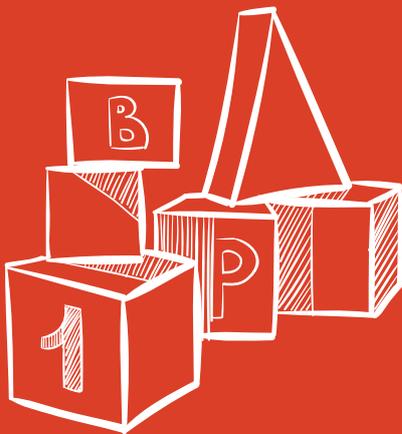


Toys & games **Usability** Evaluation Tool

Manual, Questionnaire
and Development Process

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Preface by Serenella Besio (LUDI)



TUET, Toys & games Usability Evaluation Tool
Manual, Questionnaire and Development Process

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Preface

A child's nature is made of play



Children transform objects, people, environments, and tools into play. This is because they possess a special, playful lens through which they look at the world around them. Anytime is the right time for them to play; any person can easily become a play companion, any object has the possibility of becoming a toy, and any toy can be used in dozens of ways, different from the expected ones. When interacting with children, everyone perceives their immediate and constant availability to go beyond the world of reality and to enter the world of imagination; they too feel the urge to return to childhood... and play with them.

Play is fun, it is joy, concentration, and challenge. It is being in contact with the world in an extraordinary, unrepeatable way.

All these considerations are valid for children, for all the children of the world, and also for all the children who have inhabited the earth before us. Of course, they are also valid and true for children with disabilities. They too enjoy and are willing to play. Like their peers, they want to engage in play, they want to experience the feelings of freedom, elation and amazement that are related to playful activities.

Article 31 of the United Nation Convention on the Rights of the Child recognises their right, and the right of all children "to rest and leisure, to engage in play and recreational activities appropriate to [their] age and to participate freely in cultural life and the arts", and establishes that States Parties shall respect and promote this right and encourage equal opportunities for leisure activity.

Nevertheless, play can sometimes be difficult and challenging for these children; it seems that the world around them is full of obstacles and barriers and is not accessible and friendly enough to give them the opportunity to explore and invent play activities as they would like. Quite often their motor, sensory, and communication abilities do not effectively match the available objects and environments around them; sometimes the objects and environments may be difficult to interpret or may even be perceived as frightening. Adults and other children would like to play with them, or to help them to play, but they do not know how to do so.

Since 2014, a European COST Action called "LUDI – Play for Children with Disabilities" has been devoted to studying the need and the right to play of children with disabilities. A wide multidisciplinary network gathering professionals and researchers from 32 different countries has been established to support research, development, training activities, and cultural and political awareness raising.

During its short but very intense life, LUDI has disseminated this theme through publications, participation in conferences, connections with associations in the field and with toy company representatives, and last but not least, with two very successful training schools.

LUDI also has a website (www.ludi-network.eu), and a Facebook page (www.facebook.com/ludi.network).

Among the publications inspired by LUDI, this book, and this tool, stand out for their importance and their value. They represent the final result of a research activity that has combined the extensive professional experience, the perspectives, and the previous tools of the two most important existing institutions in Europe in the field of study concerning the accessibility and usability of toys—AIJU in Spain and FM2J in France.

The core of this work is the idea that the world around children with disabilities needs to change. Specifically, objects and built environments are what need to be changed in order to give these children the opportunity to enjoy their right to play; more precisely, toys and play contexts must change.

A new inclusive awareness must come into being, supporting the spread of the nascent paradigms of usability and accessibility. Toys and play environments should be created with the widest possible range of human functional abilities in mind, so that they can be used by a wider number of users, including those who have very particular ways of interacting with them.

In the meantime, the education and rehabilitation professionals, family members, and teachers who share their time with children with disabilities must become more skilled in selecting and choosing the toys for them—in being able to evaluate them—as well as in setting up effective play environments.

Choosing or designing a toy or a game is not as simple as it might seem, especially for children with disabilities. A careful analysis of the play material should be done, thinking about its purpose and play category, reviewing the characteristics needed so that children will be able to play freely and autonomously as they need and wish and feel pleasure in play.

Unfortunately, due to the complexity of finding a good solution, parents of children with disabilities often give up looking for the right toys and concentrate on different activities instead. Furthermore, teachers and professionals working with these children are often more focused on their educational and rehabilitative goals, and tend to overlook the playful side of their lives.

Evaluating the usability of toys and games is an activity that requires specific competences and some expertise, and a standard affordable tool for supporting this process has been long awaited. Learning to manage the toy/game evaluation process means professionals and parents will have to acquire a new capacity; in a broad sense, in the not-so-distant future, this will contribute towards disseminating a new, more inclusive culture of play.

Now, TUET is ready to be used and is available to anyone who is interested in improving the lives of children with disabilities, willing to play with them and help them play whenever, wherever and however they wish. Simply to play, for the sake of play.

Serenella Besio

Chair of the COST Action “*LUDI – Play for Children with Disabilities*”

University of Bergamo, Italy



1 Manual of Instructions

1.1. General overview

1.1.1. What is TUET?

TUET (Toys & games Usability Evaluation Tool) is a method of analysis to evaluate play materials by considering the physical characteristics that are relevant for children with hearing, visual, or upper-limb motor impairments.

1.1.2. Why has TUET been created?

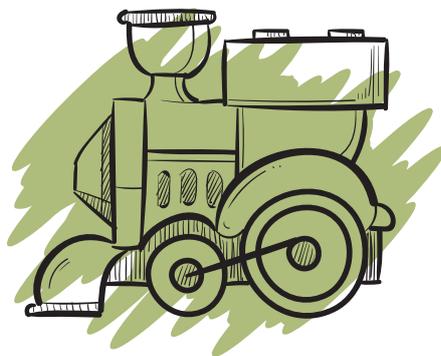
TUET has been created, on the one hand, because investigations carried out by AIJU (Spain) and FM2J (France) have shown that toys and games on the market manifest a continued lack of accessibility and usability for children with some type of hearing, visual or motor impairment. And, on the other hand, in response to a demand from parents and therapists looking for more accessible play materials for these children.

From 2007 to 2017, a total of 2,866 mainstream toys and games were analysed by AIJU in collaboration with ONCE and CEAPAT. Only 21% of them were found to be usable for children with motor impairment, 44% for children with visual impairment, and 86% for children with hearing impairment, without any adaptations or external assistance to play. Additionally, only 5% of the toys and games were found to be simultaneously accessible for all three impairments. In France, a similar percentage was found by FM2J. Among all the 1,600 toys and games FM2J have analysed since 1996, only 8% have received the 'Handilud' distinction, which indicates that the toy is considered usable for children with some kind of impairment.

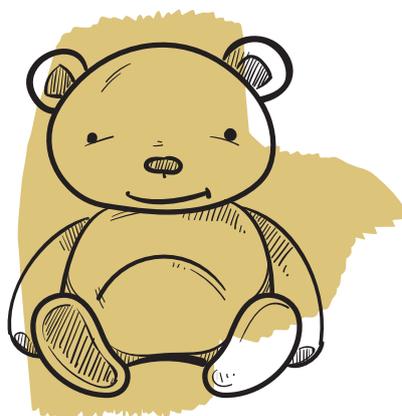
1.1.3. What principles is TUET based on?

TUET is based on Universal Design principles as well as on previous research on toys and games for children with impairments carried out by: FM2J (1996–2017); AIJU (1991–2017); ONCE (2007–2017); CEAPAT (2007–2017); Lekotek (1980–2017); and the University of Buffalo, Let's Play Projects (1995–2006).

Universal Design is a philosophy for designing products that are usable by people with the widest possible range of functional capabilities. All children are different, not only in terms of their abilities, but also in relation to their activities and play preferences; to imagine that a product could be usable for all of them is simply impossible. Nevertheless, the more Universal Design features a toy or game has, the greater likelihood it has of being played with successfully by a broad range of children, including those with some kind of impairment.



Technical data sheet	
Title	Toys & games Usability Evaluation Tool (TUET).
Authors	Costa, M. (AIJU), Périno, O. (FM2J), Ray-Kaesler, S. (HES-SO EESP).
Purpose	Review the physical characteristics of a toy or a game in order to make a decision about its usability for a specific group of children with hearing, visual or upper-limb motor impairment.
Application	Toy designers, engineers, teachers, toy librarians, therapists or parents.
Field of application	Toys and games, high or low tech, prototypes or commercialised products that have at least some physical element (not including purely digital games).
Time of application	From 10 to 30 minutes depending on the complexity of the play material evaluated.
Material	PDF or printed version.



1.2. TUET questionnaire structure, definitions and instructions for use

TUET is composed of 33 items. The first part (A) defines the specifics of the toy or game being evaluated. The second part (B) is used to evaluate the usability of the toy or game for the intended user, using three tables, each related to one of the three impairments: 1) Hearing, 2) Visual, and 3) Upper-limb Motor Impairment.

The following definitions and instructions enable the questionnaire to be filled in more easily.

1.2.1. PART A: Analysing the toy/game

Before starting the analysis of a toy/game, it is essential to examine it, handle it, play with it and describe some of its main aspects. The analysis must be conducted in detail by observing every aspect and function of the toy and answering questions A1, A2 and A3. The evaluation concerns only the toy/game, not the packaging.

A1. Name of the toy and the manufacturer: Write the name of the toy/game and the manufacturer, exactly as they appear on the packaging.

A2. Play purpose of a toy/game: Describe its purpose as defined by the manufacturer and think about where the pleasure of play comes from. What is the origin of the enjoyment or fun? Here are some examples of three different toy cars that have different play purposes:

Example 1: A car which has the shape of a telephone with wheels, the purpose of which is to obtain auditory and visual effects.

Example 2: A realistic small car, to play 'garages' or 'races'.

Example 3: A cardboard car, to play a board game.

Each of these toys/games corresponds to a different type of play activity, which in turn involves a distinct set of skills.

A3: Toy/game category according to C.O.L. classification: In our three previous examples, the telephone-car is a medium for sensory play, the small realistic car is a medium for symbolic play, the cardboard car is for a game with rules. From this, we can classify these play objects according to four main categories: toys for exercise play, toys for symbolic play, toys for rule-based games or toys for assembling play. For each toy/game, only one of these four categories must be marked. To decide which category, it is necessary to determine what the predominate play purpose is for the particular toy/game.

1.2.2. PART B. Usability of the toy/game for hearing, visual and motor impairments

Toys and games must be evaluated thinking about their intended user. If a child has a moderate visual impairment, the analysis will be different to that made for a completely blind child. It is not the same to evaluate a toy's suitability for use by a child with an upper-limb motor impairment as for its suitability for use by a child with a hearing impairment. This is why the analysis of toys and games is performed by using three separate tables, each focusing on a different type of impairment.

Table 1. Hearing impairments: partially hearing impaired – deaf

Hearing impairments involve hearing loss that prevents a person from receiving, through the ears, external auditory stimuli in their entirety. Its causes may be congenital or acquired. Children with hearing loss may have difficulty with reading and mathematical concepts. There are four levels of hearing impairment: mild, moderate, severe or profound.

- Partially hearing impaired refers to people with hearing loss ranging from mild to severe. It can affect one ear or both ears and leads to difficulty in hearing conversational speech or loud sounds.
- Deaf refers to people with profound hearing loss, which implies very little or no ability to hear.

Specific toy/game requirements

Children with hearing impairments can access a greater quantity of toys and need less help or adaptations than children with visual or motor impairments. They may encounter difficulties when playing with toys and games that have sound effects coming from electronic devices.

In this case, **for all four levels of hearing impairment**, the audible effects must be accompanied by other effects (lights, pictures, movements, vibrations, etc.). The verbal messages must be accompanied by a transcript or written version. In rule-based games, written/graphic explanations must be very easy to understand.

Finally, the toy must have a volume control mechanism that allows it to be adapted to the user's hearing level, or feature an optional headphone input.

Table 2. Visual impairments: partial visual impairment – blind / colour-blind

Visual impairments range from partial to total loss of sight. Visual loss in children may be prenatal (congenital anomalies), perinatal (prematurity, asphyxia) or postnatal (traumas, tumours). There are four levels of visual impairment: mild, moderate, severe, and blindness.

- Visually impaired refers to people with a visual impairment ranging from moderate to severe.
- Blind refers to people with total, or nearly total, vision loss.

Colour-blindness is a visual anomaly in which people confuse commonly red and green colours, although sometimes blue. Most colour-blind children, in majority males, are able to see things very clearly but are unable to fully see one or two of these colours.

Specific toy/game requirements

Lack of vision causes children to display a lack of motivation towards using objects, as well as a certain passivity. Parents and caregivers should motivate them and invite them to explore toys and games, explain to them where they are, what they are like, how to use them, etc.

For moderate levels of visual impairment, it is advisable that the toy or game should have sensory effects (e.g. sounds, vibration, movements, scents, textures, etc.) in order to motivate and guide children to play. In the case of blind children or those with severe visual impairment, these sensory effects must be realistic and recognisable by touch or hearing.

For visually impaired children, the toy/game must have vivid and/or highly contrasting colours. The areas of activation (buttons, knobs, etc.) must be clearly differentiated from the colours of the body of the toy or the background. The toy/game must have different textures, lights or reliefs, relevant for the purpose of the game.

Example 1: A doll to dress and undress. Diverse textures for the different pieces of clothing help a child to identify and place them correctly.

Example 2: A cloth doll. Different textures help children to identify the parts of its body and face.

The toy/game must have a sufficiently compact/dense structure and a base that is large enough to ensure stability when in use.

For blind children or those with severe visual impairment, the toy/game must have a realistic or recognisable overall shape, and its components (knobs, buttons, switches, connectors, pieces, images, etc.) must be easy to identify by touch. The toy pieces or accessories included (e.g. blocks, accessories, clothes, etc.) must be placed in a compartment provided for this purpose, and must be large enough to remain within the child's reach.

For children suffering from colour-blindness, red and green should not be used together in board games when play involves being able to differentiate between them.

Table 3. Upper-limb motor impairments: mild, moderate, severe

Upper-limb motor impairments are physical impairments of a transitory or permanent nature, that limit the motor skills of the upper-limbs and hands. They can be either congenital or acquired and are frequently a consequence of cerebral palsy, spinal muscular atrophy or traumatic brain injury. The possible levels of impairment (mild, moderate, severe) can be related to:

- The physical extension of the impairment (i.e. one or both limbs affected, the presence of spasms).
- How a child uses his hands when handling objects. The following examples are adapted from the manual ability classification system (www.macs.nu):

Mild: handles most objects but with somewhat reduced quality and/or speed of achievement.

Moderate: handles objects with difficulty.

Severe: handles a limited selection of easily managed objects and has limited ability to perform simple actions.

Specific toy/game requirements

The way children with motor impairments play mainly depends on their motor skills, their degree of mobility, and the amount and type of play resources they have access to. In general, most of the time they have difficulty manipulating toys and games. For this reason, toys/games that the children can control themselves should be selected.

For children with mild to moderate upper-limb impairment: The toy/game must be easy to manipulate, and its important parts (knobs, buttons, switches, connectors, pieces) must be easy to press, turn on, fit together, grasp, activate, etc. The dimensions and weight of the different elements of the toy/game should allow children to manipulate them easily. In addition, they must be padded or light enough to avoid painful impacts.

Children with more severe impairment requires forms with multiple areas for a child to wrap their fingers around, allowing them to hold the toy/game in many positions. The toy pieces and parts should have an easy connection system, employing elements like Velcro or magnets. The toy/game must have a compact/dense structure, and a base that is large enough to ensure stability when in use. The toy's dimensions should allow access for children with wheelchairs, or offer the possibility of being disassembled into modules in order to play with the separate parts on a surface. The parts or pieces of the toy must not be less than 2 cm in width, length and/or depth.

For any child with upper-limb motor impairment, being able to activate a toy with a push button is not an isolated action, but the first step towards accessing other devices, such as a computer, a tablet, a communication device, a TV remote control, a light switch, etc. This is why toys with large buttons which the children can push themselves, or that allow an external switch to be added, are highly recommendable for them.

1.2.3. Instructions to fill in the three tables

Questions in bold: 1.1.1./2.1.1./3.1.1

To answer questions 1.1.1./ 2.1.1./ 3.1.1., we must consider the level of impairment of the group of children the toy/game is intended for. If these children are not able to achieve the play purpose of the toy (A2), we must answer NO as they will not be able to really enjoy the toy/game. In this case, it is best to propose another toy. These questions in bold are very important for making decisions since they allow a correspondence to be established between the skills of a group of children with a specific impairment and the play purpose of a toy/game.

