of an assigned task but is not engaged in an activity authorized by the parent/teacher;
- Sitting quietly in an unassigned activity;
- Looking around the room;
- Staring out the window.
How to use the AHA application

The AHA application has been designed to be as easy-to-use as possible, even if you don’t have a strong technological background. From a technical point of view, users just need a stable Internet connection and a computer/tablet/mobile phone with a Web browser (and an enabled camera for AR contents on WWL). The skills required to use it are simply the abilities to navigate through a website and click buttons.

AHA Pilot Study is part of your child’s daily homework routine and it only takes 15 minutes with the presence of you as a parent at home or as a teacher in a classroom.

When anyone decides to start using a new application they generally experience a “steep learning curve” to familiarise with various new features used in the system. We have a step-by-step guide that will walk you through the AHA application to help you with the learning curve in an early stage, or that will support you to clear doubts or oversights at a later stage.

A walk-through step-by-step guide

Step 1 Sign in to your account

CHILDREN ACCESS

Each parent, teacher and child have the credentials (login and password) for accessing to the AHA system.

The children of the first group have the credentials to access to the WWL Augmented Reality literacy programme.

The children of the second group have the access to the WWL literacy programme intervention.

The children of the third group will be enabled at the end of pilot to use the WWL Augmented Reality literacy programme.

Students can directly sign in to their WWL account with their username and password provided to access the literacy programme and various contents.

To get started, go to the WWL panel shown below which is the dashboard from which you can access all the Levels and Modules that you have already completed. From here you can resume where you left off or revisit previous work. Just click the Level you want then select the Module you want to revise.
Figure 14: AHA WWL Students’ access
For the purposes of this instruction we will outline the process by ‘clicking’ the Level 1 box which will take you to the screen below.

Figure 15: AHA WWL “Levels”
Now click Module 1, which has been highlighted in the red box in the picture above. This will take you to the web page in the picture below. In the above picture you can see that there is a short video tutorial that you should watch. It explains the basic speech sounds that are pictured on the WWL Vowel Chart which is shown underneath the video box.

Figure 16: AHA WWL content
When the video has finished you can ‘click’ the pictures (icons) on the Vowel Chart. e.g. if you ‘click’ the one highlighted above with the red circle (the ‘bee’) and hover your camera over the icon, a pop-up will appear asking you to allow this programme to use your camera – so just allow that. This will connect your camera which can now be used for viewing the Augmented Reality (AR) objects. Use the camera to hover over your printed AR marker which will reveal the new AR virtual content, which in this particular example would be the ‘bee’.
You can scroll down the web page to reveal all the Vowel Charts and the Consonant Charts where you can access the AR objects that are shown on the charts.

Simply 'click' on one of the icons like the one circled in 'red' and you will see a video that shows how to make and pronounce the sounds on the chart. In this particular case when you watch the video (see the picture below) you will also hear the sound with an explanation of how to make the p (in pig) sound using the articulators (tongue, teeth and lips).

Later in the programme, from levels 4-7, the charts are expanded to include other spellings for associated speech sounds, as shown in the Vowel Chart below e.g. the icon circled in red where 'ea' can sound like 'ee' in the word 'seal'.
Finally, on certain pages in levels 4, 6 and 7, there will be a “View in AR” button as shown in the red box in the picture below. When this button is pressed you will see a ‘flashcard’ that will have AR content.

Figure 22: WWL speech sounds and spellings (view in AR)

Figure 23: Example of Augmented Reality Flashcard

PARENT AND TEACHER ACCESS

As a parent or teacher, you can sign in to your AHA account with your username and password provided to access your AHA dashboard with various functionalities.

Step 1 Parents and teachers who sign in for the first time will be prompted to answer a survey question prior to accessing AHA Dashboard. Once you have answered the question, you will be redirected to the AHA dashboard.

Figure 24: AHA Dashboard
AHA: ADHD Augmented

**Figure 25: Questionnaire for Parents and Teachers**

### AHA Dashboard

**Step 2** Browse your student list

This is your AHA dashboard. Here you can browse your children in the student list.

