



D5.13 – Independent Report on the performance of Nesplora Aula School on European population



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1. EXECUTIVE SUMMARY

VRMIND-AULA SCHOOL (Nesplora Aula School from now on) is a neuropsychological test, oriented to the educational field, for the assessment of attention in children from 6 to 16 years old. It is a Continuous Performance Test (CPT) designed to evaluate attentional processes and provide some basic psychopedagogical orientations based on the profile obtained. This test is valid to guide and facilitate the learning process of the students and also, for the early detection of learning difficulties. Nesplora Aula School offers scores about: sustained attention, divided attention (visual and auditory); impulsivity; excessive motor activity (hyperactivity); tendency to distraction, processing speed, focus on the task, attentional difference between visual and audio stimuli and between more and less stimulating tasks, sterile movement, motor activity and fatigue for tasks. Also distinguishes the tendencies to the internal or external distraction. The system provides an automatic report where all this data is described, moreover, a description of the attentional profile is done at the end of the report and some orientations are given based on the profile.

This product was launched to the market on 2018 and Nesplora has sold 68 licenses in 13 countries. In addition, more than 100 licenses have been sold to distributors in Latin America and Turkey. From 2018 up to now both the professionals from Nesplora and also our customers are carrying out different investigations with this tool.

Even though to continue researching with Nesplora Aula School it is always useful since these studies increase the visibility of the tool and its value. This is the reason why it was planned to perform studies with Nesplora Aula School in different countries during the VRMIND Project.

This deliverable describes the studies that are being carried out and the main conclusions. It is important to notice that our current collaborators in Europe have not shared with us all the data and they will do it in the future.

2. RELATION WITH OTHER WPS AND DELIVERABLES

This deliverable is closely related with D5.14: Independent report on the performance of Nesplora Aula School on Latam population; D5.15: Independent report on the performance of Nesplora Aula School on North American population; and D3.2 Aula School field test report.

3. COLLABORATOR'S STUDIES

Since the moment we started the development of Nesplora Aula School, we started looking for European collaborators. First of all we contacted with the collaborators of Nesplora Aula and our current customers who had previously expressed interest, since they have access to children population. Most of our contacts did not want to collaborate with us mainly due to agenda constraints and difficulties to achieve the sample. So we started inviting different experts in the neuropsychological and educational field.

These unsuccessful contacts are shown in table 1.

We also published a profile in the Enterprise Europe Network - EEN. This process has been relatively slow and started to show interesting outcomes on February 2018. These have been the institutions interested in collaborating with us, but, finally none of these institutions collaborated with Nesplora Aula School:

SPAIN

1. Consorci Sociosanitari de Terrassa.
2. Hermanas Hospitalarias, which is currently collaborating in the studies with the Nesplora Aquarium test.
3. Andalusian Knowledge Agency.
4. Therapeutic Community of Jaen.
5. La Fé Hospital.

ITALY

1. Camera di Commercio Industria Artigianato Agricoltura di Torino.
2. Casa di Cura del Policlinico.

GREECE

1. CSRI- Cognitive Systems Research Institute.

The collaborators and studies of Nesplora Aula School are described and detailed below:

3.1 Sincrolab

Collaborator's description: Sincrolab was born with the mission of giving global access to the latest advances in neuroscience, synchronising cutting-edge technologies with specialised centres for patients care. It is a platform aimed at the recovery and development of cognitive abilities. Consists in personalised, standardised and scientifically validated cognitive stimulation trainings focused on the educational and health field. They integrate neuroscience, psychology and education knowledge optimising cognitive development through innovative tools and pioneering technologies. The collaboration agreement with this collaborator can be found in Annex 1.

Location: Madrid (Spain)

Sample's commitment: Minimum 70 children between 6 and 16 years old.

Sociodemographic data: All the participants are students of the school "Colegio Virgen del Remedio" located at Alcorcón, Spain. The study is being carried out at the moment so, we do not have the data yet.

Measurements:

- **Nesplora Aula School:** Nesplora Aula School (Climent, 2018) is a continuous performance test that takes place in a virtual scenario, very similar to a school classroom. During 20 minutes, the child is situated in a virtual context, shown through a head-mounted display with movement sensors and earphones and a single-button switch. Perspective places the child in one of the desks, facing the blackboard, where the stimuli appear. Stimuli are presented both on a visual and auditory basis, and, at the same time, previously randomized distractors of ecological nature appear progressively. The core of Nesplora Aula School is composed by two main exercises: (a) a NO-GO paradigm-based exercise (i.e., "Press the button when you DO NOT perceive the target stimulus") and (b) a GO paradigm-based exercise (i.e., "Press the button when you perceive the target stimulus").