Responses: 'Yes', 'No', or 'Does Not Apply'

The first step of the analysis consists in verifying whether the item is relevant for the particular toy/game. For example, for visual impairment, in item 2.2.3. 'The board game avoids using red and green together (colour-blindness)', if the toy being evaluated is not a board game, then tick the box 'does not apply' and go to the next question. Another example, for hearing impairment, in item 1.2.1, 'Toy sound effects are accompanied by other effects (lights, pictures, movements, vibration, etc.)', if the toy being evaluated does not have any sound elements (e.g. a doll which makes no sounds) then tick the box 'Does Not Apply'. If the toy does produce some kind of sound, then make an evaluation by ticking the box in either the 'Yes' or 'No' column, depending on whether you believe the toy or game conforms to this statement or not.

Calculating the results of the analysis

To complete the analysis, add up the total number of answers in the 'Yes' and 'No' columns (ignore the 'Does Not Apply' column) and write a total at the bottom of each column. This sum is then used to assess whether the toy/game is '**Usable**' (more answers in the 'Yes' column than the 'No' column) or '**Unusable**' (more or the same amount of answers in the 'No' column as in the 'Yes' column).

The more positive responses obtained in the table, the greater the level of usability of the toy/game for the intended target group. In the case of associated impairments, the results of two or three sections (Tables 1, 2 or 3) must be added up to obtain a final result.

Positive responses in the three tables means a great level of usability for the toy/game; it is able to address a broad range of children, with or without impairments.

However, with certain groups of children a more qualitative type of analysis will be necessary. Sometimes, despite having a high number of positive responses, a toy/game may be considered 'unusable' because it does not meet an essential criterion for these children to be able to play with it.

The evaluation must be carried out taking into account the content of the answers more than the simple sum of 'Yes' or 'No' responses. It is essential to bear in mind the play purpose of the toy/game to be able to carry out the final evaluation. As a general rule, when the quantitative results make you hesitate between 'Unusable' and 'Adaptable', it is advisable to select 'Adaptable' and propose adaptability solutions for the toy/game.

Evaluation: Usable/ Unusable/ Adaptable

A toy/game is **Usable** by the intended target user if it can be used for the purpose for which it was designed and the pleasure of play obtained.

A toy/game is **Adaptable** if it can be made 'Usable' with a simple modification that does not alter its primary function or its play purpose. An example of adaptation is to incorporate coloured Velcro strips on the buttons of a toy to make them easier to identify. However, when a doll is too small so that it becomes necessary to propose a larger one, then this is not an adaptation, it is another toy!

Some toys/games are definitely **unusable** for certain children. The best thing to do when a toy or game is unusable is to try to find another toy in the same category (A3 - C.O.L) that is usable for the child or children in question.

Finally, remember that TUET is just a tool. It can be a significant help when creating or selecting games and toys for the pleasure of playing, but it can not replace the decisions of adults who have direct knowledge of the children and their abilities.

2^{TU ET} Questionnaire



Evaluator: Name or code _____ Date _____

A.1 **Toy/game:** Name _____ Company _____

A.2 **Toy/game play purpose:** What is the primary element of fun in the play activity with this toy/game?
(For example, for a ball, the pleasure is in throwing and catching it, bouncing it, etc.)
List in order of importance the different elements that can arouse the play pleasure, to specify what is the main play purpose or objective of play with this toy/game. Keep this purpose in mind when making the final evaluation of the toy/game.

A.3 **Toy/game play Category:** How would you classify this toy/game?
Tick **one** of the four main categories according to C.O.L. classification. In order to determine a category, **it is necessary to look for which aspect predominates in the toy/game.**

- Toys for Exercise Play:** Toys used during sensory and motor activities for the pleasure in obtaining immediate effects or results (sensory toys / motor toys / handling toys).
- Toys for Symbolic Play:** Toys leading the player to recreate actions, situations, events, or scenes, using their imagination, and inspired by their knowledge and understanding of reality (role-playing toys / staging toys / representation toys).
- Rule-based Games:** Rule-based games involve a set of instructions or norms that the players must know and follow in order to achieve the intended objective (association games / circuit games / expression games / combination games / skill and sports games / strategy games / chance games / question-answer games).
- Toys for Assembling Play:** Separate pieces that can be assembled in order to build a new creation (construction toys / positioning toys / experiment toys / production toys).

B. USABILITY OF THE TOY/GAME

Table 1 **Relevant items for children with HEARING IMPAIRMENT**
Partially hearing impaired – deaf

1.1 INTENDED PLAY PURPOSE OF THE TOY/GAME					
1.1.1 The toy/game play purpose can be achieved using mainly visual and motor abilities, or residual hearing. (Keep in mind the degree of impairment of the intended user and answer YES if you consider that the intended user can achieve the play pleasure with this particular toy/game).	<table border="0"> <tr> <td>YES</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	YES	NO	<input type="checkbox"/>	<input type="checkbox"/>
YES	NO				
<input type="checkbox"/>	<input type="checkbox"/>				

1.2 SENSORY EFFECTS																
1.2.1. The toy/game's sound effects are accompanied by other effects (lights, pictures, vibrations, movements, etc.).	<table border="0"> <tr> <td>DOES NOT APPLY</td> <td>YES</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	DOES NOT APPLY	YES	NO	<input type="checkbox"/>											
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<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>														
1.2.2 The toy/game has a volume control and/or an optional output for headphones.																
1.2.3 The audible verbal messages are intelligible and/or accompanied by a written version.																
1.2.4. In rule-based games, the written/graphic explanations are easy for the intended user to understand.																

YES NO

CONCLUSION: Considering the degree of HEARING impairment of the intended user, the toy/game is:

USABLE UNUSABLE ADAPTABLE

Are there adaptability solutions that will not change the play purpose of the toy/game? What are they?

Table 2 **Relevant items for children with VISUAL IMPAIRMENT**
Partially visually impaired – blind / colour-blind

<p>2.1 INTENDED PLAY PURPOSE OF THE TOY/GAME</p> <p>2.1.1 The toy/game play purpose can be achieved using mainly hearing and motor abilities, or residual vision. (Keep in mind the degree of impairment of the intended user and answer YES if you consider that the intended user can achieve the play pleasure with this particular toy/game).</p>	<table border="0"> <tr> <td>YES</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	YES	NO	<input type="checkbox"/>	<input type="checkbox"/>
YES	NO				
<input type="checkbox"/>	<input type="checkbox"/>				

<p>2.2 COLOURS AND TEXTURES</p> <p>2.2.1 The toy/game has vivid and/or highly contrasting colours (e.g. yellow and dark blue / black and white / red and white).</p> <hr/> <p>2.2.2 The relevant areas of use (buttons, knobs, holes) of the toy/game are clearly contrasted and/or easily differentiated from the background.</p> <hr/> <p>2.2.3 In board games, the use of red and green together is avoided (colour-blindness).</p> <hr/> <p>2.2.4 The toy/game has different textures, lights, reliefs or materials, which are suitable for the purpose of the toy/game.</p>	<table border="0"> <tr> <td>DOES NOT APPLY</td> <td>YES</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	DOES NOT APPLY	YES	NO	<input type="checkbox"/>											
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<p>2.3 FORM AND COMPONENTS</p> <p>2.3.1 The toy/game (overall structure) has a realistic or recognisable form, easy to identify by touch.</p> <hr/> <p>2.3.2 The specific components of the toy/game (e.g. knobs, buttons, switches, connectors, pieces, images, etc.) are easy to identify by touch.</p> <hr/> <p>2.3.3 The toy/game is of a sufficiently compact structure or has an anchoring system which prevents the pieces from dismantling at random.</p> <hr/> <p>2.3.4 The toy/game has a base that is large enough to ensure stability when in use.</p> <hr/> <p>2.3.5 The toy/game pieces or accessories included (e.g. blocks, clothes, etc.) are placed in a compartment provided for this purpose, or are large enough (2 cm at least) to remain within the child's reach or sight.</p>	<table border="0"> <tr> <td>DOES NOT APPLY</td> <td>YES</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	DOES NOT APPLY	YES	NO	<input type="checkbox"/>														
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<p>2.4 SENSORY EFFECTS</p> <p>2.4.1 The toy/game has sensory effects in addition to, or instead of visual messages (e.g. sounds, vibration, movements, scents, etc.).</p> <hr/> <p>2.4.2 The toy/game has realistic sound effects or audible messages (e.g. cows moo; they do not meow).</p> <hr/> <p>2.4.3 The toy/game actions and visual effects are clearly recognisable by touch or hearing (e.g. elements that appear and disappear).</p>	<table border="0"> <tr> <td>DOES NOT APPLY</td> <td>YES</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	DOES NOT APPLY	YES	NO	<input type="checkbox"/>								
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YES	NO
<input type="checkbox"/>	<input type="checkbox"/>

CONCLUSION: Considering the degree of VISUAL impairment of the intended user, the toy/game is:

USABLE UNUSABLE ADAPTABLE

Are there adaptability solutions that will not change the play purpose of the toy/game? What are they?

Table 3 **Relevant items for children with UPPER-LIMB MOTOR IMPAIRMENT mild, moderate, severe**

<p>3.1 INTENDED PLAY PURPOSE OF THE TOY/GAME</p> <p>3.1.1 The toy/game play purpose can be achieved using mainly hearing, visual, and lower-limb motor abilities, or a moderate level of upper-motor abilities. (Keep in mind the degree of impairment of the intended user and answer YES if you consider that the intended user can achieve the play pleasure with this particular toy/game).</p>	<p>YES NO</p> <p><input type="checkbox"/> <input type="checkbox"/></p>
<p>3.2 DIMENSIONS AND WEIGHT</p> <p>3.2.1 The dimensions of the toy/game, its pieces or accessories are more than 2 cm in length/width.</p> <hr/> <p>3.2.2 The toy/game has a base that is large enough to ensure stability when in use.</p> <hr/> <p>3.2.3 The toy/game's weight is adequate for a child with upper-limb motor impairment to be able to play with it easily.</p>	<p>DOES NOT APPLY YES NO</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>3.3 FORM AND COMPONENTS</p> <p>3.3.1 The toy/game has multiple areas for a child to wrap his/her fingers around, allowing him/her to hold the toy/game in different positions.</p> <hr/> <p>3.3.2 The toy/game has a compact structure. When it is assembled or ready to play with, it does not dismantle easily.</p> <hr/> <p>3.3.3 The toy/game pieces (e.g. blocks, accessories, clothes, etc.) are easy to assemble, employing a simple connection system like Velcro or magnets.</p> <hr/> <p>3.3.4 The toy/game is soft and padded enough to avoid painful impacts.</p>	<p>DOES NOT APPLY YES NO</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>3.4 MOVEMENTS AND GESTURES</p> <p>3.4.1 The important parts of the toy/game (such as handles, buttons, switches, connectors, etc.) are easy for the intended user to press, rotate, fit together, grasp, activate, etc.</p> <hr/> <p>3.4.2 The response time of the game can be adjusted to allow actions with slow gestures.</p> <hr/> <p>3.4.3 The buttons to start the toy / game (the audio part, the visual elements, the movements, etc.) can be activated by the intended user.</p> <hr/> <p>3.4.4 The toy/game allows an external switch to be added in order to activate it.</p>	<p>DOES NOT APPLY YES NO</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>

YES NO

CONCLUSION: Considering the degree of MOTOR impairment of the intended user, the toy/game is:

USABLE UNUSABLE ADAPTABLE

Are there adaptability solutions that will not change the play purpose of the toy/game? What are they?

3 Development and Validation

3.1. Previous research and background about inclusive toys

3.1.1. Research on inclusive toys at AIJU

AIJU, Technological Institute

AIJU is a European Technological Institute for Children's Products and Leisure located in Spain. It was inaugurated in 1985 as a non-profit organisation designed to carry out R&D projects to increase levels of safety and quality within the toys and games sector.

AIJU has five areas of expertise: **1.** Child user research, **2.** Product Development & ICT, **3.** New materials, industrial processes and prototyping (3D printing) **4.** Safety, **5.** Innovation & Sustainability. The aim of the "Child user research" area is to carry out studies related to children, specialising in user requirements and validation with children and parents. This area also conducts research based on information obtained from play centres, schools, consumer panels and expert panels, which collaborate with AIJU (more than 9,000 families and 400 Toy libraries and schools in Spain and an international network to carry out European studies).

AIJU is a member of several forums as well as national and European Committees working in the field of toy safety (physical, chemical and electrical aspects), child-care articles and playgrounds. AIJU has carried out several R&D European projects, ranging from past FP4 to FP7, as well as many other research programmes.

Guidelines for Toy Designers

AIJU carried out various investigations from 2007–2017 to analyse the features of toys in the market and their adequacy for children with special needs, specifically for children with hearing, visual, mental and motor impairments.

The first project was "*Play, Toys and Disabilities*", in 2007. In this study, 1,131 toys were selected and assessed with the purpose of analysing their adequacy for children with special needs. One of the most important findings was that only 25% of the mainstream toys analysed were accessible to children with motor, visual and hearing disabilities as in most cases they required some adaptation or help from another person for them to be used. Only 5% of the toys complied with the "Design for all" requirement, which means that only a minority of toys were simultaneously accessible for children with motor disabilities and hearing and visual impairments, without requiring any assistance or adjustment.

AIJU also carried out research to understand the specific problems children with motor disabilities experience when playing with dolls. The study had the objective of determining what characteristics would make the dolls more accessible. A sample of 54 dolls on the market was assessed by 70 experts in disabilities from 20 disability centres in Spain. The toys were also directly tested with 163 children with motor disabilities. The results showed the most frequent problems children with motor disabilities experience when playing with dolls. As a result of this research, a list of recommendations for the design of accessible dolls for children with motor impairment were developed and disseminated to toy companies. Other studies considering specific categories of toys and games for specific impairments were developed at AIJU from 2010 to 2016.

Guidelines for Early Therapy

AIJU managed another related project: "*Play, toys and Early Stimulation*", to determine how to use toys as tools for early stimulation. In this study, focused on children from 0 to 2 years old, experts in early childhood intervention centres analysed 300 toys. The usability of the toys was evaluated as well as their ludic and therapeutic potential. The information was divided into two age groups (0–12 and 13–24 months) with specific developmental characteristics, and parents were given suggestions on how to play with their babies using toys to stimulate the different areas of intervention: motor, cognition, communication, socialisation and personal autonomy. As most of the material analysed presented usability problems for babies, AIJU created a publication with guidelines to make the toys and play proposals more suitable for this target.

Guidelines for parents: Toy Guide

From 1991 to 2017, the Technological Institute evaluated more than 4,000 toys and games, 150–200 per year, for the Toy Guide publication (www.guiaaiju.com). Each product is evaluated by final users: children, parents and advisors (Teachers Therapists, Paediatricians). A total of 15 variables are evaluated, divided into three main domains: Playfulness, Usability and Child Development issues.

In the last 10 years, in collaboration with CEAPAT and ONCE, 2,866 toys and games have been tested by users and experts to evaluate accessibility requirements by considering users with functional diversity in the evaluations. Data conclusions showed 86% of toys/games were usable for children with moderate to severe hearing impairments, 44% were usable for children with severe visual impairment, and only 21% of toys or games are usable for children with moderate to severe upper-limb motor impairments.

All this research has allowed AIJU to compile the main characteristics to consider when developing inclusive toys taking into consideration motor, hearing and visual impairments.

The conclusion of all these studies is that the design process in toys and games needs to be reviewed in order to increase their level of usability and accessibility. Special attention is required in these three physical disabilities: Hearing, Visual and Motor impairment.

3.1.2. Training and analysis of toys for all at FM2J

FM2J Play Training Centre

In 1990 the first Play Centre opened in Lyon (France). In 2006, after years of practice and observation within several play centres and toy libraries, the “Centre national de Formation aux Métiers du Jeu et du Jouet” (FM2J) was created. This Play Training Centre aims to train all professionals interested in the use of play and toys in their practice (www.fm2j.com).

FM2J has always considered play as an inclusive activity. The main FM2J topics are play for all, toys and games observed from different perspectives, cultural, educational, social, psychological, care for younger and older people, whatever the venue, in kindergartens, families, schools, toy libraries, hospitals, centres or institutions.

FM2J is involved in various research fields: **1)** toys and games analysis encompassing toys and disabilities; **2)** the classification of toys and games; **3)** the play framework or the conditions for play; **4)** toy libraries; **5)** play for people with Alzheimer’s disease; and **6)** playgrounds in schools.

Among the 23 different training courses set up by FM2J, the “Play and children with disabilities” course is intended for all professionals interested in free play, whether they are teachers, therapists, toy librarians, play facilitators or designers.