In the toolbar for each child, you can find these icons to access various functionality:

- WWL Account
- Case Data
- Observations
- Data Analytics

Next steps will explain these functionalities one by one.

**WWL Account**

**Step 3** Check the WWL student account

From WWL Account, you can view your child’s account on the WWL programme to check his/her progress.

*To go back to your AHA dashboard, use the Back button in your browser.**

**WWL Account becomes not available when your child is already signed in to WWL, because only one user can access the same WWL student account at the same time.
Case Data

Step 4 Review the student’s case data

You can review the results of your child’s literacy assessment here.

You can browse your group, a short description about the two types of assessments used (NARA II and Vernon tests), and results from Pre-Assessment and Post-Assessment.

*Assessment takes place before and after the AHA intervention. Pre-Assessment refers to the test your child took before the AHA intervention. Post-Assessment refers to the test your child took after the AHA intervention.

Observations

Step 5.1 The most recent observation is shown with the information collected by the parent or teacher when you enter in the “Observations” area.

Click “New” on the right-hand side for performing the child behaviour observation.
Step 5.2 Enter your child’s off-task behaviour

The following screenshot shows the measurement tool of the off-task behaviour:

You are asked to enter estimated time (in terms of percentage) of your child’s off-task behaviour using the measurement tool shown in the figure.

**Figure 29: AHA Off-Task Behaviours**

Each slider showed in the blue panel is a six-point scale ranging from 0 to 5. The red panel gives to the teacher and parent a clear indication of the following values:

- 0 → No (0%) off-task behaviour was observed during the period
- 1 → Student engaged in off-task behaviour occasionally (1-20%) during the period
- 2 → Student engaged in off-task behaviour during some (21-40%) of the period
- 3 → Student engaged in off-task behaviour during approximately half (41-60%) of the period
- 4 → Student engaged in off-task behaviour during most (61-80%) of the period
- 5 → Student engaged in off-task behaviour during majority (81-100%) of the period

The first slider refers to **overall off-task behaviour**. The other sliders refer to **motor**, **verbal**, and **passive off-task behaviour**, respectively. The definitions for these categories of off-task behaviour are provided previously in the booklet.

Please note that the sum of the estimated time for motor, verbal, and passive off-task behaviours (Sliders 2, 3, and 4) should be roughly equal to that of the overall off-task behaviour (Slider 1).

Once you have entered your observation values, click on the button “Submit Observation”.

**Start your observation at the beginning of each WWL session. End your observation after 15 minutes, regardless of whether your child finished the WWL session or not.** A stopwatch will be useful to measure elapsed time.

Immediately after the end of the 15-minute observation time, estimate your child’s off-task behaviour (overall, motor, verbal, and passive) in terms of the percentage of time during the 15-minute observation. Even if your child needs more time to complete the WWL session, please base your observation on the 15-minute interval.

Enter your observation moving the button to the position that best reflects the percentage of time that the child was off-task during the observation.
OBSERVATION EXAMPLE

The following figure is a schematic example of an observation of a child’s off-task behaviour exhibited during a 15-minute observation time:

Immediately after the end of the 15-minute observation time, estimate the child’s overall off-task behaviour. In this example, overall off-task behaviour (a total of any off-task behaviour) can be roughly estimated as 50% of the observation time. Of the 50% overall off-task behaviour, roughly the 40% accounts for motor off-task behaviour and the 10% accounts for passive off-task behaviour.

According to the above estimate, you can enter your observation values using the slider bars as follows:

![Observation Example](image)

To save your observation, click “Submit Observation”. You will be redirected to the previous page where you can check the most recent observation.

Data Analytics

**Step 6 Overview the student’s progress**

In this section, you can overview your child’s monitored progress in the AHA intervention through various charts. Charts include: scores of the WWL multiple choice questionnaires, time spent on WWL (weekly and per level), and change in your child’s off-task behaviour.

At the end of the intervention phase of AHA project, all participants from the two groups with intervention (parents, teacher and students) will receive an evaluation questionnaire by e-mail which is compulsory to fill in prior to the evaluation of the project.

