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USER GUIDE TO CUSTOMIZE STEAM FOR STUDENTS WITH IDD IN THE SPANISH CONTEXT

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CONTENT

1. INTRODUCTION

In the project proposal we describe the guides as: "Guides for using the user model and the resource repository in the adaptation of real interventions. The teacher must be able to characterize a student by using the user model and then search the repository for resources that can fit the needs of the students. 6 Application Guides, one for each of the partner countries and 1 in English. 6 Designed specifically for the IDD of the most common students in each country and 1 for the EU (duplication of disabilities will be avoided). All in English.

With this in mind, the coordinator developed the general guide for the use of the taxonomy, the user model and considered a case scenario as a sample. With this guide, partners produced their own guides that provide details about their context and how it can be applied in their institution.

1.1 Context of IDD in Spain.

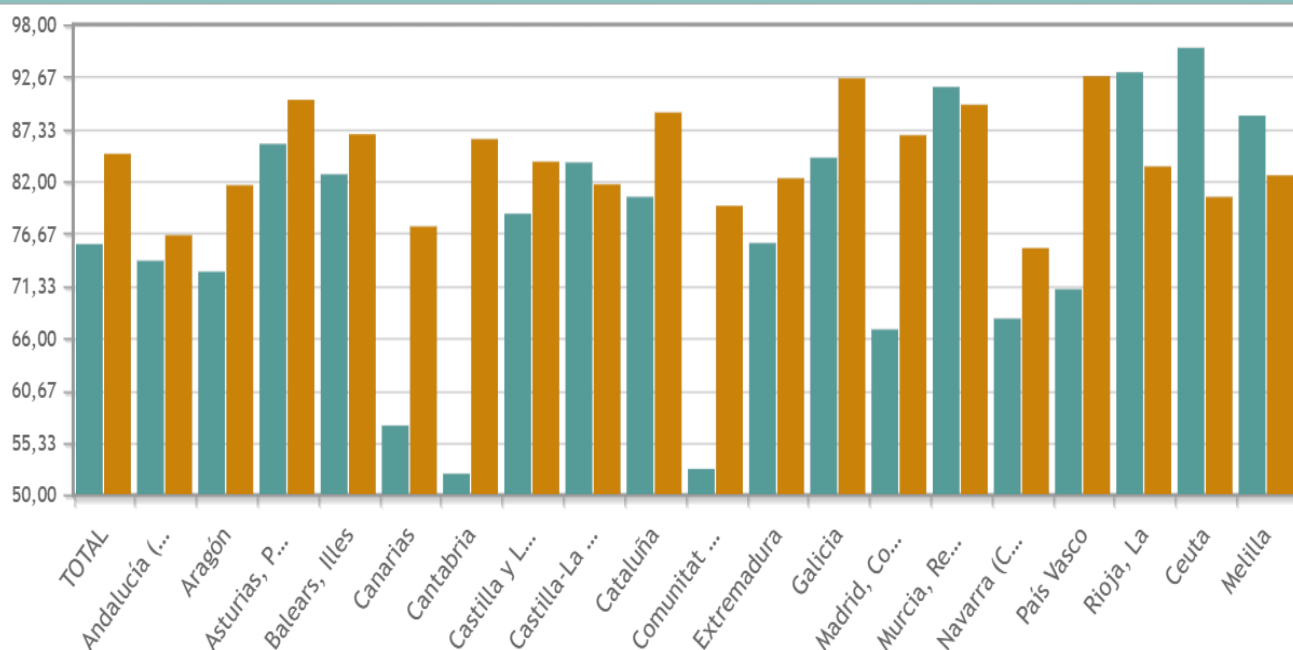
The context of IDD in Spain in recent years and according to figures from the Ministry of Education, vocational training and sports, in terms of the IDD in which this project is framed, yields the following data as of 2022-2023. Firstly, we find the following data grouped into ordinary units by autonomous community and disability.