Play framework or the conditions for play

After many years of observing players inside different play venues, from 1995 to 2006, the concept of play framework has been developed in six points. It simultaneously includes the study of toys/games, the organisation of material spaces, and the presence of adults. The main functions of the play framework are: to support free play as a specific activity in itself; to simplify situations that, in real life, are often complex and with several meanings; to help children begin to play, understand that play is just for fun and to trigger children’s desire to play; to support caregivers and help them to understand what their roles are in play situations.

In 2011, a new study to understand the role of the play framework for children and adult educators in centres for children with special needs was developed.

FM2J is involved in International research networks like the COST- LUDI project on Play and children with disabilities, in which it is the French representative.

Ludoscope and Handilud: Analysing toys and games

Ludoscope was published every year between 1995–2015. In this publication, 50 to 100 mainstream toys and games from all categories and all companies were analysed each year.

The analyses of toys and games were conducted based on various series of evaluation criteria: attractiveness; safety; developmental psychological level required to use a toy (from the ESAR system), play principles; material usability

of a toy; solidity and stability; ease of handling and simple coordination; sensorial aspects; ease of locating and purchasing; suitability of the toy for adult play (the visual aspect of the toy renders it suitable for adults with disabilities when its design is not too childish).

Some of the toys analysed bear a special “Handilud” distinction, which indicates that these toys can be considered as usable for children or adults with disabilities. Furthermore, in 2007, the “Handilud Guide” was published, which reviews 80 toys and games. This concluded a study about play for children with disabilities and their caregivers. Among all the 1,600 products analysed, only 8% of toys and games received the Handilud distinction.

The practice of analysis has led to the development of a simplified classification of games and toys based on the criterion of play activity from categories established by J. Piaget. This is the C.O.L. (classification of play objects), which is very widely used today when it comes to classifying and ranking toys and games.

Enfantos

A new project, Enfantos, started in 2016. A team with extensive experience in play and toys (Psychologists, Toy Librarians and Ludologists) evaluate toys and games and publish their analyses on the internet. The Enfantos mission is to help parents, families and professionals who work with children to improve their knowledge about play and toys for all (<https://enfantos.com>).

All this experience in the analysis of toys and games triggered the need to develop a tool like the TUET.

3.1.3. Play and assessment of children with disabilities at the Occupational Therapy department - HES-SO EESP

The department of occupational therapy (OT) of the University of applied Sciences and Arts of Western Switzerland (HES-SO), school of social work and health - EESP (www.eesp.ch), located in Lausanne, offers a European-accredited Bachelor programme. The programme encourages students to consider the occupation of play in the context of health and wellbeing, social inclusion and social justice. The school has faculty members engaged in collaborative research, notably through trans-European networking platforms such as COST (COoperation in Science and Technology) and participation in the action LUDI (<https://www.ludi-network.eu>) on the play of children with disabilities.

Play has a central place in OT as primary means and goals for intervention with children with disabilities. Occupational therapists closely analyse how a child’s characteristics and the play environments support or interfere with play to generate multiple therapeutic strategies. They are also concerned with making sure the child’s basic needs are met so that they are able to play (e.g. environmental adaptations: play setting, play materials and toys). Examples of effective OT intervention approaches are contextual, participatory methods in provision of play-based occupational therapy, with a strong focus on changing the environment as a way to enable play.

Occupational therapists are equally knowledgeable about the child’s disability, the play development, the play activity and the environment.

This expertise has been crucial to focus on user requirements and define usability criteria for the different levels of disabilities in TUET.

3.1.4. AblePlay at the National Lekotek Center

The National Lekotek Center is a non-profit organisation located in the U.S. that provides services to improve the lives of children with special needs through the utilisation of toys and play (www.lekotek.org).

Lekotek offers family support, professional toy lending and training. During play sessions parents & siblings participate, learning how to best integrate play techniques and activities into their daily routines at home. At the end of each session, the family borrows several toys from the toy lending library to use at home during the month. Play groups, special events and Compuplay programmes are also offered to families that join the Lekotek organisation. From 1980, over its 35-year history, Lekotek has conducted over 1.5 million play sessions in 22 USA states.

The National Lekotek Center has a Top Ten Tips to consider when parents or caregivers buy toys for children with disabilities (www.lekotek.org):

1 Multisensorial appeal, **2** Method of activation, **3** Where the toy will be used, **4** Opportunities for success, **5** Current popularity, **6** Self-expression, **7** Adjustability, **8** Child's individual characteristics, **9** Safety and durability, **10** Potential for interaction.

AblePlay

In November 2005, Lekotek launched AblePlay (www.AblePlay.org) providing access to ratings and detailed reviews from National Lekotek professionals on toys and other play products appropriate for children of all abilities. Their main goal is show product information categorised by disability category to further simplify the toy-buying experience in parents and caregivers with children with special needs.

AblePlay designed a rating system that focuses on the developmental areas of physical, sensory, communicative, cognitive, and social/emotional skills of a toy or play product. Every toy is rated on a scale of 1–5 and every play product ("Great Finds") receives checkmarks in these key categories. Website visitors can also search by specific skills and disabilities. After the analysis, the AblePlay organisation provides an "AblePlay" label to go on the toy packaging of selected products.

The criteria and variables studied by Lekotek and AblePlay have been reviewed to create TUET.

3.1.5. Let's Play Projects at Buffalo University

Let's Play Projects includes several investigations focused on young children with disabilities and play, carried out at the University of Buffalo (New York, USA) (<http://letsplay.buffalo.edu>).

The first project began in 1995 (model demonstration grant) to establish a play and assistive technology lending library for children and families involved in early intervention. With the second investigation, 2001–2003, "The effectiveness of assistive technology in promoting playfulness in young children", the physical (assessable toys and supporting materials) and human environments that promote play and playfulness in children with disabilities were established.

The third investigation, 2004–2006, was a project to develop and validate a tool to identify and evaluate the usability of toys for all children (from birth to three years of age); including those with disabilities by identifying universal design components. The project was named UDP: Developing a tool to measure Universal Design for Play. This project, coordinated by Susan Mistrett and Amy Goetz Ruffino, allowed the creation of a final project: Let's Play Special Needs website, to offer recommendations and provide support for family play experiences.

Universal Design for Play Tool (UPD)

The investigators reviewed play stages in little children, examined toy features that accommodate most children, and looked at the barriers children faced during play, as well as potential toy design features to address these barriers. They provide toy adaptation proposals as well as strategies and supporting materials that are useful when considering play options for young children with disabilities.

The Universal Design for Play Tool (UDP tool) was created to help parents of children with disabilities, individuals who purchase toys (child-care providers, hospital workers, commercial buyers) and toy designers to successfully identify toys with universal design characteristics.

In order to design a flexible, adjustable, usable toy, multiple options must be present. These inclusive design features address three primary principles:

- 1) Multiple ways to present (the presentation is appealing and the toy is easy to understand)
- 2) Multiple ways to use (the toy is easy to use and adjustable)
- 3) Multiple ways to play (the toy can be played with in different ways and is fun to play with)

Many aspects of the UDP tool and findings obtained in Let's Play projects have been reviewed and included in the present study. However, their research focused on toys for children of young ages and did not consider specific features that arise from the needs of physically handicapped children, that is why the next step in toy evaluation was to create TUET.

3.2. TUET development in LUDI “Play for Children with Disabilities”

The new tool presented in the publication, Toys & games Usability Evaluation Tool (TUET) is one of the outcomes from the COST Action TD1309 LUDI “Play for Children with Disabilities”.

The Toys & Games Usability Evaluation Tool (TUET), has been developed using the following three-phase procedure:

Phase 1) Creating the tool and first evaluation.

Phase 2) Tests by potential final user groups to improve content of the tool.

Phase 3) Validation process.

3.2.1. Phase 1: Creating the tool and first evaluation

LUDI Network and AIJU-FM2J collaboration (March 2017)

The COST Action LUDI “Play for Children with Disabilities” is a European scientific networking project (2014–2018) which aims at studying the theme of play (play for the sake of play) of children with disabilities. LUDI includes members from 32 countries from all over Europe; researchers come from various scientific areas: pedagogy, psychology, rehabilitation, medicine, technology, engineering, sociology, etc.

The network has three main objectives: a) collecting and systematising all existing competencies and skills: educational research, clinical initiatives, know-how of resources centres and user associations; b) developing new knowledge related to settings, tools and methodologies associated with the play of children with disabilities; c) disseminating the best practices emerging from the joint effort of researchers, practitioners and users.

As one of the networking research outcomes from LUDI the extensive experience in toy evaluation of AIJU (Spain) and FM2J (France) were combined, initiating a collaboration to create a new toy evaluation tool: TUET.

The seed of TUET was provided by Odile Périno (FM2J) and planted by Maria Costa (AIJU) in a LUDI short-term scientific mission (STSM) in Spain, in March 2017.

The current information on toy & game characteristics and usability was gathered. After an extensive review of previous toy evaluation methodologies, the usability criteria regarding the features to design more usable toys were obtained and analysed by teams of toy experts, designers, teachers, and parents at AIJU and FM2J.

As a first result, these criteria were organised by a toy’s main physical aspects and then by relevant aspects addressed at reducing the main barriers to play in different target groups. A first version of the tool was ready for initial tests in April 2017.

1st LUDI Training School (University of Zuyd, April 2017)

The First LUDI Training School “Play and Toys for All” was held at the Zuyd University of Applied Sciences (Heerlen, The Netherlands), between 18–21 April 2017. The aim of the event was to train participants who have an interest in the main research topics of LUDI: play, children with disabilities, societal barriers, play for the sake of play, toys and technology for play, inclusive play.

A total of 44 trainees with different professional backgrounds and from several European countries joined the LUDI Training School and had the possibility to work on a play challenge in close collaboration with children with disabilities and their parents.

In this context, the Toys & Games Usability Evaluation Tool, first version, was tested with experts and trainees in an inter-professional approach, evaluating a sample of 20 toys in various workshops conducted by Odile Périno. Qualitative outcomes about the content and format of the tool were obtained.

Sylvie Ray-Kaesler, a highly experienced occupational therapist researcher from the School of Social Work and Health, University of Applied Sciences and Arts of Lausanne, HES SO EESP joined the team and the current authors of the tool started working together.

3.2.2. Phase 2: Tests by potential final user groups

French and Spanish tool version Tests

Qualitative analysis of the tool was carried out in France (conducted by O. Périno), in Switzerland (conducted by S. Ray-Kaesler) and in Spain (conducted by M. Costa) evaluating a total sample of 50 toys and games. A cross-cultural adaptation procedure was applied to translate the tool from English to French and Spanish.

A sample of 15 caregivers and therapists tested the tool (French version) during a training school about “Play and children with disabilities” in the Centre national de Formation aux Métiers de Jeu et Jouet, FM2J (Lyon, France), in June 2017.

A sample of 50 Occupational Therapy students from the School of Social Work and Health EESP, University of Applied Sciences and Arts of Lausanne, HES SO EESP (Switzerland), carried out toy and game evaluations in June 2017.

The same sample of 22 toys/games were evaluated in these two locations (Lyon and Lausanne) using the French version of the tool. This sample included:

- Six toys for practice play: two rattles (Fisher Price), a wooden dragon with wheels, an inflatable ball, a box of plastic geometric shapes, a rainstick (Hop Toys).
- Four toys for symbolic play: two nurturing dolls (Famosa), a Barbie doll (Mattel), a set of Indian mini-figures (Playmobil).
- Eight rule-based games: Uno Junior (Mattel), My Very First Games (Haba), Game of the Goose, Junior Labyrinth, Billy Biber (three by Ravensburger), a sailing game to build; Guess Who? (Hasbro), Rush Hour (ThinkFun).
- Four toys for assembling play: Zoo animals (Lego-Duplo), Constructor (wooden), Five-piece puzzle (wooden) and Junior Colorino (Ravensburger).

At the beginning of September 2017, another sample of 34 toy librarian students and 12 educators carried out new evaluations (N=22 toys/games), using an updated French version of the tool, during a professional training session in FM2J (Lyon).

In parallel, in July 2017, a sample of eight experts in toys and games used the Spanish version of the tool at the Technological Institute for Children products and Leisure, AIJU, Ibi (Alicante) Spain, to evaluate a sample of 28 toys and games. In September 2017, during a training workshop, a sample of 11 toy designers evaluated the toys/games. Finally, 12 teachers specialised in special needs, participated in another evaluation of these toys and games.

The sample of 28 toys/games included:

- Seven toys for practice play: Robot Robi, Learning table (Fisher Price); Baby VIP, Moto, Wooden activities box (Juguetos); First bike (Chicco); City trike (Injusa).
- Nine toys for symbolic play: Baby Alive, Rapunzel, PlayDoh letters and language (Hasbro); Pirates & Sirens Pin y Pon, Barriguitas House (Famosa); Elegance Lois (Muñecas Arias); Box of shapes (Color Baby), Police figures and School set (Playmobil).
- Eight rule-based games: Emotiblocks (Miniland); Simon Optix, Connect 4 Travel game (Hasbro); Squawk, Fantastic Gymnastics (Mattel); Galletas, Sushi-go (Devir); Fakes (Cayro games).
- Four toys for assembling play: Beados Crystals, Build a Bot, Rabbit (Famosa); 3D Sculpture Puzzle, Colour Cubes (Educa).

The variables of the tool analysed in this process were related to: semantic, experiential and conceptual equivalence; understanding, task performance and response formatting. Several tool modifications were made with the results obtained in the evaluation of toys and games in these three countries. A total sample of 140 users (with different backgrounds) tested the tool during this period. The synthesis of the results obtained were crucial to develop the next English version of the tool.

Refinements of the tool: TUET English version

The new English version of the tool was reviewed by native English speakers. This version was given the acronym “**TUET: Toys & games Usability Evaluation Tool**”. This is the version used in the final step of the process: Cross-cultural validation research in eight European cities, in October–November 2017. Extended explanations of the methodology and results are included in the next chapter.

3.3. TUET Validation process

3.3.1. Methodology

Research design

The purpose of the research was to validate the “TUET” tool through inter-rater agreement, in order to estimate its capacity to produce constant results, and to evaluate the tool content (comprehension and usefulness).

The goal was to obtain a minimum of 100 evaluators in at least 40 Teams of evaluators (with various backgrounds/profiles represented: Teachers, Therapists, Designers) to evaluate a sample of toys/games. Each Team of Evaluators was composed of two to three people with the same/similar background/profile:

- Therapists (TH) or Occupational Therapy Students (THs)
- Teachers (TEA) or Primary/Special Education/ Teaching Students (TEAs)
- Designers/Engineers (DEE) or Design/Engineering Students (DEEs).

In order to assure the repeatability of the experiment design and to obtain significant rates of evaluation for the final statistical analysis, each team tested the same sample of 12 toys/games. Each team of evaluators reached a consensus and filled in a sheet of the Toys & games Usability Evaluation Tool (TUET).

A protocol procedure was created to carry out the toy and game evaluations and the final test of the tool itself. Each task was defined in order to ensure that the experiment was repeated in the same way by each evaluator. All aspects relating to the tasks required before, during and after the toy evaluations were defined and explained to the leaders of the validation (one for each test location).

The procedure included relevant information related to:

- Environmental conditions required to carry out the fieldwork (locations, timing, internet access, etc.).
- Composition and codification of teams (same background in each team).
- Preparation and guidelines to use the toys and games in the evaluation process.
- Evaluation procedure (methodology, electronic system, etc.).

Instruments

Two instruments were used in this validation research: 1) Toys & games Usability Evaluation Tool (TUET) to evaluate toys and games, and 2) an Evaluation of the tool content Questionnaire.

- 1) The Toys & games Usability Evaluation Tool** (TUET version Oct–Nov 2017) included 2 questions related to play purpose and toy/game C.O.L. classification and 32 items related to the usability toy/games features relevant for different impairments, scored by 3 categorical answers (*Yes, No, and Does Not Apply*). Table 1 Hearing = 5 items / Table 2 Visual = 13 items / Table 3 Motor = 12 items. At the end of each table relating to 1 impairment, there are questions about the usability and adaptation required for each toy/game.
- 2) Evaluation of the tool content Questionnaire** was composed of: 8 initial descriptive questions to identify and classify the groups of respondents; 7 questions related to the comprehension and the usefulness of the tool scored on two categorical answers (*Yes, No*); and finally, 7 open questions about the same issues to require qualitative assessment from the respondents about TUET.

An electronic version of the tool was created and pre-tested (Electronic TUET and Electronic TUET Final Validation Questionnaire) using the Tesi Gandia Integra Quest 4 software. All information was collected in an electronic system. After the fieldwork, the codification and data analysis processes were carried out by using IBM SPSS Statistics 25.