![Data Analytics](image)
After the AHA project finishes

The sustainability of the AHA, beyond the life of the project is a key factor for this initiative to provide. In fact, the AHA project was aimed at encouraging innovation and creativity in the application of ICTs for educational toolkits for students with ADHD. The main targets are students at risk of exclusion, such as children and young adults with special needs, as well as families and teachers engaged with these subjects. With regards to these groups, the project was inspired by thoughts about the positive fallouts that the sharing of evidence-based practices would have on the wellbeing and climate of the child’s life. Therefore, we intended to answer the following question:

After the end of the project is it possible to continue using the AHA project?

To encourage a long-term impact the project faced the challenge to spread this new approach within relevant professional communities that are involved in the management of ADHD. Moreover, the use of ICTs, when sustained by a rigorous theoretical framework, can help to overcome cultural, organisational and logistic barriers.

The different components of the AHA project - theoretical framework, web-based application – are all designed to work together effectively and the knowledge of one component will encourage the acceptance of the others. Therefore, the service set up during the AHA project will contribute in:

- Provision of a lifelong learning program to increase knowledge and improve the quality of cooperation between researchers, professionals, educational operators and families at European level, on the topic of emerging technologies for the education of students with ADHD.
- Improvement in the academic performances and social skills of ADHD students.
- Improvement in the quality of life of subjects affected by ADHD, and for their families.
- Dissemination of information of used by policy and decision makers in assessing the effectiveness and efficiency of Augmented Reality for literacy skills of students with ADHD.

How can anyone interested find useful information about the AHA project?

The AHA partners in each European country (Ireland and Italy), which are involved in the consortium, intend to support the formation of a network of families, associations, schools, and professionals. Any user interested in AHA approach can contact a member of this network to receive support and suggestions. Furthermore, consent forms are available to download from the public site of the application.

The network will be the primary means through which we hope to achieve our most ambitious goals:

- Supporting educational policies that promote the integration of students with special needs.
- Supporting policies aimed at promoting equality, social cohesion and active citizenship for students with ADHD.
- Improvement in the social life of communities, due to the reduction of some of the antisocial behaviours related to ADHD.
- Supporting economic and social growth facilitating the integration of people with ADHD within the life of communities and the workplace.

However, going beyond the AHA application means we also need to promote the use of the AHA approach beyond the specific disability. An ICT-based system to monitor behaviours within intervention plans that is based on a functional analysis model can be useful in many different contexts and situations. This will be helpful for pupils with typical development and those with other disorders.

The main reason that the application was developed was to be specifically used with ADHD. However, the feedback, during the development process, from potential stakeholders showed that there was a great deal of flexibility within the product. It was believed that it was useful for other psychopathological areas that aim to connect their intervention to the results of a behavioural functional analysis. This can easily be seen in the case of autistic spectrum disorders and in conduct disorders but it is also useful with specific learning disabilities (i.e., dyslexia). It can be used, for example, when monitoring spelling mistakes or reading mistakes as they can be treated ‘as if’ they were behaviours that can then be operationalised and successfully observed.

For example, if you are a teacher you will be aware that students with dyslexia makes many spelling mistakes. The first strategy is to carefully examine their exercise books in order to estimate how many errors they make, and discover where the areas are that they make the most frequent occur (i.e. math or science). Then to identify the type of mistakes they tend to make (i.e. swap letters, omit double consonants). Although you may not be aware of it, you are actually making an observation and gathering a useful set of baseline data. Often you will begin to plan a reading support intervention after this type of first step. Then you can introduce the various strategies designed to help students manage their problems.

At this step, you will share the intervention you have planned with the child’s parents to help them understand how to help their child at home during homework or coursework. Creating alliances, which are important to help reduce the child’s anxiety levels, to inform the parents’ understanding and to help the child grow in a learning environment of calmness and confidence. At the end of your intervention, you are used to evaluate whether it worked or not, comparing a new set of observations with the baseline data. This comparison will measure how much the target behaviour increased or decreased.