	INTELLECTUAL	FIREBRAND
TOTAL	75,6	84,8
Andalusia (3)	73,9	76,5
Aragon	72,8	81,6
Asturias, Principality of	85,8	90,3
Balearic Islands, Illes	82,7	86,8
Canary Islands	57,1	77,4
Cantabria	52,2	86,3
Castilla y León	78,7	84,0
Castilla-La Mancha	83,9	81,7



Catalonia	80,4	89,0
Valencian Community	52,7	79,5
Extremadura	75,7	82,3
Galicia	84,4	92,5
Madrid, Community of	66,9	86,7
Murcia, Region of	91,6	89,8
Navarre (Autonomous Community of)	68,0	75,2
Basque Country	71,0	92,7
Rioja, La	93,1	83,5
Ceuta	95,6	80,4
Melilla	88,7	82,6

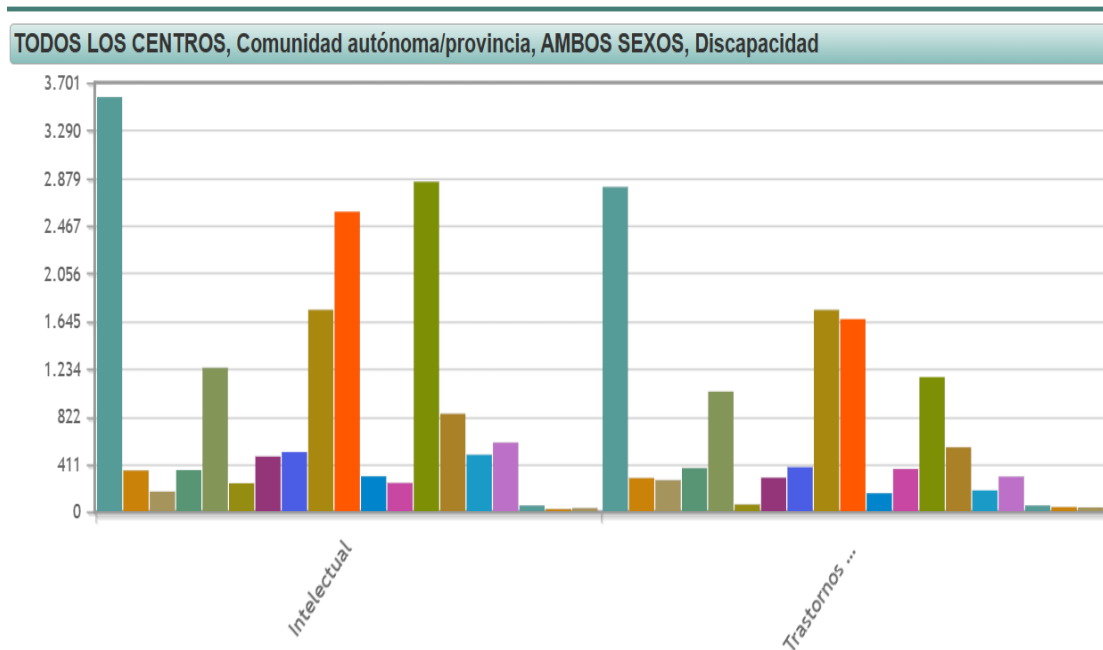
Comunidad autónoma, Discapacidad



As for the distribution of these students by sex, disability and autonomous community, we find the following data in public and private Special Education centres:

	BOTH SEXES	
ALL CENTERS	INTELLECTUAL	FIREBRAND
01 ANDALUSIA (2)	3.574	2.800

02 ARAGON	359	294
03 ASTURIAS, PRINCIPALITY OF	178	275
04 BALEARS, ILLES	364	379
05 CANARY ISLANDS	1.242	1.039
06 CANTABRIA	250	66
07 CASTILLA Y LEÓN	480	297
08 CASTILLA-LA MANCHA	519	388
09 CATALONIA	1.742	1.741
10 VALENCIAN COMMUNITY	2.588	1.663
11 EXTREMADURA	309	163
12 GALICIA	252	372
13 MADRID, COMMUNITY OF	2.845	1.164
14 MURCIA, REGION OF	847	559
15 NAVARRE, AUTONOMOUS COMMUNITY OF	494	188
16 BASQUE COUNTRY	599	306
17 RIOJA, LA	57	57
18 CEUTA	26	44
19 MELILLA	35	42



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[1]<https://www.educacionfpydeportes.gob.es/servicios-al-ciudadano/estadisticas/no-universitaria/alumnado/apoyo/2022-2023.html>

1.2 SCO Numbers.

The data as of 2025 collected by our institution Colegio de Educación Especial Sagrado Corazón are as follows:

Column1	Column2	Column3	Column6	Column7	Column8
	TEA/DRIVING.	PLURIDISC.	INTELC DISC.		
	TOTAL STUDENTS				
EBO 1			5		5
EBO 2		3	1		4
EBO 3			5		5
EBO 4		4		1	5
EBO 5		3	1		4
EBO 6		4			4
EBO 7		1	3	1	5
EBO 8		1	1	4	6
EBO 9		1	1	5	7
EBO 10		1	3	2	6
EBO 11		3			3
EBO 12		1		4	5
EBO 13		2	2	3	7
EBO 14			6		6
TOTAL EBO		24	28	20	72



Column1	Column2	Column3	Column4	Column5	Column6
	TEA/DRIVING.	PLURIDISC.	INTELEC DISC.	TOTAL STUDENTS	
TVA 1	4			3	7
TVA 2			5	1	6
TVA 3				7	7
TVA 4	3			4	7
TOTAL TVA	7		5	15	27

2. MAIN ISSUES TO BE TAKEN INTO ACCOUNT BEFORE ANY INTERVENTION

To adapt or develop interventions that facilitate STEAM education, three main issues must be taken into account:

- 1) **Student Profile:** Refers to the student's disability. It is essential to identify the student's IDD or several IDDs, their levels of severity, and characteristics according to the DSM-5 criteria (Association, 2022). This information helps determine if the student fits the existing data in the taxonomy or if a new disability and its associated data need to be added. A profile can encompass multiple disabilities, allowing comorbidities to be considered. Defining the student's profile may require access to medical reports related to the student.
- 2) **Educational Program Context:** Clearly define the time allotted for STEAM discipline activities, whether the program is conducted alongside other IDD students, in regular classes with full or partial integration, or in a Special Educational Needs (SEN) school. This clarification helps to understand the development of the activity, the type of support teachers can provide, and the resources available at the school. For example, if the goal is to develop computational thinking in a technology class that meets for four hours a week, this sets a time limit for regular class activities. However, if the student with IDD receives additional support classes, the time available may differ. Therefore, it is crucial to have a clear framework of the context of the activity.
- 3) **Discipline and learning objective to be achieved.** Since this guide focuses on adapting STEAM education, it is necessary to define which STEAM discipline will be addressed and the learning objectives to be achieved through the activity. Achieving a learning goal may require more than one activity. Schools may cover one or multiple STEAM disciplines, but each discipline must be addressed separately. This information helps teachers define the learning program. In addition, it is important to know the school's available resources or budget for acquiring equipment.

With these considerations in mind, the taxonomy and user model can be used effectively.

3. STEPS TO USE THE TAXONOMY AND USER MODEL

To use the taxonomy and user model, you can follow a bottom-up or top-down strategy. That is, starting from the definition of the student's profile or starting with the activity to be developed. The authors of this guide recommend starting with defining the user profile in the taxonomy, although the other approach is also valid. The following section describes how to proceed with this process.

3.1 TAXONOMY

The taxonomy allows the needs of IDD students to be classified. It is based on a set of categories and some taxa, then the taxonomy is implemented as the basis of the User Model, so to use the taxonomy it might be necessary to define new taxa or simply classify the needs of the students using what is available.



The current distribution of the taxonomy is shown in Figure 3.

- **IDD:** only three IDDs were considered Autism Spectrum Disorder, Attention Deficit Hyperactivity Disorder (ADHD) and Dyslexia (SLD – Specific Learning Disability).
- **Level:** The level or levels of the disability.
- **Features:** IDD features based on IDD level. This was done using DSM features (Association, 2022). For example, for ASD, a characteristic could be "deficiencies in social communication and interaction."
- **Difficulty:** associated with one or more characteristics related to education, "problems in initiating and maintaining conversations. Lack of response."
- **Educational area:** In which difficulty is included. those included in the DSM-5.
- **Learning Objective:** A learning objective linked to a possible activity that focuses on a difficulty and an activity.