Evaluators sample

125 participants tested the tool “TUET English version” in October and November 2017. Most of the evaluators were from Italy (43%), Politecnico di Milano (19%) and University of Aosta Valley (24%), followed by Ireland (13%), Malta (11%) and Spain (11%). The remaining 23% were from The Netherlands (9%), Switzerland (9%), and France (5%).

The tests carried out at Politecnico di Milano (Italy) were conducted by Andrea Bonarini; at University of Aosta Valley (Italy) by Nicole Bianquin; at Cork University (Ireland) by Helen Lynch; at University of Malta by Veronica Montanaro; at AIJU, Spain by María Costa; at Zuyd University (The Netherlands) by Rianne Jansens, at HES-SO EESP, Lausanne (Switzerland) by Sylvie Ray-Kaeser; and at FM2J (France) by Odile Périno.

From the initial 125 participants, a total Final Sample of 109 evaluators achieved two tasks: 1st task, Evaluation of 12 toys and games using TUET questionnaire; and 2nd task, Evaluation of the tool content (comprehension and usefulness of the tool).

The profiles of the Respondents in the final sample were represented by 69% Professionals and 31% Students. Most of the professionals were: Teachers (26%) and Therapists (25%), followed by Designers/Engineers (18%). The students' backgrounds were: Primary/Special education/Teaching students (13%), Occupational Therapy Students (10%) and Design/Engineering Students (8%).

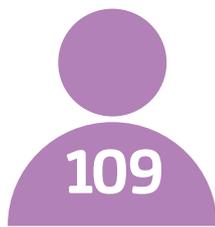
In terms of experience of work with children with disabilities, 77% of the respondents had some experience, while 23% did not have any experience. Some students, despite not having started working professionally with people with disabilities, had personal experience of disabilities in their own families.

Regarding the types of disabilities, 40% of the sample had experience with children with motor impairments, 28% with visual impairments, and 26% with hearing impairments. Some professionals also had experience with other disabilities, the most common of these was ASD (Autism Spectrum Disorders), which represented 50% of the “other” option.

All participants had an Intermediated-Advanced level of English, and 24% of them were native English speakers (from Ireland and Malta).



EVALUATORS SAMPLE SUMMARY



Total evaluators

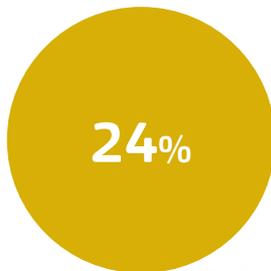


Evaluating Groups

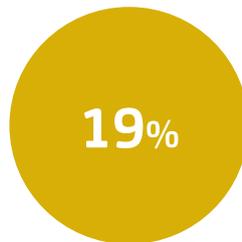


Countries

PARTICIPANT PROVENANCE



University
of Aosta Valley
Italy



Politecnico
di Milano
Italy



Cork
University
Ireland



Malta
University
Malta



AIJU – ONCE - CEAPAT
Spain



Zuyd University
The Netherlands

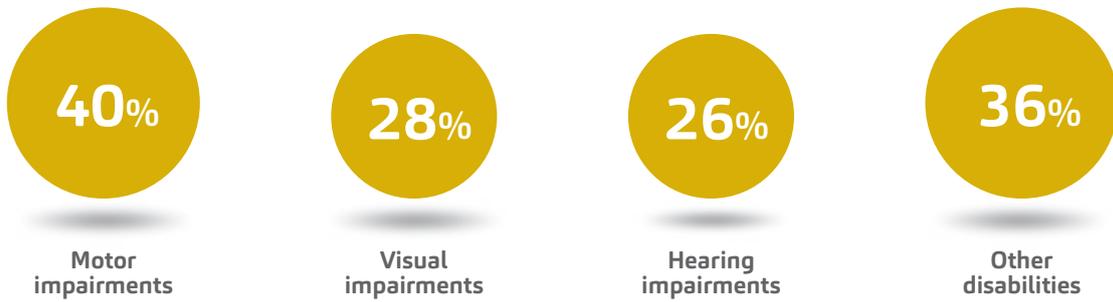


HES-SO EESP,
Switzerland



FM2J
France

TYPES OF DISABILITIES EXPERTISE



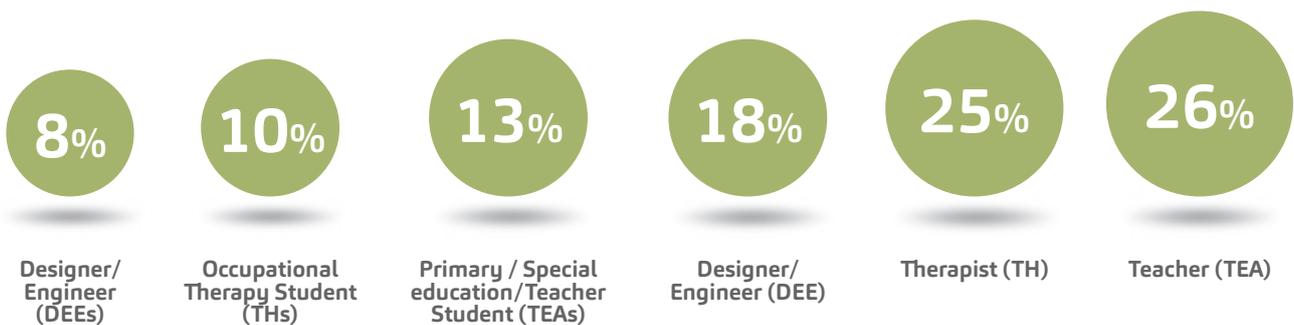
EXPERIENCE WITH DISABILITIES



EXPERTISE



EVALUATOR PROFILES



Toys and games sample

The sample of toys and games was composed of 8 sets of 12 different toys and games, this means that 96 toys and games were evaluated in the present research ($12 \times 8 = 96$).

To select this sample of toys and games, three criteria were required:

- 1** Representation of 4 categories of toys and games according to C.O.L. classification (Toys for practice play; Toys for symbolic play; Rule-based games and Toys for assembling play).
- 2** Representation of toys and games usable and unusable for different disabilities (Hearing, Visual and Upper-limb Motor impairment).
- 3** Mainstream toys and games easy to find in the European market in 2017.

All these toys and games were also evaluated in the AIJU Toy Guide 2017–2018.

TOYS AND GAMES SAMPLE SUMMARY



Toys and games list: Dance & Move Beat Bo (Fisher Price); Plush Fear & Friends (Nici); Enchantimals dolls (Mattel); Emotiblocks (Miniland); Connect 4 Grab & Go (Hasbro); Blinkin' Buddies–Kid K'nex (F. Juguetes); Play and learn–Magtastix (Color Baby); Toucan (Juguetos); Elegance Natal (M. Arias); Sushi Go (Devir); Lego City (Lego).

Each toy or game was evaluated by playing with it for about 10–20 minutes, first in an exploratory way, then by focusing on the specific TUET questions. Immediately after the playing experience with a single toy, the form was filled in, then the evaluators went back to the toy or game to make sure that their answers matched their experience.

Each toy/game was evaluated by 47 groups of evaluators using TUET. A total sample of 564 toy/game evaluations were analysed (47×12 toys/games = 564 evaluations).

All variables in TUET were analysed by the evaluators for each toy or game, providing 18,048 pieces of data to carry out statistical analysis, and almost 1,500 qualitative answers, which were also reviewed in the present research.

3.3.2. Validation results

To measure its reliability and validity, quantitative and qualitative approaches were used to study inter-rater agreement.

Methods of Analysis

For the statistical analysis of the TUET results, the following analysis tools were employed: Gold Standard, Cohen's Kappa, Chi-Square, Variance, and Mode.

Gold Standard: The answers to the questions that are defined as correct by experts. A team of experts from AIJU, ONCE and CEAPAT (in Spain) evaluated the sample of 12 toys and games. From October to November 2017, three sessions were carried out with 6–6–3 experts to create consensus scores for each item evaluated through TUET. An external check was carried out by O. Périno (FM2), France) and S. Ray-Kaesler (HES-SO EESP, Switzerland) to define a final consistent Gold standard set of data at the end of December 2017.

Cohen's Kappa: A statistical test that measures inter-rater agreement for qualitative items. It is generally thought to be a more robust measure than a simple percent agreement calculation, since K takes into account the possibility of the agreement occurring by chance. We used this statistic in order to determine which toys/games had the best accordance with the Gold Standard.

Chi-Square: A statistical test that is used to check if there is goodness of fit between the expected value and that obtained. If there is a perfect match between the obtained and expected frequencies, a value of 0 is given. On the other hand, if there is a large discrepancy between these frequencies, a higher value is given. It is considered that when the Chi-Square value is higher than 0.05 there is no agreement between the obtained and expected value and, therefore, Cohen's Kappa result is not valid. In the present research, Chi-Square confirmed that the Cohen's Kappa results were valid.

Variance: A descriptive statistic that measures the degree of dispersion of the answers. It was used to measure the dispersion of each of the questions in the questionnaire in each of the 12 toys/games analysed.

Mode: A descriptive statistic that was used to ascertain which category of question has the highest response rate. In our case we compared the mode of each of the questions with its Gold Standard.

Results

To check the validity of TUET, two main analyses were carried out. Firstly, Cohen's Kappa was studied. The results were statistically significant ($\text{sig.} > 0.05$) and the Kappa value was in most cases between 0.40 and 0.60, representing moderately positive results. Low association with Gold standard results were focused on five questions. On the other hand, a variance study was carried out with each of the TUET questions. Of the 32 usability questions analysed, six showed dispersion rates (greater than 0.30).

Cohen's Kappa

In order to ascertain which questions from the questionnaire had a higher error response rate, it was decided to first obtain the degree of general agreement of the questionnaires in relation to the correct answer (Gold Standard) and classify the results according to the toys and games analysed. To do this, Cohen's Kappa index was calculated, by which the percentage of success of the answers was obtained by eliminating the probability that a correct answer occurred by chance. This analysis was performed by analysing the responses from "native English speakers" (those from the countries of Ireland and Malta, $N=23$ people, in 9 groups). See example with Group Code 3 (Ireland) in Table 1.

Inter-rater agreement Kappa per Evaluator average was from 0.539 to 0.686 for the native English-speaking respondents; this represents a moderate to good agreement rate. With this previous knowledge, an index of agreement of the total TUET questions with each of the toys/games was carried out. For this analysis, it was decided to take into account the respondents' previous experience with disabilities.

The higher the number of variables, the less likely it is to obtain very high Kappa values (more than 0.70). With this in mind, and taking into account the high number of variables in the questionnaire, the results obtained with Cohen's Kappa statistic were positive, ranging from 0.40 to 1.00. Some toys (Toy 2, Toy 5, Toy 11 and Toy 12) even obtained scores higher than 0.60. This means that the degree of agreement between the Gold Standard and the Evaluators' answers was high for these toys and games. For the rest of the toys, moderate values between 0.40 and 0.60 predominated, which are still quite positive values if the large number of variables in the questionnaire are taken into account.

Evaluators Code 3 (Ireland)		
Toy/game Evaluated	Chi-Square	Kappa
TOY 1	Significant	0.543
TOY 2	Significant	0.705
TOY 3	Significant	0.487
TOY 4	Significant	0.592
TOY 5	Significant	0.652
TOY 6	Significant	0.502
TOY 7	Significant	0.431
TOY 8	Significant	0,506
TOY 9	Significant	0.532
TOY 10	Significant	0.412
TOY 11	Significant	0.647
TOY 12	Significant	0.658

Table 1

In relation to the answers segregated by hearing, visual, motor, other disabilities and no experience: The group that differed least from the Gold Standard (GS) were the experts in visual disability, followed by the experts in the other disabilities. The people who had the least agreement with the GS were those with no experience in dealing with disabilities.

Variance analysis

An analysis of the variance of each of the 37 questions of the TUET, and for the 12 toys/games, was carried out, this time by analysing the answer of all the respondents (N=109).

The analysis of variance describes the dispersion in the answers to each question. For the variance analysis, and taking into account that there were 3 possible answers (“Does Not Apply”, “Yes” and “No”), the following ranges of variance were considered as high (0.50–1.00), medium (0.30–0.49) and low (0.0–0.30).

In this second part of the analysis, the mode was used at the same time. This allowed researchers to ascertain whether most of the answers to each question corresponded to the Gold Standard. A table was obtained for each of the questions and for the complete sample of toys/games. Two polarised examples are shown in Table 2 (Question 2.3.1.) and Table 3 (Question 3.5.2.) The interpretation of the results obtained in this phase was based on the following premise: “The less variance between the answers and the greater difference with the Gold Standard, the worse the question is”. The results showed that: Questions with “Quite bad” GS associations (Q2.1.1, Q2.3.2, Q2.4.1 and Q 3.5.1.) needed to be revised in order to achieve a better agreement with the Gold Standard. The question with a “Really bad” GS association (Q3.5.2) had to be thoroughly revised and its continuing place in the questionnaire had to be evaluated. On the other hand, it was

Q2.3.1			
	Variance	Mode	GOLD
TOY 1	0.061	2	2
TOY 2	0.060	3	3
TOY 3	0.204	2	2
TOY 4	0.123	2	2
TOY 5	0.043	2	2
TOY 6	0.097	2	2
TOY 7	0.171	2	2
TOY 8	0.021	2	2
TOY 9	0.000	3	3
TOY 10	0.290	2	3
TOY 11	0.157	2	2
TOY 12	0.065	2	2
TOTAL	0.088		

Table 2

Q3.5.2			
	Variance	Mode	GOLD
TOY 1	0.080	2	3
TOY 2	0.238	2	3
TOY 3	0.593	3	2
TOY 4	0.271	2	2
TOY 5	0.291	3	3
TOY 6	0.383	3	3
TOY 7	0.222	2	3
TOY 8	0.496	2	3
TOY 9	0.401	2	3
TOY 10	0.732	3	2
TOY 11	0.309	3	3
TOY 12	0.328	2	3
TOTAL	0.319		

Table 3

recommended to revise the questions with “High dispersion rates” (Q2.3.3, Q 2.4.2, Q2.5.1, Q 2.6.1, Q 2.6.2, Q 2.6.3) in order to reduce their degree of variance.

The main concern with these results was about the conclusions from the analysis at the end of each of the three tables (Hearing, Visual and Motor impairment), specifically: toys/games that were evaluated as being adaptable, which were unusable according to the experts (GS); or toys/games that were evaluated as being unusable because they received a “No” in an item marked in bold, which the experts thought could be usable if adapted.

Reviewing the reasons for these problems:

- 1 This might be due to a misunderstanding of the meaning of what is an adaptable/ usable/ unusable toy/game.
- 2 This might be due to a lack of a description of the disabilities or gradation of severity for each disability.
- 3 This might be due to unclear phrasing of items, or a double question in the same item.
- 4 This might be due to too few items, inappropriate content of items or inappropriate analysis criteria.

Content Validity

All respondents of the final sample (N=109) answered the TUET Evaluation Questionnaire with questions reviewing the content and discriminant validity, comprehensibility and usefulness of the tool.

Most of the evaluators interviewed (81%) considered that the TUET items were relevant to each disability. The remaining 19% considered that TUET should include some specifications about the severity of the user’s impairment (“Some items are hard to fill in as there can be a big difference in severity of impairment”).

Most of those interviewed (65%) did not think that there were any important aspects missing from the form regarding hearing, visual or motor disabilities. However, 35% of respondents believed that the form could be more precise regarding the aspects of different disabilities. Respondents considered the answers to the items would need to be different according to the severity of the impairment, and also if additional impairments were present.

In reference to the clarity of the items, many respondents thought that all the items were understandable (68%). However, 32% thought that some questions were confusing (these were the same questions that had high dispersion rates).

Most respondents (90%) considered the tool to be useful for discriminating whether toys or games are usable or unusable for a particular disability. The other 10% answered that TUET required some improvements because of the great differences that exist between users: “More information on an individual and the severity of their disability is needed”, or “Each user is unique and requires different adaptations and individualised observations”.

Many respondents who gave negative opinions nevertheless thought that it was a useful tool, but that it did not consider children who have two or more concurrent disabilities. Finally, some negative observations were related to codifying results and conclusions “It needs to be nuanced based on qualitative answers and not only on quantitative ones”.