Intervention:

- **Sincrolab:** The intervention will be carried out through the training platform for children. The platform allows to design specialized training, adapted to the cognitive profile of each child. The training is adapted depending on the results obtained in the different sessions. The training is done in 48 sessions



divided into 4 sessions per week of 15 minutes each, during 12 weeks.

Objectives of the study: This study has two main objectives. On the one hand, we intend to check the validation of test-retest of Nesplora Aula School and its ability to detect changes in children's performance and, on the other hand, we seek to verify the effectiveness of the intervention with Sincrolab.

Hypotheses: The main hypothesis is that children will improve their attention capacity and speed of response after training with Sincrolab and that Nesplora Aula School will serve to detect this change and therefore to monitor interventions.

Next steps: We have encountered several difficulties in carrying out the evaluations of this study. First of all, the study was going to be carried out in another school in Madrid (Spain), after some first meetings it was decided to start the study after the summer holidays to be able to carry them out in a more continuous way. At the last moment, the school management refused the study due to time and infrastructure limitations. This meant not carrying out these evaluations and looking for a new school for the study.

After analysing the schools in the Community of Madrid that could best adjust to this study, the "Virgen del Remedio" school was contacted. The project was explained to them, a meeting was held with the school's orientation and management department, and after accepting the study, the organisation began. Everything is already organized and the evaluations will begin in mid-February. In March we will be able to receive the data of the first administration of Nesplora Aula School. After the 12-week intervention with the Sincrolab system, they will administer the test again and send us the data.

3.2 Universidad de Las Palmas de Gran Canaria (ULPGC)

Collaborator's description: Universidad de Las Palmas de Gran Canaria (ULPGC) is a modern university, with innovative studies within the Spanish higher education panorama. We are collaborating with Zaira Santana (PhD), a university teacher. She also coordinates the psycho-pedagogy unit at La Paloma Hospital, where she also conducts various studies. The collaboration agreement with this collaborator can be found in Annex 2.

Location: Las Palmas de Gran Canaria, Canary Islands, Spain.

Sample's commitment: 100 children between 6 and 16 years old.

Sociodemographic data: All the participants are children who come to the psycho-pedagogical unit with learning difficulties. The study is being carried out at the moment so, we do not have the data yet.

Measurements:

- **Nesplora Aula School:** Already described in section 3.1.

Objectives of the study: The objective of the study is to verify the effectiveness of a physical training program for the improvement of child's attention. Nesplora Aula School will be used to check the effectiveness of the program by carrying out a previous evaluation and another subsequent evaluation. In addition to the physical training, the psycho-pedagogical orientations offered by the evaluation system itself will be taken into account in order to facilitate the learning process of the children.

Hypotheses: The main hypothesis is that children will improve their academic performance with the combination of physical sports and the psychopedagogical orientations proposed according to their attentional profile. On the other hand, Nesplora Aula School is expected to be valid to detect changes in attentional performance and monitor interventions and treatments.

Next steps: The sample is already being collected with the children who come to the Psychotogether consultation. This sample will be completed with other children to whom they have access from the university. More than 30 children have already been evaluated with Nesplora Aula School and we expect to receive the data from this first administration of the test in March. After the intervention, Nesplora Aula School will be administered again and the data from the evaluations will be shared with us again in order to carry out the necessary analyses.

3.3 Axular Lizeoa

Collaborator's description: Axular Lizeoa is a school of reference in Spain. In this school, the psychopedagogical orientation is given great importance to achieve the integral education of the students. It has the following characteristics: (1) Anticipatory and foresighted, that is, oriented to prevent rather than cure. Therefore, it will be especially important in Pre-school and Primary Education. (2) Balancing and complementary to the shortcomings that we can discover in our students. (3) It reinforces individual development and responds to the diversity of students.

Location: San Sebastian, Basque Country, Spain.

Sample's commitment: 108 children between 7 and 13 years old.

Sociodemographic data: All the participants are students of the school Axular Lizeoa. They belong to two courses of primary education and secondary education. All students of both courses have been evaluated, without having inclusion or exclusion criteria depending on the attentional profile or school performance.

Measurements:

- **Nesplora Aula School:** Already described in section 3.1.

Objectives of the study: The main objective of this second study in this school was to check the correct functioning of the test and to affirm an easy understanding of the generated report as well as valid. Another objective was to provide psycho-pedagogical guidance based on the results to children to try to facilitate their learning process.

Hypotheses: After the changes made in the report after the pilot study carried out in this same school, it is hypothesized that the report will be clear and easy to interpret. It is also expected that the description of the attentional profile that is offered and the psychopedagogical orientations provided will be used and easily applicable in the school environment.