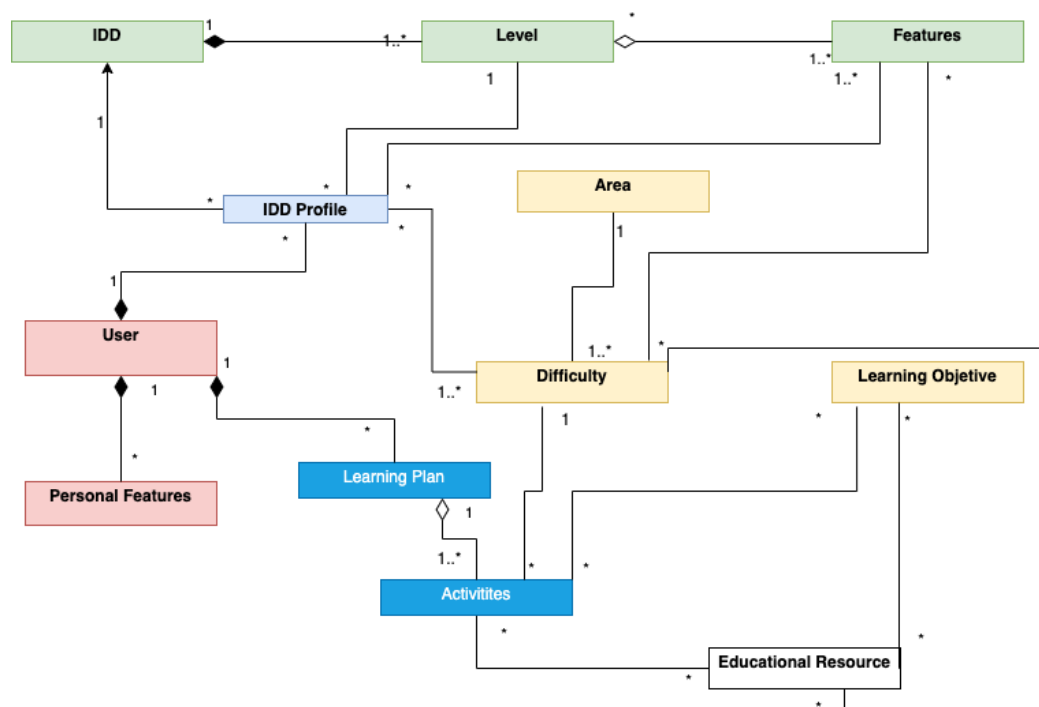


Figure 3. – UML Class Diagram for Taxonomy Description Proposal

The identified IDDs have been mentioned above, but the characteristics already included were compiled using the DSM-5 criteria and are presented in Table 1.

Table 1. – IDD-based features

IDD	Main symptoms	Secondary symptoms
FIREBRAND	Social Communication and Social Interaction	Social-emotional reciprocity
		Nonverbal Communicative Behaviors Used for Social Interaction
		Developing, maintaining, and understanding relationships
	Restricted and repetitive patterns of behavior, interests, or activities	Stereotyped or repetitive actions
		Insistence on equality, uncompromising adherence to ritualized routines or patterns, or nonverbal verbal behavior
		Very restricted and fixed interests that are abnormal in intensity or focus
		Hyper or hyporeactive to sensory information or unusual interests in sensory aspects of the environment

In addition, the taxa related to the identified difficulties are presented in Tables 2, 3 and 4, while the taxa for the learning objectives are shown in Table 5.

Table 2. – Difficulties for the three levels of ASD

Difficulties for ASD
Atypical response to sensory stimuli
Cooperative interaction
Coordination and/or pattern of strange movements
Developmental delay or unusual speech patterns
Uncomfortable Sensoric Environments
Express feelings
Eye contact during conversations
Fixed interest
Hyperresponsiveness
Hyporreactivity
Intense attachment to objects or activities
Limited language usage
Literal interpretation of language and abstractions
Making/Keeping friends/interacting with peers
Managing the transition and adapting to changes and new situations
Memory and attention to detail
Memory and attention to detail, Intense concentration
Mental rigidity,
Misinterpretation of social situations and intentions
Need to follow routines
Non-interactive gameplay
Pragmatic language skills
Trouble starting and maintaining conversations. Lack of response
Repetitive behavior
Repetitive motions
Sensory Information Management
Sensory overload
Sensory-perceptual self-stimulation behaviors
Solitary activities and limited participation in meetings
Specific sensory preferences
He talks excessively. Impulsiveness
Understanding facial expression or body language
Understand social norms and rules. Inappropriate social behavior
Use of nonverbal cues

To use the taxonomy effectively, a few preparatory steps are required:

- **Step 1:** Gather the student's medical reports and analyze them to define an accurate profile.
- **Step 2:** Identify the student's specific educational difficulties associated with the profile characteristics.