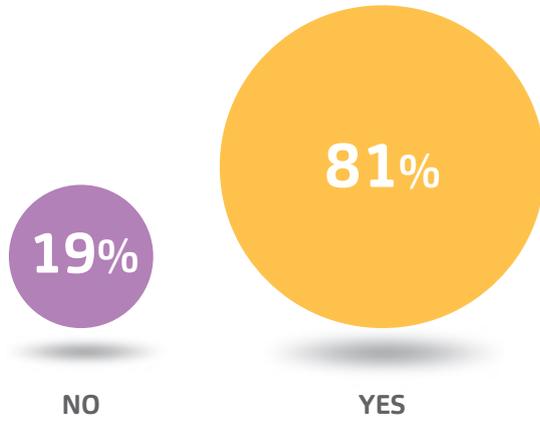
Despite this, it is significant that **all of the respondents considered the tool to be useful for their work:**

For Designer / Engineers: TUET is easy to use and useful for creating toys/games by considering relevant aspects that add usability and accessibility to a new product. This tool gave a good overview of the different features of toys/games. Additionally, it was seen as a tool which can help them be mindful of individual needs when designing and selecting toys.

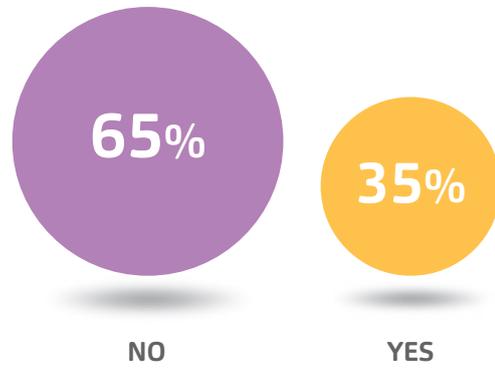
Teachers considered it to be very useful for choosing toys in schools and advising parents, as well as for showing improvements and innovations in the mainstream market of toys and games that can be interesting for children’s development.

Therapists considered TUET to be useful for advising parents and for training students to be aware of children’s needs when selecting toys and games, and also for creating new toys or adapting existing ones.

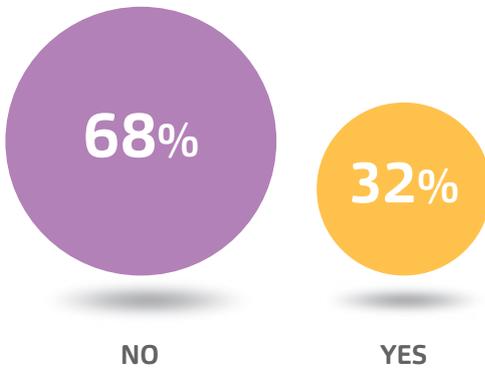
1. Regarding each disability, do you consider the items to be relevant?



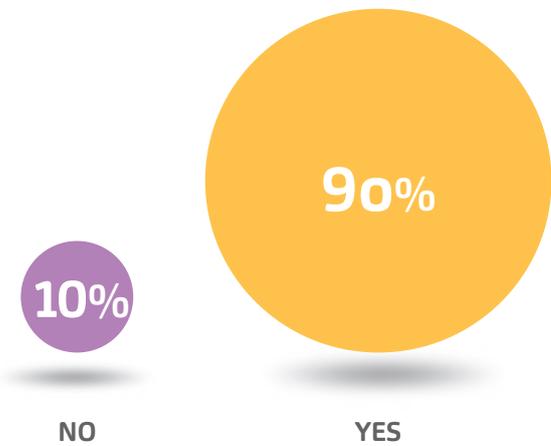
2. Are there any important aspects that you think are missing from the tool in HEARING, VISUAL or MOTOR disabilities?



3. Are there items that you did not understand or were confused about?



4. Do you think that this tool can be used to discriminate/differentiate between toys/games that are usable or unusable for a particular disability?



5. Do you consider this tool useful for your field of work?



Conclusions

Even though it requires some modifications, TUET is a useful tool for designers, engineers, teachers and therapists. All respondents considered it to be important to develop a final version of the tool to help them in their daily work.

The main decisions to improve the tool were:

- 1 To add more descriptive definitions of what is an adaptable/usable and unusable toy/game.
- 2 Include precision on the severity/type of disability (e.g. partial visual impairment - blindness/ partial hearing impairment - deafness).
- 3 Delete and/or modify items with high dispersion rates and items with low association to Gold Standard scores. Clarify the content of the sentences.
- 4 Clarify any doubts obtained in the research about toy/game analysis in the instructions.
- 5 Adjust the analysis criteria including a qualitative question in TUET.
- 6 Add the possibility to sum up the results of two or three sections in the case of multiple impairments.

For this reason, a Manual of Instructions and a new version of the TUET Questionnaire (January 2018) were created.

3.3.3. Final TUET 2018 test and refinement

A final test was carried out at the 2nd LUDI Training School “Play and Toys for All” that was held in Bergamo University, Department of Human and Social Sciences (Italy), between 22–26 January 2018. The aim of this event was the same as for the first training school: to allow participants to exchange knowledge about play in children with disabilities, societal barriers, play for the sake of play, toys and technology for play and inclusive play. A total of 48 trainees with different professional backgrounds and from European countries and some other invited countries joined the LUDI Training School.

The Toys & games Usability Evaluation Tool (version: January 2018), was tested with trainees (N=48), during two half-day workshops conducted by Odile Périno. The 48 trainees were divided into 12 groups of evaluators: 4 trainees per group. Each group evaluated 2 toys. During the first day, they evaluated 12 mainstream toys and games with low tech. The second day, the evaluations involved 6 robot-toys.

The first day’s 12 Toys and games sample were: Blinkin’ Buddies (Kid K’nex), Sound Puzzle Box (Battat), Snail (Kouvalias), Magnetic Construction (SmartMax), Blocks Duplo (Lego), Toucan (Juguettos), Brickle Colour (Korxx), Ted Carousel (Ambi Toys), Skwish (Manhattan toy), Rainstick (Hop Toys), Animal Planet (Klein) and Magic Banjo (Playskool). The second day’s 6 robot-toys sample were: Happy Dog Fur Real friends (Hasbro), Dance & Move Beat Bo (Fisher Price), Animal Cube (Magic), Sensory Ball (Fluffy), Robot Larva (Caterpillar), Xeno (Giochi Preziosi). Furthermore, 3 toys from the previous validation (carried out in Oct–Nov 2017) were included in this sample (Toucan, Blinkin’ Buddies, and Dance & Move Beat Bo).

Before the first workshop, all trainees were invited to read the TUET Manual of Instructions (January 2018 Version) before completing the TUET questionnaire. On the second day, analyses were carried out more easily because the trainees were familiar with TUET and they had already read and understood the Manual of Instructions.

The results of TUET Version January 2018 showed improved rates of concordance with gold standard evaluations, and less dispersion in TUET questions that had caused problems in the previous version. The evaluation also showed that TUET is not only useful for different types of low-tech toys and games, but also for high-tech robot-toys. These results confirmed the usefulness of the Manual of Instructions in helping evaluators to apply the tool correctly. However, some examples were added and some sentences of the questionnaire were improved in a final refinement of the tool.

3.3.4. Conclusion

The development and validation of the TUET questionnaire showed that it provides reliable and valid measures for assessing the accessibility and usability of toys and games for children with hearing, visual and upper-limb motor impairments.

The TUET questionnaire and Instruction Manual presented in this publication represent the final version of this process.

Rather than the end, this is the beginning of the life of TUET. A tool acquires consistence in its validity each time it is used. It is important to compare the results obtained with this tool and develop new studies in different countries from now on. It will also be necessary to test the French and Spanish versions in the future. More toys and games must be evaluated. Finally, more specifications related to the other types of disabilities must be added in order to address a wider range of children.



4

How and for
whom might



be useful?

4.1. How TUET might be useful for companies, engineers and designers

When a toy company decides **to produce a new toy or a new game**, it might have a category of children in mind without taking into account their particularities. Toy/game specifications sheets usually comprises the toy/game category, age-level, trends and fashions, competition, material components, and cost. With these criteria it is not possible to integrate a reflection on usability for children with disabilities when making mainstream toys.

First of all, it is important to remember that less than 10% of toys and games in the market are usable for children with disabilities without making adaptations. Second, many toys and games could be usable for children with disabilities by making small modifications. Third, these modifications can be really minor and not expensive, since they are anticipated at the beginning of the development process.

The TUET tool is useful at various points **in the creation process of a new toy/game**:

- 1) **Conceptual design phase:** TUET items offer designers an opportunity to incorporate new ideas, creating new toy concepts, focusing on novel features of a toy/game that offer added value to a new product and are easy to manage from the beginning of a project.
- 2) **Detailed design phase:** TUET items allow designers to adjust the characteristics of toy/game pieces, colours, dimensions, materials, etc., to a broader audience, to a greater target.
- 3) **Validation phase with a first prototype:** TUET is useful to check whether the design needs to be updated to assure the usability of the product.

Before the product is commercialised, the TUET recommendations ensure that a toy/game design is aligned with the users' needs, without involving high costs. For example: buttons on clothes will be swapped for Velcro; in toys for practice play, pastel colours will be changed for contrasting colours; in rule-based games, pawns will be big enough to be easily grasped.

In addition, incorporating TUET in the process of developing new toys and games is a way of **training designers in universal design features**.

Finally, **increasing the usability of a company's toy/game projects** ensures more purchase satisfaction for final consumers and a better position of the brand in the market.



4.2. How TUET might be useful for teachers

When a teacher proposes toys or games to his pupils, it means that he considers toys to have an educational value and uses them to complement the more formal education, in the cognitive, emotional and social fields. So it is essential that **all children have access to these educational tools to make the same experiments**. In addition, the inclusive school situation requires that **pupils play together, interact and express themselves during these experiences**.

Even if the play situation is not 100% inclusive, which is almost impossible, the important thing for a teacher is to be sure that each child can **find toys and games that suit him or her, to be able to play the same as the others, in the same play category, i.e. games and toys that correspond to the overall skill level of the children in the class**.

For teachers and their assistants, TUET is useful to:

- Choose or buy toys/games for all the pupils of a same classroom
- Identify those that are usable for children with visual, hearing or motor disabilities
- Allow all children to have access to educational tools to make the same experiments
- Prepare the classroom's stock of toys and games in a real inclusive approach
- Increase their knowledge of toys and games
- Have a better understanding of the needs and skills of the children with disabilities



4.3. How TUET might be useful for toy libraries

Play is a fundamental, inalienable right of children, whatever their abilities. When children play together, they recognise themselves as partners in play and their disabilities lose importance.

Toy Libraries, which welcome all kinds of children, are defined as typical **inclusive venues insofar as toys/games are cultural mediators**, at the heart of their practice. Their main mission is to enable children of all ages and all abilities to play, and make them play together. This is the reason why they must offer mainstream toys and games, usable for all, **to enable moments of shared play between children, or children and adults.**

Most of the time, toy libraries do not receive visits from individuals, but rather families or groups of players from schools or institutions. Toy librarians do not have the opportunity to get a precise knowledge of each player. They compensate by having a very good knowledge of the toys/games they offer in response to players' requests. The knowledge of toys and games requires tools for analysis, to be able **to adjust the toys offered to meet the demand as accurately as possible when players have different skills.**

TUET is a **quick to use, easy and practical tool for toy libraries** because:

- It enables them to acquire a deeper knowledge of toys and games
- It may improve their knowledge of children with disabilities and their skills and abilities
- It helps them to propose toys adapted to children's skills
- It allows them to select toys that make it easier for children to meet and play together
- It can help to organise shared moments between children and adults with a relevant toy/game
- It can help to advise families or professionals to select or buy toys and games
- It is useful for advising toy companies



4.4. How TUET might be useful in a therapeutic process

Play is about what a child wants to do freely, based upon an urge for discovering and exploring. When children with disabilities face play restrictions and social exclusion, environmental factors that constrain their play, especially regarding the accessibility or usability of toys and games, need to be identified. **Play is a fundamental occupation and a human right;** when a child is unable to play with a toy of his choice because of its lack of usability, this is an occupational injustice. Thus, **providing toys and games that enable a child to participate in play is essential.**

When it comes to accessibility and usability, it is a matter of **person-environment-occupation fit**. Therefore, it is necessary to be aware of children's personal play needs, capacities and the toy challenges that influence their play performance in order to offer them greater opportunities to participate in play. With their specific knowledge on human functioning, environmental and activity components, **occupational therapists** are in an ideal position to increase the accessibility and usability of toys and games and create an inclusive environment for play.

The TUET tool might be useful in a **therapeutic process** because:

- it is **an instrument that helps rate the accessibility and usability of a toy or game in an objective way. In the creation or selection phase of an accessible and usable toy for a specific group of children**, an objective perspective should be optimal.
- by identifying a toy's features (shape, effects, colours, textures) that can influence a child's ability to access and use it, **an occupational therapist can better support the child's play performance by choosing a toy that best matches or suits his or her functioning.**
- **it can help analyse the underlying cause of accessibility problems of toys and games.** A first prerequisite for any efficient adaptation is undeniably to verify whether or not the toy or game is adaptable. Then, if the answer is positive, the therapist can plan the adaptation for usability based on the child's capacities to interact with the toy. **With the TUET indicators in mind, the therapist can more effectively determine the best adaptation to improve the design of the toy.** The successful adaptation maximises the suitability of the toy to a child's needs, his play performance and participation, and prevents injuries.
- **It fosters the development of inclusive toys and games** that allow openness of use to suit the needs of a variety of children with various capacities, along with **the adaptation of mainstream toys**, rather than compensating children with impairments by providing them with **specialised assistive tools**, which carry a stigma. Such an approach might help the therapist define acceptable toy adaptations for the child and his/her family.



4.5. How TUET might be useful for parents

Every parent knows better than anyone else what their child can do and what his/her play and toy preferences are. This is why TUET does not initially appear to be a tool that parents might need in the family context.

However, within associations of parents of children with disabilities or family services that assist them, TUET **may give professionals an opportunity to invite families to:**

- Reflect and share on play and toys
- Discuss the value of toys
- Provide knowledge on the different types of toys and games
- Provide knowledge on how to observe mainstream toys and games
- Join in with the process of evaluation of toys and games
- Provide important information on usability and adaptability of play materials that might better support their child's play
- Encourage them to look for toys that are suitable for their child from among mainstream toys
- Lead them to become better consumers

Parents' involvement as partners in the evaluation process is a key element **to collect information** on their child's play strengths and needs, and to understand the parents' priorities, resources and expectations for their child's play. Indeed, families can **provide critical knowledge** from their unique perspective as experts of their child. They can be instrumental in **identifying adaptations** of toys that will work best for their child. Parents' involvement leads to feelings of empowerment and higher levels of parental satisfaction and well-being. It can encourage them to **feel comfortable selecting toys** to play with their child and to become advocates for accessible toys.



5

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6 Authors and collaborators

6.1. Authors

MARIA COSTA (AIJU, Valencia, Spain)



Maria Costa, PhD, has been head of the Children's Research Department at the European Technological Institute of Children's Products and Leisure (AIJU, Spain) since 1992. During these years she has directed many research projects in the areas of play, toys and games, children's development, healthy aging, etc. She has designed and started up diverse methodologies of sociological investigation. She has promoted cooperation between institutions, schools, universities and companies related to the children's products sector. She has acted as a consultant for companies in the toy sector, as well as in European public and private institutions. She has been the coordinator of the AIJU Toys and Games Guide publication for 27 years, analysing more than 4,000 toys and games with children. She has written several publications related to society, parenting, children's products, stores,

inclusive play, or children's trends. She has participated in national and international conferences related to her areas of expertise and conducted training workshops for designers and toy developers. Maria Costa is a member of the International Trend Committee at "Spielwarenmesse" (Germany). She is a management committee member of the European LUDI COST Action, focused on "Play for children with disabilities" 2014–2018.

ODILE PÉRINO (FM2J, Lyon, France)



Odile Périno has been a play, toys and games specialist for 30 years and she is attached to the FM2J, Play Training centre (www.fm2j.com). She has founded several play centres, always with an inclusive orientation related to the children with disabilities. First, for children with a migrant background; second for all ages and contexts, including detained adolescents as well as elderly people; then, a toy and book library, and finally a play centre for all. From these different venues she observed inclusive play situations and supervised several non-academic studies including "Play within rehabilitation centres". She defined and published the original concept of "play framework" for setting up play spaces inside toy libraries, rehabilitation centres, schools and institutions. In 2007, she founded the FM2J Play Training centre which provides national professional certificates and offers specialised

training courses on play, toys and games. Among the games created by Odile Périno, Trapenum is a fun game for blind and sighted people to play together. Current publications: toys and games analyses and advice at www.enfanttoys.com. She is a management committee member of the LUDI COST Action "Play for children with disabilities".