Well! The path you followed by now identifying a target behaviour, building a network between caregivers, gathering observational data, planning an intervention, and verifying the results can be easy through the use of the AHA application.

How you can contribute

All people interested in ADHD issues as well as parents, teachers or health professionals can contribute to the project’s activities by contacting us for further testing and development. You can help by experimenting with the Web application in your own home or school.

If you are interested in receiving more information please contact the project team at aha@ucd.ie
The AHA application can be applied to others measuring the Augmented Reality effect in literacy skills in which a systematic process of behavioural monitoring is needed, and not only for clinical purposes.

Useful links

Project Web site: https://aha.ucd.ie/

Facebook: https://www.facebook.com/aha.adhd.3

Twitter: @ADHDAugmented (https://twitter.com/ADHDAugmented)

https://www.youtube.com/channel/UChcwJbpyH7US8jAP6Gg4Kg

https://www.wordsworthlearning.com/

http://hadd.ie/

AHA Project Email: aha@ucd.ie


Project coordinator eleni.mangina@ucd.ie
Acknowledgements

The collaborating partner organizations would like to thank all their staff who worked tirelessly and passionately to make the AHA project succeed and in helping us in the management of the countless problems and challenges we ran into. Particular and heartfelt thanks to the parents and teachers that bravely accepted the challenge to systematically observe the children’s behaviours. Thank you also the supporting organisations and, in particular, Kerry Pace from Diverse Learners who regularly advised the consortium.

Last but not least, I would like to thank all HADD Ireland staff that supported us during the different steps of the engagement strategy process.

Special thanks to Na Li, for managing the financial aspects of the project with accuracy and precision.

Heartfelt thanks to the partnership’s stakeholders who gave us the possibility to rethink and improve many aspects of the application, making it more suitable for everyone.

Assoc. Prof. Eleni Mangina
AHA Coordinator

Authors

[Italy] www.itd.cnr.it
The Italian Institute for Educational Technologies (ITD) is one of the research institutes of the Italian National Research Council with more than 40 researchers, technologists and technicians on its staff. It has two branches one in Genoa and the other in Palermo. The main disciplines of reference for the Institute’s research activity are the cognitive sciences, computer science and instructional theories. The research activities are focused on the development and integration of ICT in various educational settings (school, university, business); the study of technological innovation as a learning resource; educational issues related to different disciplines and topics (humanities, sciences, environmental education, health, etc.); learning issues of particular social significance (disability, learning difficulties, social disadvantage, intercultural issues, etc.). In this framework ITD has participated in several national and international funded projects. WHAAM ITD is partner of AHA project and participates in the development of the AHA web service.

[Ireland] www.wordsworthlearning.com
WordsWorth Learning Limited (WWL) was established in 2008 as a spin-off from a Sole-Trader Speech & Language Therapy Private Practice for remediating reading and spelling problems such as dyslexia. The objective was to create and bring to the market a more affordable digital version of the original remedial literacy programme which was created in 1996 by Rita Treacy and was paper-based. The new online version of the programme, launched in 2011 is still tested and used today in the Private Practice. In AHA project, Rita Treacy has completed all (pre and post) literacy attainment assessments for all participating students - to evaluate outcomes. WordsWorthLearning has provided the online training course or all participating teachers and parents. WWL has designed, implemented, tested and validated all AR Objects.

[Ireland] www.ucd.ie
Founded in 853, University College Dublin (UCD) is one of Europe’s leading research-intensive universities, where a comprehensive suite of strong disciplines forms the foundation of high quality interdisciplinary research, scholarship and innovation. UCD is the national leader in research funding, attracting quality investment that has helped the university to establish a reputation as a world-class destination for leading researchers. UCD is ranked within the top 1% of higher education institutions worldwide. UCD is the largest University in Ireland: with greater than 1,500 academic staff across a range of disciplines, more than 1,550 PhD students and more than 3,400 Masters students, producing 22% of Ireland’s PhD graduates each year with more than 33,000 registered students. In this project Assoc. Prof. Eleni Mangina’s team is coordinating the AHA development, evaluation and dissemination.