Methodology: In order to carry out the evaluations with Nesplora Aula School to the students of the Axular Lizeoa school, the work of several Nesplora professionals was counted on. 3 Nesplora workers went to the school for two days to evaluate the students. There were 6 virtual reality systems in order to carry out the evaluations in groups of 6 to have two entire courses evaluated in a short period of time. To carry out these tests in groups, everything was organized in a separate room, without external distractions and with enough space for the comfort of the children and the evaluators. Each turn of 6 people lasted 40 minutes. At the beginning they were explained that a virtual reality test was going to be carried out, without giving explanations of the task, and the functioning of the virtual reality system was explained to them. Once the explanation was given, the tests were connected and the children were evaluated. After all the evaluations were completed, all the reports were prepared and handed over to the centre's counsellor so that they could benefit from the psycho-pedagogical orientations.

Results: After obtaining and analysing the reports obtained from all the participants, it is concluded that the changes made in the report favour the understanding and use of it. School professionals refer that the report adds great value to their work with students. They also say that the report is consistent with the performance of children on a day-to-day basis in the school environment and that the strategies provided are easily applicable in the school routine.

Conclusions: With all this it is concluded that the Nesplora Aula School test is valid in the educational field to facilitate the learning process of the students. The report is easily interpretable and understandable by the counsellors, teachers, parents and by the students themselves. The use of this test provides an added value to the school and can help prevent problems arising from attentional difficulties in later stages. It also helps to prevent school failure.

3.4 **Mente Idílica**

Collaborator's description: Mente Idílica is a company specialized in clinical practice activities, neurosciences, psychology, school guidance, clinical research, biotechnology research and development, social and human sciences research. The collaboration agreement with this collaborator can be found in Annex 3.

Location: Paredes. Portugal.

Sample: 100 children between 6 and 16 years old.

Sociodemographic data: The children participating in the study are from a school to which Mente Idílica offers school guidance services. Currently the study is being carried out and we hope to receive the data in the coming weeks.

Measurements:

- **Nesplora Aula School:** Already described in section 3.1.
- **Conners' Parent & Teacher Rating Scale for parents and teachers:** The Conners' Scales were designed by C. Keith Conners in 1969 and their use has been extended to the pre-treatment evaluation process. These scales have become a useful instrument whose objective is to detect the presence of ADHD and other associated problems, by evaluating

the information collected from parents and teachers (Campos et al., 2002; Campos et al., 2003). In this case, the scale for teachers will be used to collect the data and carry out the study.

- **School Performance:** The school performance of the children will be taken into account to know the relationship between the evaluation tests previously explained and the results obtained at the school level. It is sought to know if the qualifications obtained are consistent with their attentional profile.

Objectives of the study: The aim of this study is to provide a better understanding of the children's cognitive profile, exploring Nesplora Aula School's scores correlations with Conners' Teacher Rating Scale and school performance and the school performance. The aim is to know the relationship between these three measures and to know if the attentional profile is reflected in the scores obtained.

Hypotheses: Correlation between the variables of both tests would provide complementary data about the attentional profiles of the students. It is also hypothesized that the attentional profile will affect the results of the students. This affectation will not be bidirectional, the difficulties at the attention level can cause a worse school performance but, poor school performance does not indicate an attentional deficit.

Next steps: We are waiting for the data that we will receive in the near future. After receiving the data, statistical analysis will be carried out to check the correlations. Depending on the data obtained, we may defend the use of the Nesplora Aula School against the Conners Scale for teachers or propose the combination of both to obtain complementary data on children's profiles. However, it should be borne in mind that the data provided by the Conners Scale are not objective and may be biased by the person consulted.

4. CONCLUSIONS

The aim of these studies is to measure the validity, applicability and usefulness in the educational field. From the commercial point of view, these studies are done in order to give value to the test in front of the market so the studies can open new markets in foreign countries.



Nesplora Aula School was deployed into the market in 2018 and from that moment until now some studies are being carried out by the R+D department of Nesplora but also by independent experts, mainly our clients.

For this report we expected to make studies with a total sample of 300 subjects, and we will be able to recruit 378 subjects. However, three of our current collaborators continue with the evaluations and they will give us the remaining data in the next months. In any case, we have not been able to get as many collaborators as we wanted out of Spain. The ethical constraints and the deadline of the studies have been the main reasons to not collaborate with us. The studies carried out are very important since these studies will allow us to publish new scientific articles and to get a better position of Nesplora Aula School in the market.