SYLVIE RAY-KAESER (HES-SO EESP, Lausanne, Switzerland)



Sylvie Ray-Kaeser is an Occupational Therapist (OT). She has worked for over 20 years in clinical and community-based child and family intervention teams, specialising in children with neurodevelopmental disorders and their occupations. In 2008, she joined the University of Applied Sciences and Arts of Western Switzerland, School of Social Work and Health, Occupational Therapy Department in Lausanne as Associate Professor (www.eesp.ch). She coordinates the "OT with children" programme. Her teaching interests are in the assessment of children's abilities, activities and participation, in methods of intervention and application of knowledge to practice. Her research is primarily concerned with the screening and play assessment of children with developmental coordination disorder and with the cross-cultural adaptation of instruments; she has authored many papers and book chapters on these

topics. Sylvie Ray-Kaeser is a management committee member of the LUDI COST Action "Play for children with disabilities" and co-editor of the LUDI guidelines (2018) for supporting the play of children with disabilities.

6.2. Collaborators

ANDREA BONARINI (AIRLab, Politecnico di Milano, Italy)

Andrea Bonarini is the Coordinator of AI and Robotics Lab (AIRLab) at Politecnico di Milano. Politecnico di Milano is one of the top Technical Universities in Europe. AIRLab established in 1973, supports the activities of 10 tenured professors about 20 PhD students and research assistants, more than 60 master theses and more than 100 student projects per year, in Artificial Intelligence, Robotics, and Machine Learning.

Andrea Bonarini works since the mid Eighties on Human-Machine Interaction, focusing in the last years on playful interaction, and entertainment. He is developing emotional objects and robogames, where autonomous robots can play physical games with people, and are designed to obtain engagement and enjoyment in playing activities. A natural evolution of the past activities supporting people with disabilities (autonomous wheelchairs, special interfaces) has been the development of robogames for all, tested in assistive structures. A multi-faceted robot, Teo, was awarded the prestigious Kazuo Tamie Award in 2016. He serves as vice-coordinator of the Workgroup on Tools and technologies for the play of children with disabilities of the LUDI COST Network.

HELEN LYNCH (UCC, Cork University, Ireland)

Helen Lynch, PhD is an Occupational Therapist (OT) who has worked for 20 years with families and children with special needs, specialising in Developmental Coordination Disorder, sensory integration, and play occupation. She completed a master's degree (2007) and PhD (2012) researching time-use and children's occupations, and exploring play environments in the homes of infants under two.

In 2004, Dr Lynch joined the Department of Occupational Science and Occupational Therapy (OSOT) in UCC, Cork Ireland as lecturer and Director of the Graduate Studies programme. The Department of OSOT is a leading centre of research on play occupation in Ireland: Dr Lynch is currently leading a team researching Universal Design for social inclusion in community parks and playgrounds, funded by the National Disability Authority: Centre for Excellence in Universal Design (2017–2018). Dr Lynch is a management committee member of the LUDI COST Action: Play for Children with Disabilities 2014–2018.

NICOLE BIANQUIN (University of Aosta Valley, Italy)

Nicole Bianquin, PhD, works at the Department of Human and Social Sciences of the University of Aosta Valley, Italy. This University brings together the three formerly separate Faculties of Psychology, Education and Modern Languages and Communication. The diverse teaching and scientific backgrounds that converge have in common a strong vocation for sector-specific advanced training. In fact, the areas of expertise covered by the Department belong to the broad family of social sciences and humanities and are understood not just as an occasion for scientific and theoretical research, but also as an opportunity for professionalisation.

Dr Bianquin's area of expertise is focused on special education and didactics, namely promoting the importance of play as a driver for development among teachers and parents. She assists educators and leads them to understand the importance of play in itself, also for children with disabilities, specifically by making them aware of—and recommending—strategies, techniques, scenarios and toys (available on the market or adapted) in order to increase the capacity and opportunity to play. She is a member of WG1 – Children's play in relation to the types of disabilities, in LUDI COST Action.

VERONICA MONTANARO (University of Malta)

Veronica Montanaro is a Speech and Language Pathologist, visiting assistant lecturer at the University of Malta. She has great expertise in the area of Augmentative and Alternative Communication. She is working in a resource centre for children with PMLD, in Birkirkara, Malta, which also provides training workshops to parents, carers and professionals, as well as consultation for individuals requiring AAC as a means of communication.

She has also carried out research on how young children learn to use iPads. This study has provided insight into the way children under the age of three use an iPad. It may also be beneficial to target specific skills that may be lacking in children who need to use the iPad functionally. She is a management committee member of the LUDI COST Action: Play for Children with Disabilities 2014–2018.

RIANNE JANSENS (Zuyd University, Heerlen, The Netherlands)

Rianne Jansens is a paediatric occupational therapy lecturer at the Occupational Therapy education program of Zuyd University: teaching about play for typically developing children and children with disabilities. She is experienced in providing therapy interventions, in counselling parents and professionals, in taking part in research teams regarding diverse groups of children/youngsters with disabilities in diverse settings, e.g. school, home, community. Zuyd University of Applied Sciences, offers more than 50 Bachelor degrees, about 15 Master's education programmes, and several post graduate courses in the social, technology, arts, economic and management domains.

At the University, thematic research centres carry out applied research in close cooperation with professionals in the field, local governments and companies to support innovations. Knowledge transfer, evaluation research and implementation activities, often together with students, are our scope in order to contribute towards societal changes in the region. In particular, the Research Centre for Assistive Technology in Health Care plays an important role in initiating and stimulating innovation in long-term care for children, adults and the elderly to meet their needs in daily living. Rianne Jansens is an MC member of LUDI COST Action for the Netherlands, chairing Working Group 2 on Tools and technology for the play of children with disabilities.

PALOMA MONTOTO (ONCE, Alicante, Spain)

Paloma Montoto started working at the Espiritu Santo College for the Blind and Visually Impaired more than 20 years ago. She is currently working as an integrated education teacher at the CRE Alicante (Spain). Her expertise is focused on children with visual disabilities, and on providing training and consulting to parents, teachers and children themselves. She has illustrated several assistance exercise books written by A. Vallés Arándiga related to visual stimulation. She participated in the book "Braille's didactics beyond the code: New perspectives in the visually impaired student body literacy", published by ONCE in 2015. She collaborated with the "Braitico" Braille method elaboration in 2017. She is part of a team that, since 2017, has been working on assessing families in play, toys and games in collaboration with AIJU.

The National Organisation for the Spanish Blind (O.N.C.E.) is a non-profit organisation which has existed since 1938. Its work is dedicated to improving the quality of life of all that people who are blind or visually impaired throughout Spain.

CARMEN CAÑIZARES (CEAPAT, Albacete, Spain)

CEAPAT is the State Reference Centre for Personal Autonomy and Technical Aid in Spain. It was created by Ministerial Order in 1989, as a Centre maintained by The Institute of Social Services and the Elderly. In 2006, Ceapat became part of the network of State Reference Centres (CRE), established by Law 39/2006, to promote personal autonomy and care for people in situations of dependency. The CREs respond to the objective of offering quality social services to assist people in situations of dependency and their families. These reference centres are key to the promotion and exchange of knowledge, professional training and provision of highly qualified services.

Carmen Cañizares is an Occupational Therapist dedicated to informing, counselling, evaluating and training people with special needs from CEAPAT in Albacete. She has experience and knowledge about use and adaptation of toys and games for inclusion intervention. She is part of a team that has been working for over 10 years on assessing families in play, toys and games.

Other collaborators in TUET Development and Validation: Noemí Rando, M^a José Martínez, Eloy Hurtado, Adriana Mera, Raúl Esteban, Clara Blasco, Encarna Torres, Olga Zabala, Rocío Abril, Sonia Torres, Ángela Vigara y Nieves Cabrero.

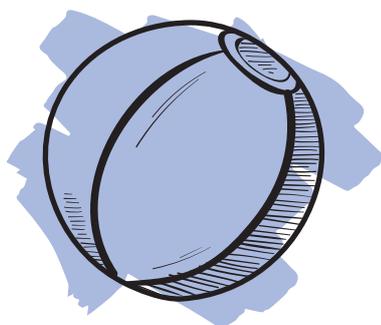
English translation & proofreading by: James Hunt.

7 Annex 1. C.O.L. Classification: Toy and game categories

C.O.L. Simplified Toys and Games Classification

by FM2J, Play Training Centre - Lyon - France (www.fm2j.com)

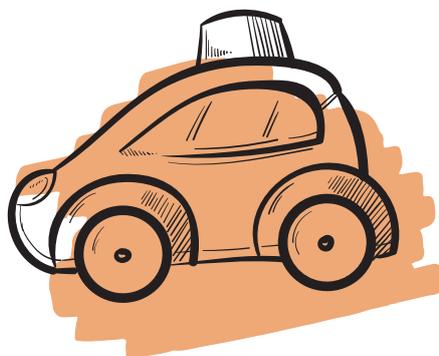
Toys for Practice Play		
<i>Toys used during sensory and motor activities in order to obtain pleasant effects or immediate results.</i>		
Sensory Toys	Toys used during iterative play experience involving one or more of the five senses: sight, hearing, touch, smell or taste.	 1
Motor Toys	Toys used during iterative play experience involving locomotive movements for the whole body.	 2
Handling Toys	Toys used during iterative play experience involving hand movements such as grabbing, squeezing, hitting, tying, threading, shaping, emptying, filling, drawing, etc.	 3



Toys for Symbolic play

Toys for Symbolic play, leading the player to recreate an action, an event or a situation using his imaginative world according to his perception of reality.

<p>Role-play toys</p>	<p>Toys used by the child to try and imitate a person, an animal or an event with life-sized items. It leads the child to play as an actor.</p>	 <p>4</p>
<p>Staging toys</p>	<p>Toys used to represent a specific situation or event. The child leads the scene as a director without a predetermined scenario.</p>	 <p>5</p>
<p>Representation toys</p>	<p>Toys used to represent a thing, a character or a situation by the production of drawings, paintings, arrangements or modelling.</p>	 <p>6</p>



Rule-based games

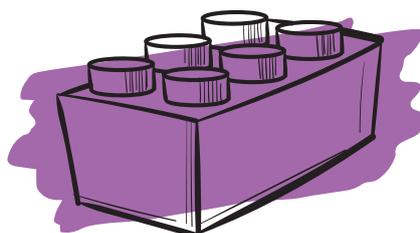
Rule-based games involve a set of instructions or norms that players must know and follow in order to achieve the intended objective.

<p>Association games</p>	<p>Games that consist in comparing or bringing together two or more identical or different elements according to certain predefined criteria.</p>	 <p>7</p>
<p>Circuit games</p>	<p>Games that consist in moving along circuits, pathways, tracks which may or may not be pre-established. Each move within the game has a function, which is represented by a special square, such as traps, speeding-up or stopping boxes, etc.</p>	 <p>8</p>
<p>Expression games</p>	<p>Games that consist in expressing thoughts or feelings through any form of expression such as gestures, mimes, words, writings or drawings.</p>	 <p>9</p>
<p>Combination games</p>	<p>Games that consist in arranging items according to a precise order to create a whole unit.</p>	 <p>10</p>
<p>Skill and sports games</p>	<p>Games that require the use of physical skills towards a set goal, after an initial analysis of the situation (ring toss, etc.).</p>	 <p>11</p>
<p>Strategy games</p>	<p>Games that consist in analysing a situation or a layout to implement an action plan before making a tactical move.</p>	 <p>12</p>
<p>Chance Games</p>	<p>Games where the player(s) makes decisions or undertakes actions in a random manner.</p>	 <p>13</p>
<p>Question-answer games</p>	<p>Games that consist in finding the answer to a set question according to different topics (history, cinema, music, literature, geography, arts, sports, sciences, etc.).</p>	 <p>14</p>

Toys for Assembling play

Separate pieces that can be put together in order to build up a new creation.

Construction toys	<p>Individual play items that create a three-dimensional unit (length, width and depth) once put together. The player applies various techniques such as building-up, locking together, etc.</p>	 <p>15</p>
Positioning toys	<p>Individual play items that can be put together to create a two-dimensional whole (length and width), using a variety of different techniques such as juxtaposing, threading, etc.</p>	 <p>16</p>
Experiment toys	<p>Individual play elements that can be mixed to experience chemical and physical phenomena: electricity, magnetism or optics.</p>	 <p>17</p>
Production toys	<p>Individual play elements that can be mixed to produce an end-result of a culinary, handicraft or artistic nature.</p>	 <p>18</p>



From AIJU Toy guides 2002–2017:

1 Octotunes (Lamaze/Tomy); **2** First bike (Chicco); **3** El Pulpo loco (Diset); **4** Nenuco Doctora (Famosa); **5** School (Playmobil); **6** Play-Doh Touch shape studio (Hasbro); **7** Lince (Educa Borrás); **8** Parchís (Falomir); **9** Pictionary (Mattel); **10** Glotones (Ludilo); **11** Fútbolín Multigames (Ocio Trends); **12** Catan Junior (Devir); **13** Squawk (Mattel); **14** Quizzers (Cayro Games); **15** Eco mega bolsa (Megablocks); **16** Superpegs Mini (Miniland); **17** Cristalcefa (Cefa); **18** Aquabeads (Epoch).





8 Annex 2. Manual
& Questionnaire,
French version

8.1. Généralités

8.1.1. Qu'est-ce que le TUET?

Le TUET (Toys & games Usability Evaluation Tool) est une méthode d'analyse des caractéristiques physiques des matériels de jeu en fonction des besoins des enfants ayant une déficience auditive, visuelle ou motrice des membres supérieurs.

8.1.2. Pourquoi le TUET a-t-il été créé?

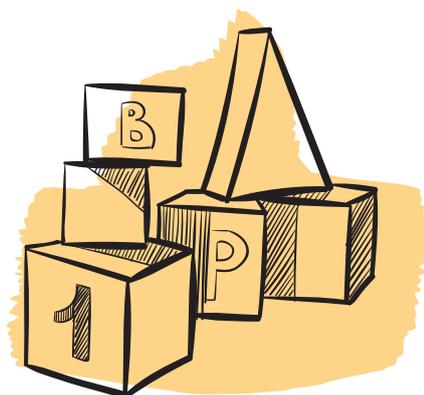
Le TUET a été créé d'une part parce que les précédentes recherches menées par AIJU et FM2J sur les jouets et les jeux grand public ont régulièrement montré leur manque d'accessibilité et des difficultés d'utilisation pour les enfants ayant une déficience auditive, visuelle ou motrice et, d'autre part, parce que les parents mais aussi les thérapeutes sont à la recherche de supports matériels de jeu plus facilement utilisables par ces enfants.

De 2007 à 2017, 2866 jouets et jeux grand public ont été analysés par AIJU en collaboration avec ONCE et CEAPAT. Seulement 21% d'entre eux sont utilisables par des enfants ayant des déficiences motrices, 44% par des enfants ayant des déficiences visuelles et 86% par des enfants ayant des déficiences auditives lorsqu'ils sont proposés sans adaptation ou sans aide extérieure pour jouer. De plus, seulement 5% de ces jouets sont accessibles pour les 3 déficiences simultanément. En France, le pourcentage annoncé par FM2J est similaire. Parmi les 1600 jouets et jeux que FM2J a analysés à partir de 1996, seulement 8% ont reçu la mention « Handilud » indiquant que le jouet est considéré comme utilisable par des enfants en situation de handicap.

8.1.3. Quelles sont les fondements théoriques du TUET?

Le TUET est fondé sur les principes du Design Universel et sur les précédentes recherches sur les jouets, les jeux et les enfants en situation de handicap menées par FM2J (1996–2017), AIJU (1991–2017), ONCE (2007–2017), CEAPAT (2007–2017), Lekotek (1980–2017) et l'Université de Buffalo à travers son projet « Let's Play Projects » (1995-2006).

Le Design Universel est une philosophie pour concevoir des produits utilisables par tous et pour le plus large éventail possible d'habiletés fonctionnelles. Chaque enfant est différent, non seulement en termes d'habiletés, mais aussi d'activités et d'intérêts de jeu ; imaginer qu'un produit puisse être utilisable par tous n'est tout simplement pas réaliste. Cependant, plus un jouet ou un jeu est doté d'un Design Universel, plus il est facile d'utilisation pour un grand nombre d'enfants, y compris les enfants en situation de handicap.