- **Step 3:** Define the educational activity or activities to be developed, including the learning objectives to be achieved.

Once this information is clear, you can start using the taxonomy:

- **Step 1:** Check if the IDD is already included in the taxonomy. If so, continue to step 3.
- **Step 2:** If IDD is not included, describe it by detailing its different levels, characteristics related to the main symptoms of the DSM-5, and possible difficulties associated with disability.
- **Step 3:** Define a profile, making sure it corresponds to a single IDD level.
- **Step 4:** Associate the difficulties and characteristics with the profile.
- **Step 5:** If the student only has one IDD level, continue to Step 6; otherwise, return to Step 3 and define a new profile.
- **Step 6:** Identify the learning objectives, taking into account the educational context and the needs of the student.
- **Step 7:** Develop a learning plan that includes one or more activities tailored to address learning objectives based on the student's IDD profile.

3.2 USER MODEL

Once the learner's IDD has been classified using the taxonomy and a possible learning plan defined, it is time to implement it in the User Model. This allows you to search for specific resources tailored to the learner's profile and find similar activities that can help personalize the learning plan.

A detailed guide on how to use the user model can be found here: <https://robosteamsen.eu/userModel/public/home>
 The steps to follow to use the User Model are as follows:

- **Step 1:** The IDD is already included in the taxonomy.
- **Step 2:** Create a new user.
 - Step 2.1: We will go to the "Resources and Tools" section.

Resources and Tools

Figure 1.- Resources and Tools.

- Step 2.2: Click on "User Model".



Figure 2.- User Model.

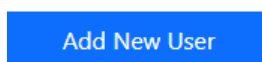
- Step 2.3: . We will create a profile for the student in the "User Management" function.



Users Management

Figure 3.- User Management

- Step 2.4: We will add a new user (name, gender, age, and institution).



Add New User	
Name	
Gender	
Age	
Institution	

Figure 4.- Add new user

- Step 2.5 : Once the profile is saved we must go to the "Manage profiles" section (profile name, profile description, IDD level and select the characteristics and difficulties) and then we will create the profile (Create Profile).

MANAGE PROFILES

Profile Name

Profile Description

IDD Level

☒ Social communication and social interaction
☐ Restricted, repetitive patterns of behavior, interests, or activities
☒ Inattention
☐ Hyperactivity and impulsivity
☐ Difficulty Reading

☐ Careless mistakes in schoolwork
☐ Cooperative Interaction
☐ Delayed development or unusual speech patterns
☐ Expressing Feelings
☐ Eye contact during conversations
☐ Fixed Interest
☐ Forgetful or losing things
☐ Intense focus
☐ Limited language use
☐ Literal interpretation of language and abstractions

Select Features
☐ Difficulty understanding the meaning of what is read
☐ Difficulty understanding number concepts, number facts or calculation
☐ Difficulty with mathematical reasoning
☐ Difficulty with written expression
☐ Difficulty with spelling

Select Difficulties
☐ Memory and attention to detail
☐ Misinterpretation of social situations and intentions
☐ Non-interactive play
☐ Organization and planning of tasks and activities
☐ Pragmatic language skills
☐ Problems initiating and maintaining conversations
☐ Sharing a common focus
☐ Short attention span
☐ Solitary Activities and Limited Engagement in meetings
☐ Understanding facial expressions or body language

- **Step 3:** Once the user is defined, the new learning plan is created.
 - Step 3.1: Click on "Training Plan Management". (Figure 5)



Training Plans Management

Figure 5.- Create New Learning Plan

- Step 3.2: Click on "Create New Learning Plan". (Figure 6)