For instance, the study which is being carrying out in collaboration with Mente Idíllica will help us to demonstrate that Nesplora Aula School has good psychometric characteristics as other tools used in this field but with value added. As the Conners test is the golden standard for the evaluation of attentional processes, when we will finish our current study we will be able to demonstrate that Nesplora Aula School has good psychometric properties in comparison with Conners Scale for teachers. Besides that, this study will allow us to have a scale of Nesplora Aula and Nesplora Aula School in Portugal. By obtaining data from 100 children without pathology, we will be able to compare their results with those of the children in the Spanish sample and see if there are significant differences in the performance obtained. If there are differences between the two populations, it will be necessary to study in what aspects the differences are and look for the reasons for them. On the other hand, if there are no differences between the scores obtained by the children from Portugal and Spain, it is concluded that the current scales of the Nesplora Aula and Nesplora Aula School tests can be applied in Portugal. This also opens up a new market for us.

The study with Axular Lizeoa opens a new target population to be assessed with Nesplora Aula School. To know the attentional profile of the students will allow us to demonstrate that our tool is useful at the educational field not only with children with attentional difficulties but also with children without problems, to characterize the attentional profiles and facilitate the learning process. On the other hand, after the studies carried out in Axular Lizeoa, it is concluded that the Nesplora Aula School report is easily interpretable by school professionals, parents and students. This report provides psychopedagogical strategies based on the profile of each student to facilitate the learning process. Finally, it should be noted that Axular Lizeoa is

a reference centre in Spain and can help us open up the market in other schools and institutions. For example, the German School of our city has already contacted us in order to acquire our system and even to be able to carry out studies in collaboration with us. So we are already getting the first results.

The studies with Sincrolab and ULPGC will help us to know the validity of the test for the monitoring of treatments and the detection of changes in the attentional profile. This is important both in clinics and in schools as it allows us to know if the physical or cognitive treatments or interventions are effective to improve the aspects that are reflected in the report. Therefore, in spite of waiting for the results, it is hypothesized that Nesplora Aula School can be a reliable test for the first evaluation and a valid tool to follow up on the person evaluated. In addition, the recommendations provided by the test can help us to focus the personalized intervention.

As previously explained, due to several reasons we do not have all the data from the collaborators. But in the different annexes of this deliverable we include the Collaboration agreement with the commitment. So we will continue in 2019 with these studies with our own resources since we think that they help us to have a better position in the market.

Finally, we have attended three congresses during the year to present Nesplora Aula School to different professionals. In May we went to the IX National Meeting of Counselors (Zaragoza, Spain) where the evaluation tool was presented and its application in the schools. The present professionals were counselors of schools throughout Spain. In addition to the oral communication, we had a stand where we made demonstrations to interested people and we offered them more information about the test and the studies. We contacted several potential clients that are currently being managed or sales have already been closed. In June we attended the IX International Congress of Psychology and Education (Logroño, Spain) in which we made another presentation on the development of attention in childhood and stability in the results of cognitive exploration. This congress gave us more visibility and helped us in the promotion of Nesplora Aula School. In November we presented a work at the ICERI2018 congress to explain different psychometric aspects of the Nesplora Aula School test. Special emphasis was placed on the calculation of the significant differences used in the report to find favourable conditions for the child.

5. REFERENCES



Amador Campos, J.A., Idiázabal Alecha, M^a Ángeles, Aznar Casanova, J.A. & Però Cebollero, M. (2003). Estructura factorial de la escala de Conners para profesores en muestras comunitarias y clínica. *Revista De Psicología General y Aplicada*, 56: 173-184.

Amador Campos, J.A., Idiázabal Alecha, M^a Ángeles, Sangorrín García, J.Espadaler Gamissans, J.M. & Forns i Santacana, M. (2002). Utilidad de las escalas de Conners para discriminar entre sujetos con y sin trastorno por déficit de atención con hiperactividad. *Psicothema*, 14(2): 350-356.

Moreno, M. (2018). Nesplora Aula School: una prueba neuropsicológica para el ámbito educativo. Oral communication at *IX Encuentro Nacional de Orientadores*, 18-20 May 2018, Zaragoza, Spain.

Moreno, M., Rebón, F., Aierbe, A., Mejías, M., González, M. & Climent, G. (2018). Desarrollo atencional en la infancia: Estabilidad en los resultados de la exploración cognitiva. *XIX Congreso Internacional de Psicología y Educación*, 20-23 June, Logroño, Spain

Ruiz-Ruano García, A.M., López Puga, J., Lizarazu Rodrigo, B., Moreno Oyarzabal, M., Aierbe Pombo, A., Mejías Pérez, M. & Climent Martínez, G. (2018). Comparing attentional performance with Calibrated Bayes Factors in virtual reality-based continuous performance test. Oral communication at ICERI2018 - International Conference of Education, Research and Innovation. 12-14 November 2018, Seville, Spain.