Fiche technique	
Titre	Toys & games Usability Evaluation Tool (TUET).
Auteurs	Costa, M. (AIJU), Périno, O. (FM2J), Ray-Kaeser, S. (HES-SO EESP).
But	Passer en revue les caractéristiques d'un jeu ou d'un jouet pour décider s'il peut être utilisé par un groupe d'enfants ayant une déficience auditive, visuelle ou motrice des membres supérieurs.
Utilisateurs	Créateurs de jouets et de jeux, ingénieurs, enseignants, ludothécaires, thérapeutes ou parents .
Domaine d'application	Jouets et jeux, high Tech ou non, prototypes ou produits commercialisés qui possèdent des éléments matériels .
Durée d'une analyse	De 10 à 30 minutes selon la complexité du matériel de jeu et l'expérience du TUET déjà acquise par les évaluateurs.
Supports	PDF ou version papier.



8.2. Structure du questionnaire, définitions et instructions d'utilisation du TUET

Le TUET se compose de 33 items. La première partie (A) du TUET définit les spécificités du jouet ou du jeu en cours d'évaluation. La seconde partie sert à évaluer si le jouet ou le jeu est utilisable pour un groupe d'enfants déterminé à partir de 3 tableaux. Chacun d'entre eux concerne l'une de 3 déficiences suivantes: 1. auditive, 2. visuelle, 3. déficience motrice des membres supérieurs.

Les définitions et instructions suivantes permettent de remplir plus facilement le questionnaire

8.2.1. A: Analyse du jouet ou du jeu

Avant de commencer l'analyse d'un jouet ou d'un jeu, il est indispensable de l'examiner, de le manipuler, de jouer avec et de décrire ses principaux aspects. L'analyse doit être faite avec précision en observant chaque facette et chaque fonction du jouet pour répondre aux questions A1, A2 et A3. C'est bien le jouet ou le jeu qui doit être évalué et pas la boîte ou l'emballage.

A1. Nom du jouet/jeu et nom du fabricant: écrire le nom du jouet/jeu et du fabricant comme ils sont écrits sur la boîte.

A2. But du jeu avec le jouet/jeu: décrire la finalité du jeu telle qu'elle est donnée par le fabricant et/ou se demander d'où vient le plaisir de jouer avec ce jouet ou ce jeu. Les exemples suivants avec les voitures-jouets illustrent les différentes finalités de jeu:

Exemple 1: Une voiture qui a la forme d'un téléphone avec des roues pour obtenir des effets visuels et sonores.

Exemple 2: Une petite voiture réaliste pour jouer au garage, au circuit, etc.

Exemple 3: Une voiture en carton pour jouer sur un jeu de plateau.

Chacun de ces jouets correspond à une activité de jeu particulière, en rapport avec un ensemble d'habiletés.

A3: Catégorie du jouet ou du jeu selon le classement C.O.L: Au vu des 3 exemples ci-dessus, la voiture-téléphone est un support pour le jeu d'éveil (jeu d'exercice), la petite voiture réaliste est un support pour le jeu symbolique et la voiture en carton permet de jouer à un jeu de société. Les jouets et les jeux peuvent donc être classés en 4 catégories principales: jouets pour le jeu d'exercice, jouets pour le jeu symbolique, jeux de règles ou jouets pour le jeu d'assemblage. Pour chaque jouet/jeu, il faut donc cocher l'une ou l'autre de ces catégories. Pour décider d'une catégorie et d'une seule, il est nécessaire de déterminer quel est le but du jeu qui prédomine pour ce jouet ou ce jeu.

8.2.2. B. Facilité d'utilisation du jouet ou du jeu pour des enfants ayant une déficience auditive, visuelle ou motrice

Les jouets et les jeux doivent être évalués en tenant compte d'un public déterminé. Si les enfants sont malvoyants, l'analyse ne sera pas identique à celle qui serait faite pour des enfants non voyants. L'évaluation diffère selon que le jouet ou le jeu s'adresse à des enfants ayant une déficience motrice des membres supérieurs ou à des enfants sourds. C'est pourquoi l'analyse des jouets/jeux se fait à partir de 3 tableaux séparés, chacun en rapport avec un type de déficience.

Tableau 1. Déficiences auditives: malentendants - sourds

Les déficiences auditives sont des pertes d'audition qui empêchent l'oreille de percevoir la totalité des sons. Les causes peuvent être congénitales ou acquises après la naissance. Les enfants ayant des déficiences auditives peuvent rencontrer des difficultés en lecture ou de compréhension des concepts mathématiques.

- Les personnes malentendantes ont une perte d'audition légère ou modérée ou une déficience auditive dite partielle qui peut toucher une ou deux oreilles. Ceci entraîne des difficultés pour suivre une conversation ou pour entendre des sons forts.
- Les personnes sourdes ont une perte d'audition profonde ce qui équivaut à une capacité d'audition très faible ou absente.

Caractéristiques requises pour les jouets ou les jeux

Les enfants ayant une déficience auditive peuvent accéder à un grand nombre de jouets et de jeux et ont besoin de moins adaptations que les enfants avec une déficience visuelle ou motrice. La difficulté provient de jouets et de jeux qui produisent du son.

Dans cette situation et **pour tous les niveaux de déficience auditive**, les effets sonores doivent s'accompagner d'autres effets (lumières, images, mouvements, vibrations, etc.). Les messages oraux doivent être doublés de messages écrits. Pour les jeux de règle, les explications écrites ou dessinées doit être faciles à comprendre.

Enfin, il doit être possible de régler le volume sonore d'un jouet selon les capacités auditives résiduelles de l'utilisateur ou d'ajouter des écouteurs.

Table 2. Déficiences visuelles: malvoyants – non voyants / daltoniens

Les déficiences visuelles sont des pertes partielles ou totales de la vue. Leur origine peut être prénatale (anomalies congénitales), périnatale (prématurité, asphyxie) ou postnatale (traumatismes par accidents ou tumeurs). Il y a 4 niveaux de déficience visuelle: légère, modérée, sévère et profonde.

- Les personnes malvoyantes ont une déficience visuelle modérée à sévère.
- Les personnes non voyantes ont une perte visuelle totale ou presque.

Le daltonisme est une anomalie génétique de la perception des couleurs, généralement rouge et vert, parfois bleu. La plupart des enfants atteints sont des garçons; ils sont capables de voir les objets avec netteté mais ne sont pas capables de différencier ces couleurs.

Caractéristiques requises pour les jouets ou les jeux

Le déficit visuel engendre une moindre motivation à utiliser les objets ainsi qu'une certaine passivité. Les parents et aidants doivent susciter l'intérêt du jeu en invitant les enfants à manipuler les jouets, en leur indiquant où ils se trouvent, à quoi ils ressemblent et comment les utiliser.

Pour tous les niveaux de déficience visuelle, le jouet/jeu doit s'accompagner d'effets sensoriels (sons, vibrations, mouvements, odeurs, textures, etc.) de façon à motiver et guider l'enfant pour atteindre le but du jeu avec ce jouet/jeu. Ces effets sensoriels doivent être réalistes et reconnaissables au toucher ou à l'audition lorsque la déficience visuelle est sévère ou profonde.

Pour les enfants malvoyants, le jouet ou le jeu doit être de couleurs vives et/ou très contrastées. Les éléments nécessaires à son utilisation (boutons, poignées, etc.) doivent être de couleurs bien différenciées du support ou du fond. Le jouet/jeu doit comporter des textures, reliefs, lumières et matériaux différents qui soient appropriés à la finalité ou au but du jouet/jeu:

Exemple 1: Poupée à habiller. Des vêtements de différentes textures vont aider l'enfant à les identifier et à les enfiler correctement.

Exemple 2: Poupée de chiffon. Quand elle est fabriquée avec différents tissus, il est plus facile d'identifier les parties du corps.

Le jouet doit également avoir une structure compacte et une base suffisamment large pour assurer sa stabilité.

Pour les enfants non voyants, le jouet/jeu doit avoir une forme réaliste et reconnaissable, et ses composants (poignées, boutons, interrupteurs, connecteurs, illustrations, etc.) doivent être facilement identifiables au toucher. Les éléments du jouet/jeu ou les accessoires (cubes, vêtements etc.), doivent pouvoir être placés dans un compartiment prévu à cet effet ou être assez volumineux pour rester à portée de la main de l'enfant.

Pour les enfants atteints de daltonisme, le rouge et le vert ne doivent pas être utilisés en même temps dans les jeux de société.

Tableau 3. Déficience motrice des membres supérieurs

La déficience motrice des membres supérieurs est une atteinte physique transitoire ou permanente diminuant les capacités fonctionnelles des bras et des mains. Elle peut être congénitale ou acquise. Elle est souvent la conséquence d'une paralysie cérébrale infantile, d'une amyotrophie spinale ou d'un traumatisme crânien. Les niveaux de déficience (légère, modérée, sévère) sont dépendants de:

- L'étendue de la déficience (ex. un ou deux membres, la présence de spasme).
- La manière d'utiliser ses mains en maniant des objets. Les exemples suivants sont adaptés de la classification de l'habileté manuelle www.macs.nu:

Atteinte légère: manipulation de la plupart des objets avec une qualité et/ou une vitesse quelque peu réduite.

Atteinte modérée: manipulation des objets difficile.

Atteinte sévère: manipulation d'une sélection limitée d'objets faciles à utiliser et faible capacité à réaliser des actions simples.

Caractéristiques requises pour les jouets et les jeux

La manière de jouer des enfants avec une déficience motrice dépend surtout de leur mobilité et de leur capacité de déplacement, ainsi que du type de ressources à disposition. La plupart rencontrent des difficultés à manipuler les jouets et les jeux. Ceux que les enfants peuvent contrôler par eux-mêmes sont à privilégier.

Pour les enfants avec une déficience motrice légère à modérée, les jouets et les jeux doivent être faciles à manipuler. Les parties importantes du jouet/jeu comme les poignées, boutons, interrupteurs, connecteurs, etc. doivent être faciles à presser, tourner, insérer, attraper, enclencher, etc. Les dimensions et le poids des différents éléments du jouet ou du jeu doivent permettre aux enfants de jouer facilement avec. De plus, le jouet ou le jeu doit être suffisamment souple ou rembourré pour éviter des chocs douloureux.

Les enfants avec une déficience sévère ont besoin de jouets offrant des possibilités de prises permettant de les maintenir dans différentes positions. Leurs composants doivent être faciles à assembler, avec des éléments de jonction comme du Velcro ou des aimants. Les jouets et les jeux doivent avoir une structure solide et une base suffisamment large pour assurer leur stabilité. Leurs dimensions doivent permettre à un enfant en fauteuil roulant d'y accéder ou offrir la possibilité d'être séparés en plusieurs parties. Ces parties ne devraient pas être de taille inférieure à 2 cm de longueur, largeur et profondeur.

Pour un enfant ayant une déficience motrice, être capable d'activer un jouet en pressant sur un bouton-poussoir est une première étape qui ouvre l'accès à l'utilisation d'autres dispositifs : ordinateur, tablette, télécommande ou interrupteur. C'est pourquoi il est hautement recommandé de proposer des jouets qui ont des boutons sur lesquels l'enfant peut s'appuyer pour les mettre en action ou qui permettent l'ajout de contacteurs externes.

8.2.3. Comment remplir les 3 tableaux?

Questions en caractères gras : 1.1.1. / 2.1.1. / 3.1.1.

Pour répondre aux questions en gras 1.1.1. / 2.1.1. / 3.1.1. il faut prendre en considération le niveau de déficience du groupe d'enfants considéré. Si ces enfants ne peuvent pas atteindre le but du jeu inhérent à un jouet particulier (A2), la réponse est NON car ils n'auront pas de plaisir à jouer avec cet objet. Dans ce cas, le mieux est de leur proposer un autre jouet/jeu. Ces questions en gras sont très importantes pour décider de la suite car elles mettent en lumière la concordance possible ou non entre les capacités d'enfants avec une déficience particulière et la finalité d'un jouet.

Réponses "Oui", "Non" ou "Ne s'applique pas"

La première étape de l'analyse consiste à vérifier si la question est pertinente pour le jouet/jeu. Par exemple, pour la déficience visuelle, question 2.2.3. : « Dans les jeux de plateau, les couleurs rouge et vert ne sont pas utilisées en même temps pour éviter les problèmes liés au daltonisme », si le jouet à analyser n'est pas un jeu de plateau, il faut cocher la case « Ne s'applique pas » et passer à la question suivante. Autre exemple pour la déficience auditive, question 1.2.1. : « Les effets sonores sont associés à d'autres effets (lumières, images, mouvements, vibrations, etc.) ». Si le jouet à évaluer ne comporte aucun élément sonore, comme une poupée qui ne parle pas, il faut alors cocher la case « Ne s'applique pas ». Si le jouet fait du bruit, ce sont les cases « Oui » ou « Non » qui doivent être cochées selon que le jouet ou le jeu correspond à cette affirmation ou non.

Calcul des résultats de l'analyse

Pour finir l'analyse, il faut additionner les réponses "Oui" et les "Non" en ignorant celles des « Ne s'applique pas » et noter le total au bas de chaque colonne. Ceci permet d'estimer si le jouet ou le jeu est « **Utilisable** » (davantage de réponses dans la colonne « OUI » que dans la colonne « NON »), ou « **inutilisable** » (davantage ou le même nombre de réponses dans la colonne « NON » que dans la colonne « OUI »).

Plus le nombre de réponses positives est important, meilleures sont les possibilités d'utilisation pour les enfants concernés. Dans les cas de déficiences associées, les résultats de plusieurs tableaux peuvent être additionnés.

Quand les réponses sont positives dans les 3 tableaux, ceci signifie que le jouet ou le jeu est facile à utiliser et qu'il peut être proposé à un large panel d'enfants avec ou sans déficiences.

Cependant, avec certains groupes d'enfants il peut être nécessaire d'avoir une approche plus qualitative. En effet, malgré un nombre de « Oui » élevé, on peut estimer qu'un jouet est inutilisable car il ne remplit pas un critère essentiel pour que les enfants puissent jouer avec. L'évaluation devrait se faire selon le contenu des réponses plutôt que sur la simple addition des « Oui » et des « Non ». Il est indispensable de garder à l'esprit le but du jeu pour l'évaluation finale. En règle générale, quand les résultats quantitatifs font hésiter entre « Inutilisable » et « Adaptable », il est recommandé de conserver le résultat « Adaptable » et de proposer des solutions pour adapter le jouet ou le jeu.

Evaluation : Utilisable / Inutilisable / Adaptable

Un jouet/jeu est **utilisable** pour un groupe d'enfants donné quand il peut être utilisé selon sa finalité première et pour le plaisir de jouer.

Un jouet/jeu est **adaptable** s'il peut devenir utilisable avec une simple modification qui n'altère pas sa fonction première ou le but du jeu. Exemple d'adaptation : ajouter des morceaux de Velcro colorés aux boutons d'un jouet pour qu'ils soient mis en évidence et plus faciles à reconnaître. Mais quand une poupée est de trop petite taille et qu'il est nécessaire de proposer une poupée plus grande, alors il ne s'agit plus d'adaptation mais d'un autre jouet!

Certains jouets/jeux sont manifestement **inutilisables** par certains enfants. La meilleure chose à faire dans ce cas c'est d'essayer de trouver un jouet ou un jeu de la même catégorie (A3 – C.O.L) et qui soit utilisable par ces mêmes enfants.

Enfin, il faut rappeler que le TUET n'est qu'un outil ! Il peut être une aide significative pour créer ou sélectionner des jouets et des jeux pour le plaisir de jouer mais il ne peut pas remplacer les choix des adultes ayant une connaissance des enfants et de leurs capacités.

Évaluateur: Nom ou code _____ Date _____

A.1 **Nom du jouet/jeu:** _____ Fabricant _____

A.2 **But du jeu avec le jouet/jeu:** Dans ce jouet/jeu, quel est l'élément principal qui suscite le plaisir de jouer? (Par exemple, pour une balle, le plaisir du jeu est de la lancer, de l'attraper, de la faire rebondir, etc.).
Lister par ordre d'importance les différents éléments qui peuvent susciter le plaisir de jouer pour préciser quel est le but ou la finalité du jeu avec ce jouet/jeu. Garder ce but en tête lors de l'analyse finale du jouet/jeu.

A.3 **Catégorie du jouet/jeu: Comment classeriez-vous ce jouet/jeu?**
Cocher l'une des 4 catégories du classement C. O. L. Pour choisir une catégorie, il est nécessaire de vérifier quel est le type de jeu qui prédomine avec ce jouet/jeu.