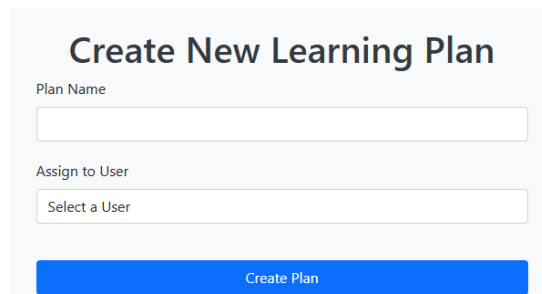
Learning Plans

Create New Learning Plan

Name	User	Actions			
Testing LP	Testing User 2	Edit	Clone	MANAGE ACTIVITIES	Delete
Testing LP (Copy)	Testing User1	Edit	Clone	MANAGE ACTIVITIES	Delete
Plan 1	Testing User1	Edit	Clone	MANAGE ACTIVITIES	Delete
Plan2	Testing User1	Edit	Clone	MANAGE ACTIVITIES	Delete

Figure 6.- Create New Learning Plan

- Step 3.3: Click on "Create a plan for a new user". (Figure 7)



Create New Learning Plan

Plan Name

Assign to User

[Create Plan](#)

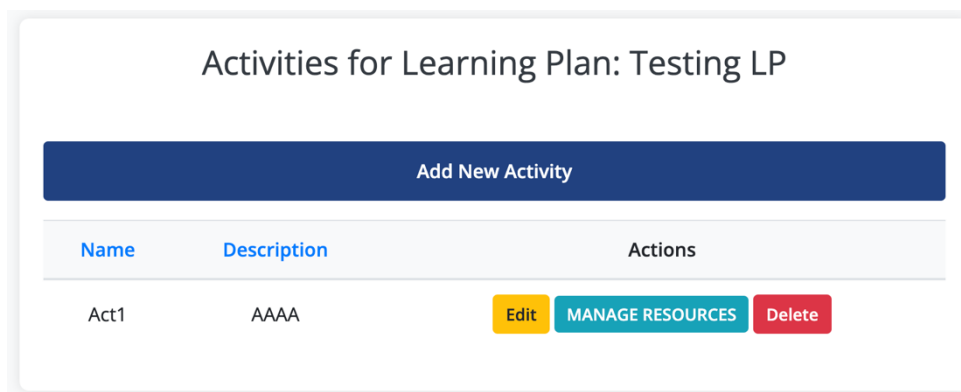
Figure 6.-Form to create New Learning Plan

- Step 3.4: Once the learning plan has been created, we will go to the "Manage the activity" action and we will add a new activity (I wash my hands, What do I need to wash my hands?) and we will make a brief description of what it consists of. (Figure 7)

[MANAGE ACTIVITIES](#)

Figure 7.- Manage the activity

- Step 3.5: Click the Manage Activities button for your chosen learning plan (Figure 8)



Activities for Learning Plan: Testing LP

[Add New Activity](#)

Name	Description	Actions
Act1	AAAA	Edit MANAGE RESOURCES Delete

Figure 8.- We will add a new activity

- Step 3.6.- Click Add New Activity for the specific plan, including a description, the difficulty to be addressed (only one), and the learning objectives you intend to address (Figure 12)

Figure 9.- Activity creation/editing form

Step 3.7.- In each of the activities that we add, we will go to the action "Manage resources" (Figure 10)



Figure 10.- Activity creation/editing form

Step 3.8.- From here we can associate different technological and methodological resources to each activity according to the learning objectives of that activity. (Figure 11)

Figure 11.- Technological and methodological resources

- Step 3.9.- Add as many activities as you need to the learning plan by going to Step 3.7.

Optional. Search for specific resources for the student's profile or for educational difficulties or learning objectives in the option "Search for educational resources and activities" (Figure 12).

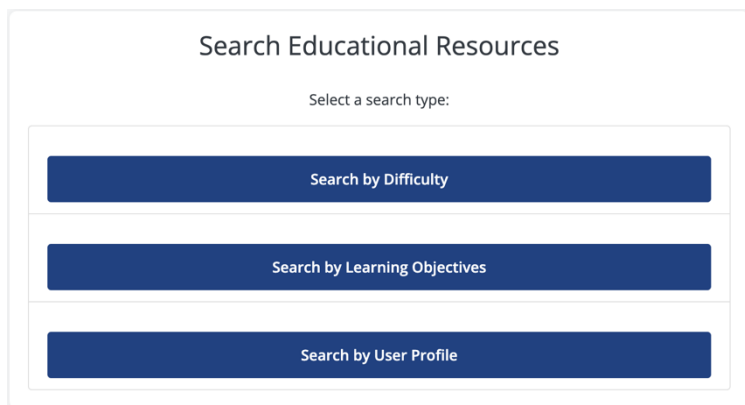


Figure 12. – Possible search options.

