How evaluate and improve four dimensions of self-regulation in preschool settings

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1. RESEARCH PROBLEM AND OBJECTIVES

Self-regulation is a key executive function and it’s development start in early years. That EF function has been studied by classical tasks or diary activities in preschool setting, but it is necessary to design technological solutions for evaluate and enrichment it based in experimental studies in a ICT context.

OBJECTIVE 1
Define and implement user model for the evaluation and monitoring of children, build up with Artificial Intelligence (AI) techniques incorporating Bayesian a models of the Item Response Theory (IRT) and following an evidence-base design (ECD)

OBJECTIVE 2
Build a open-access web platform offering tools for cognitive enrichment with tasks patterns.

OBJECTIVE 3
Develop a methodology to connect the EF with quantifiable events, indicator. Develop quantitative models to assess the cognitive enrichment and then monitor the cognitive and emotional development of children

RESULTS 2.2
Computational tools for intervention to strengthen development of executive function in children

RESULTS 3
User models for evaluation and cognitive enrichment of children in early ages

OBJECTIVE 4
Carry out an experimental fieldwork, of longitudinal character study, with children and teacher of schools, to study and demonstrate the conditions for the optimums cognitive and emotional development of children

RESULTS 2.1
Open access web platform for researchers, neuropsychologist and teacher

RESULT 3
A experimental study, long in time, of cognitive enrichment in the classroom, in real conditions

RESULT 5
A rigorous study to catalogue and analyse automatically scientific evidences to support the effecteness and suitability of the methods and tools developed, fitted to the needs of each user

2.1 PREPARATORY STUDY

COMPUTER SCIENCE TEAM
Adapt SIETTE (Test-based Intelligent Evaluation System) Platform as a web-based adaptive assessment tool for catalogue and analyse

PSYCHOLOGICAL TEAM
Review theoretical models on self-regulation in early childhood

JavaScript, Unity and HTML5
Generate configurations parameters for each task

Generate assessment indicators for each task

QR codes linked to each child profile are generated

2.2 PILOT STUDY. APRIL TO JUNE 2019. n= 49 children
LA REINA SCHOOL (MALAGA) AND HUERTAS VIEJAS SCHOOL (COIN)

TABLET SESSIONS
N= 21 children

- Attention Playing with differences
  This task is being used to help children to become familiar with interface of the tool. Two pictures appear and you have to find the difference between the two

- Motor Inhibition: Draw geometric figures with the finger according to given instructions (slowly or quickly)

- Delayed gratification: The children control a car that goes along a road where you see a gift in the distance, and they advance and advance... and you never get to the gift

FACE TO FACE SESSIONS
N= 18 children

- Motor Inhibition: Hitting

- Verbal Inhibition: Teddy/bunny says. Respond when the bell rings. I speak fast and I speak slow.

- Emotional Inhibition: Puzzle angry. The closed box.

CROSS-SECTIONAL (. 3, 4, 5 years old) and PRE-POST DESIGN WITH 3 GROUPS

CONTACT PHASE PRETEST ENRICHMENT SESSIONS POSTTEST SESSIONS

School Administrator contacts and information on research project
Parents’ Acceptance

N= NEPSY-II SubTests (children)

Experimental Group

Control Groups

N= NEPSY-II SubTests (children)

Active Group

Passive Group

TECHCAT tablet tasks

TECHCAT face to face tasks

Distractive tasks (movie, story)

BRIEF Scale (parents)

SUBTESTS SELECTED TABLE

<table>
<thead>
<tr>
<th>Subtests</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal Inhibition</td>
<td>Delay in understanding verbal instructions</td>
</tr>
<tr>
<td>Motor Inhibition</td>
<td>Delay in physical activity</td>
</tr>
<tr>
<td>Emotional Inhibition</td>
<td>Delay in emotional regulation</td>
</tr>
</tbody>
</table>

5. MAJOR CONCLUSIONS

- Subtests selected have been appropriated to evaluate SR functions in childhood
- SIETTE PLATFORM has been adapted to collect and analyse tablet data
- Tablets and Face to face tasks selected must be improved to experimental study in 2020

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Collaborating Entities: Administration and Enterprises interested