[1] EXAMPLE OF A CASE SCENARIO

Student with ASD with intellectual disability. It follows simple commands such as (Come, give me, take, don't throw...) but needs continuous supervision. It makes very simple cause-and-effect games. It does not imitate actions. Gross motor skills are normal. But in the development of fine motor skills and coordination of movements it is below its chronological age. Has a low level of oral language, expresses pleasure or displeasure by emitting sounds. He does not ask for help even with body language or guiding the adult to the object. Their communicative intention is very low. He does not obey simple commands or follow instructions. With grade 3 in **characteristics** related to communication and social interaction and level 2 in patterns of behavior, interests or restricted activities. Among their **difficulties** are regulating and understanding emotions, inability to follow instructions and rules and the use of nonverbal signals.

Steps to take before using the taxonomy and user model

- **Step 1:** Gather medical reports about the student and study them to define an accurate profile. The information described above was obtained through this process.
- **Step 2:** Analyze the student's specific educational difficulties associated with the characteristics of their profile. These have been described above.
- **Step 3:** Define the educational activity or activities to be developed, including the learning objectives. In this case, the learning objective is to improve attention and concentration and promote flexibility and adaptability.

Using the Taxonomy

- **Step 1:** Check if the IDD is already included in the taxonomy. If so, continue to step 3. In this case, it is already included.
- **Step 3:** Define a profile, making sure it's associated with a single IDD level. Based on the medical reports, the EBO 1 student profile was defined
- **Step 4:** Associate the difficulties and characteristics with the profile. The EBO1 student profile includes

Feature	Difficulty
Social Interaction	Regulate and understand emotions
Communication	Use of nonverbal cues
Behaviour	Inability to follow instructions and rules

- **Step 5:** If the student only has one IDD level, continue to Step 6. Otherwise, go back to step 3 to define a new profile.
- **Step 6:** Identify learning objectives based on the educational context and the needs of the learner.

For EBO 1 students, the objectives are:

- Regulation of impulsivity
- Promote flexibility and adaptability
- Cognitive and behavioral flexibility
- Improve attention and focus
- Improve memory

Step 7: Develop a learning plan with one or more activities tailored to address the learning objectives. Taking into account the difficulties of regulating and understanding emotions, and the inability to follow instructions and rules, the learning plan should include tasks that help her address communication challenges through interaction with a robot or an eye tracking analysis and eye tracker software (Tobii or Irisbond). Tasks should be simple, with clear solutions to mitigate stiffness. The learning plan includes two activities:

- Path of emotions
- Look for the thrill
- I wash my hands
- What do I need to wash my hands?

Deploying the solution using the user model

- **Step 1:** If the IDD is already included, proceed to Step 2. This is the case at hand.
- **Step 2:** Create one or more profiles for the student in the User Model. Use the "User Management" feature to add a new user, then manage profiles to include ASD Level 1, its features, and associated difficulties.
- **Step 3:** Create a new learning plan for the learner using the "Training Plan Management" feature. Four activities, as defined in the taxonomy, were included in Claire's plan. The first and last activities focus on communication issues, while the other two address mental rigidity.

To identify the best resources for each activity, use the "Educational Resources and Activities Search" feature. Search for resources and activities adapted to the profile of EBO 1 Student to meet their specific needs. After selecting the resources aligned with the learning objective, return to the EBO 1 student learning plan, manage the activities, and associate the chosen resources with each activity. For example, Tobii was selected for the problem of seeking emotion and What do I need to wash my hands? and Robot luminous turtle glow & go for the path of emotions. These choices were based on the equipment available at the school and the context.

4. REFERENCES

Association, A. P. (2022). *Diagnostic and Statistical Manual of Mental Disorders: DSM-5-TR*. Publications of the American Psychiatric Association.

Francisco Javier Labrador Encinas (Author), Juan Antonio Cruzado Rodríguez (Author), Manuel Muñoz López (Author) (November 2001) *Manual of Behavior Modification and Therapy Techniques (Psychology)*. Pyramid Psychology