- Jouets pour le jeu d'exercice:** Jouets utilisés dans des activités sensorielles et motrices pour le plaisir d'obtenir des effets ou des résultats immédiats. (Jouets d'éveil sensoriel / Jouets de motricité / Jouets de manipulation).
- Jouets pour le jeu symbolique:** Jouets qui permettent au joueur de reproduire ou d'inventer des actions, des situations, des événements, des scènes selon son imagination et en s'inspirant de la connaissance et de la compréhension qu'il a de la réalité (Jouets de rôle / Jouets de mise en scène / Jouets de représentation).
- Jeux de règles:** Jeux qui comportent un ensemble de conventions et d'obligations supposant l'adhésion des joueurs. Il s'agit souvent de jeux collectifs (Jeux d'association / Jeux de parcours / Jeux d'expression / Jeux de combinaison / Jeux d'adresse et de sports / Jeux de réflexion et de stratégie / Jeux de hasard / Jeux de questions-réponses).
- Jouets pour le jeu d'assemblage:** Eléments de jeu que l'on réunit en vue de réaliser un nouvel ensemble (Jeux de construction / Jeux d'agencement / Jeux d'expérimentation / Jeux de fabrication).

B. FACILITE D'UTILISATION D'UN JOUET/JEU

Tableau 1 **Items concernant les enfants ayant une DÉFICIENCE AUDITIVE**
Malentendant – sourd

1.1 FINALITÉ DU JEU AVEC LE JOUET/JEU

1.1.1 Le but du jeu avec ce jouet/jeu peut être atteint en utilisant principalement des capacités visuelles et motrices ou des capacités auditives résiduelles (gardez en tête le degré d'incapacité auditive de votre public et répondez OUI si vous estimez qu'il peut avoir du plaisir à jouer avec ce jouet/jeu).

OUI NON

1.2 EFFETS SENSORIELS

- 1.2.1. Les effets sonores sont associés à d'autres effets (lumières, images, mouvements, vibrations, etc.).
- 1.2.2 Le volume sonore peut-être contrôlé et/ou il est possible de brancher des écouteurs.
- 1.2.3 Les messages parlés sont intelligibles et/ou accompagnés d'une version écrite.
- 1.2.4. Dans les jeux de règle, les explications écrites sont faciles à comprendre pour votre public.

NE S'APPLIQUE PAS	OUI	NON
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

OUI NON

CONCLUSION: Pour un enfant avec une déficience AUDITIVE, le jouet/jeu est :

UTILISABLE INUTILISABLE ADAPTABLE

Y a-t-il des adaptations possibles ne modifiant pas le but du jeu avec ce jouet/jeu? Si oui, lesquelles?

Tableau 2 Items concernant les enfants ayant une DÉFICIENCE VISUELLE Malvoyant – non-voyant / Daltonien

<p>2.1 FINALITÉ DU JEU AVEC LE JOUET/JEU</p> <p>2.1.1 Le but du jeu avec ce jouet/jeu peut être atteint en utilisant principalement des capacités auditives et motrices ou des capacités visuelles résiduelles (gardez en tête le degré d'incapacité visuelle de votre public et répondez OUI si vous estimez qu'il peut avoir du plaisir à jouer avec ce jouet/jeu).</p>	<table border="1"> <tr> <td></td> <td>OUI</td> <td>NON</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		OUI	NON		<input type="checkbox"/>	<input type="checkbox"/>												
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<p>2.2 COULEURS ET TEXTURES</p> <p>2.2.1 Le jouet/jeu a des couleurs vives ou très contrastées (jaune et bleu marine / noir et blanc / blanc et rouge).</p> <hr/> <p>2.2.2 Les éléments nécessaires à l'utilisation du jouet/jeu (boutons, poignées, orifices) sont bien contrastés et/ou se différencient facilement de la couleur du fond.</p> <hr/> <p>2.2.3 Dans les jeux de plateau, les couleurs rouge et vert ne sont pas utilisées en même temps (daltonisme).</p> <hr/> <p>2.2.4 Le jouet/jeu comporte des textures, reliefs, lumières et matériaux différents qui sont appropriés à la finalité du jouet/jeu.</p>	<table border="1"> <tr> <td>NE S'APPLIQUE PAS</td> <td>OUI</td> <td>NON</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	NE S'APPLIQUE PAS	OUI	NON	<input type="checkbox"/>														
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<p>2.3 FORMES ET COMPOSANTS</p> <p>2.3.1 Le jouet/jeu (structure globale) a une forme réaliste et reconnaissable, facilement identifiable au toucher.</p> <hr/> <p>2.3.2 Les composants du jouet/jeu tels que les poignées, boutons, interrupteurs, connecteurs, illustrations, etc. sont facilement identifiables au toucher.</p> <hr/> <p>2.3.3 Le jouet/jeu a une structure suffisamment compacte ou un système pour maintenir les pièces ensemble qui permet de jouer sans qu'elles ne se détachent par hasard.</p> <hr/> <p>2.3.4 Le jouet/jeu a une base suffisamment large pour assurer sa stabilité.</p> <hr/> <p>2.3.5 Les éléments composant le jouet/jeu ou les accessoires (cubes, vêtements, etc.), sont placés dans un compartiment prévu à cet effet ou sont assez volumineux (les dimensions ne doivent pas être inférieures à 2 cm environ) pour rester à portée de main de l'enfant.</p>	<table border="1"> <tr> <td>NE S'APPLIQUE PAS</td> <td>OUI</td> <td>NON</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	NE S'APPLIQUE PAS	OUI	NON	<input type="checkbox"/>														
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<p>2.4 EFFETS SENSORIELS</p> <p>2.4.1 Le jouet/jeu produit des effets sensoriels en plus ou à la place des messages visuels, comme des sons, des vibrations, des mouvements, etc.</p> <hr/> <p>2.4.2 le jouet/jeu produit des effets et/ou des messages sonores réalistes (ex.: une vache meugle et ne miaule pas!).</p> <hr/> <p>2.4.3 Les actions et/ou les effets produits par le jouet/jeu sont facilement identifiables au toucher (ex. éléments qui apparaissent et disparaissent).</p>	<table border="1"> <tr> <td>NE S'APPLIQUE PAS</td> <td>OUI</td> <td>NON</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	NE S'APPLIQUE PAS	OUI	NON	<input type="checkbox"/>														
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	OUI	NON
	<input type="checkbox"/>	<input type="checkbox"/>

CONCLUSION: Pour un enfant avec une déficience VISUELLE, le jouet/jeu est:

UTILISABLE INUTILISABLE ADAPTABLE

Y a-t-il des adaptations possibles ne modifiant pas le but du jeu avec ce jouet/jeu? Si oui, lesquelles?

Tableau 3 **items concernant les enfants ayant une DÉFICIENCE MOTRICE DES MEMBRES SUPÉRIEURS Légère - modérée - sévère**

<p>3.1 FINALITÉ DU JEU AVEC LE JOUET/JEU</p> <p>3.1.1 Le but du jeu avec ce jouet/jeu peut être atteint en utilisant principalement des capacités auditives et visuelles et des capacités des membres inférieurs ou de faibles capacités motrices des membres supérieurs (gardez en tête le degré d'incapacité motrice de votre public et répondez OUI si vous estimez qu'il peut avoir du plaisir à jouer avec ce jouet/jeu).</p>	<p>OUI NON</p> <p><input type="checkbox"/> <input type="checkbox"/></p>
<p>3.2 DIMENSIONS ET POIDS</p> <p>3.2.1 Les dimensions du jouet/jeu et ses différentes pièces et accessoires font plus de 2 cm de longueur, de largeur et d'épaisseur.</p> <hr/> <p>3.2.2 Le jouet/jeu a une base suffisamment large pour assurer sa stabilité.</p> <hr/> <p>3.2.3 Le poids du jouet/jeu permet à un enfant ayant une déficience motrice des membres supérieurs de jouer avec facilement.</p>	<p>NE S'APPLIQUE PAS OUI NON</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>3.3 FORME ET COMPOSANTS</p> <p>3.3.1 Le jouet/jeu offre des possibilités de prise permettant de le tenir dans différentes positions.</p> <hr/> <p>3.3.2 Le jouet/jeu a une structure compacte. Une fois assemblé et prêt à jouer, il ne peut pas être démonté facilement.</p> <hr/> <p>3.3.3 Le jouet/jeu a des composants (cubes, accessoires, vêtements, etc.) faciles à assembler, avec des éléments de jonction comme du Velcro ou des aimants.</p> <hr/> <p>3.3.4 Le jouet/jeu est suffisamment souple ou rembourré pour éviter les chocs douloureux.</p>	<p>NE S'APPLIQUE PAS OUI NON</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>3.4 MOUVEMENTS ET GESTES</p> <p>3.4.1 Les parties importantes du jouet/jeu comme les poignées, boutons, interrupteurs, connecteurs, etc. sont faciles à presser, tourner, insérer, attraper, enclencher, etc. pour ces enfants.</p> <hr/> <p>3.4.2 Le temps de réponse du jeu peut être ajusté pour permettre à l'enfant de répondre avec des gestes lents.</p> <hr/> <p>3.4.3 Les boutons pour mettre en marche le jouet/jeu (système audio, éléments visuels, mouvements, etc.) peuvent être facilement activés par le joueur.</p> <hr/> <p>3.4.4 Le jouet/jeu permet l'ajout de contacteurs externes.</p>	<p>NE S'APPLIQUE PAS OUI NON</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>OUI NON</p> <p><input type="checkbox"/> <input type="checkbox"/></p>	

CONCLUSION: Pour un enfant ayant une déficience MOTRICE des membres supérieurs, selon son degré d'incapacité, le jouet/jeu est:

UTILISABLE INUTILISABLE ADAPTABLE

Y a-t-il des adaptations possibles ne modifiant pas le but du jeu avec ce jouet/jeu? Si oui, lesquelles?



9 Annex 3. Manual & Questionnaire, Spanish version

9.1. Descripción general

9.1.1. ¿Qué es TUET?

TUET (Toys & games Usability Evaluation Tool) es un método de análisis para evaluar las características físicas de los materiales de juego en función de las necesidades de niños/as con algún tipo de discapacidad auditiva, visual o motora (miembros superiores).

9.1.2. ¿Por qué se ha creado TUET?

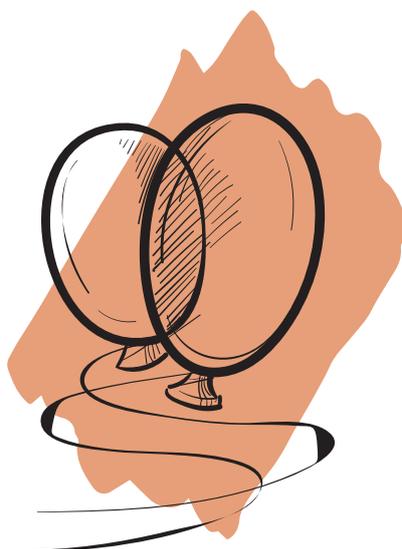
TUET ha sido creado, por un lado, porque las investigaciones llevadas a cabo por AIJU (España) y FM2J (Francia) muestran una repetida falta de accesibilidad y usabilidad en los juegos y juguetes del mercado para niños/as con algún tipo de discapacidad auditiva, visual o motora; y, a la vez, como respuesta a una demanda por parte de los padres, madres y terapeutas que buscan materiales de juego más accesibles para estos niños/as.

Entre 2007 y 2017, un total de 2866 juegos y juguetes del mercado fueron analizados por AIJU, en colaboración con ONCE y CEAPAT. Tan solo un 21% de ellos son manejables por parte de niños/as con discapacidades motoras, un 44% por niños/as con discapacidades visuales y un 86% por niños/as con discapacidades auditivas, sin ningún tipo de adaptaciones o ayuda externa para jugar. Adicionalmente, tan solo un 5% de juguetes y juegos son accesibles para las tres discapacidades simultáneamente. En Francia, FM2J encontró un porcentaje similar. De entre los 1600 juegos y juguetes que FM2J analizó desde 1996, tan solo un 8% recibió el sello 'Handilud' que indica que el juguete puede ser considerado "utilizable" por niños/as con algún tipo de discapacidad.

9.1.3. ¿Cuáles son los fundamentos teóricos de TUET?

TUET se basa en los principios de Diseño Universal así como en investigaciones previas en el campo de los juegos y juguetes para niños/as con discapacidad llevadas a cabo por: FM2J (1996-2017); AIJU (1991-2017); ONCE (2007-2017); CEAPAT (2007-2017); Lekotek (1980-2017) y los proyectos de la Universidad de Buffalo Let's Play Projects (1995-2006).

El Diseño Universal es una filosofía para diseñar productos que puedan ser usados por personas con el más amplio rango de discapacidades funcionales. Todos los niños/as son diferentes, no sólo por lo que se refiere a sus habilidades, sino también respecto a sus actividades y preferencias de juego; imaginar que un producto pueda ser utilizable para todos/as, es sencillamente imposible. Sin embargo, cuantos más principios del Diseño Universal posea un juego o juguete, más probable será que pueda ser utilizado y disfrutado por un gran número de niños/as, incluyendo aquellos/as con algún tipo de discapacidad.



Ficha técnica	
Título	Toys & games Usability Evaluation Tool (TUET).
Autores	Costa, M. (AIJU), Périno, O. (FM2J), Ray-Kaeser, S. (HES-SO EESP).
Objetivo	Revisar las características físicas de un juego o de un juguete con el objetivo de tomar una decisión sobre su facilidad de uso para un grupo específico de niños/as con discapacidad auditiva, visual o motora (extremidades superiores).
Aplicación	Diseñadores de juguetes y juegos, ingenieros, maestros/as, ludotecas, terapeutas o padres y madres.
Campo de aplicación	Juguetes y juegos, de alta tecnología o no, prototipos o productos comercializados, que tengan al menos algún elemento material (excluidos los juegos exclusivamente digitales).
Período de aplicación	De 10 y 30 minutos dependiendo de la complejidad del material de juego evaluado.
Material	PDF o versión impresa.



9.2. Estructura del cuestionario, definiciones e instrucciones de uso de TUET

TUET se compone de 33 ítems. La primera parte (A) de TUET define las especificidades del juguete o juego que está siendo evaluado. La segunda parte (B) sirve para evaluar la usabilidad del juego o juguete por parte del público destinatario mediante tres tablas. Cada una de ellas relacionadas con uno de los tres tipos de discapacidad siguientes: 1. Auditiva, 2. Visual y 3. Discapacidad motora en extremidades superiores.

Las definiciones e instrucciones siguientes permiten cumplimentar más fácilmente el cuestionario.

9.2.1. Parte A: Análisis del juguete/juego

Antes de iniciar el análisis de un juguete/juego, es indispensable examinarlo, manipularlo, jugar con él, y describir sus aspectos principales. El análisis debe realizarse con detalle mediante la observación de cada faceta y de cada función del juguete, respondiendo a las preguntas A1, A2 y A3. Es el juego o juguete lo que debe ser evaluado, y no su envase.

A1. Nombre del juguete y nombre del fabricante: Escriba el nombre del juguete/juego y su fabricante tal como aparecen escritos en el envase.

A2. Objetivo del juego con el juguete/juego: Describa la finalidad de juego, tal y como viene definido por el fabricante y/o piense de dónde se obtiene el placer de jugar con este juego o juguete. Qué es lo que provoca el disfrute o la diversión. Los ejemplos siguientes con los vehículos de juguete ilustran diversas finalidades de juego:

Ejemplo 1: Un coche con forma de un teléfono con ruedas cuya finalidad es obtener efectos visuales y sonoros.

Ejemplo 2: Un coche pequeño y realista para jugar a garages, circuito de carreras, etc.

Ejemplo 3: Un coche de cartón para jugar sobre el tablero de un juego de mesa.

Cada uno de estos juguetes/juegos corresponde a una actividad lúdica diferente, que a su vez implica un conjunto de habilidades diferenciadas y específicas.

A3: Categoría del juguete/juego según la Clasificación C.O.L.: Siguiendo con nuestros 3 ejemplos anteriores, el coche-teléfono es un soporte para el juego sensorial, el vehículo realista en miniatura es un soporte para un juego simbólico, y el coche de cartón permite jugar a un juego de reglas. A partir de aquí podemos clasificar estos objetos de juego según cuatro categorías principales: Juguetes para juegos de ejercicio, juguetes para juego simbólico, juguetes para juegos de reglas o juguetes para juegos de ensamblaje. Para cada juego/juguete, se debe marcar sólo una de estas cuatro categorías. Para decidir qué categoría, es necesario determinar cuál es el propósito de juego que predomina para este juguete/juego.

9.2.2. Parte B. Usabilidad del juguete/juego para niños/as con discapacidad auditiva, visual o motora

Los juegos y juguetes deben ser analizados teniendo en consideración el público destinatario de los mismos. Si los niños/as tienen una discapacidad visual leve el análisis será diferente del que se haga para niños/as con una ceguera total. No es lo mismo evaluar un juguete para ser usado por niños/as con una discapacidad motora en las extremidades superiores que si va a ser usado por niños/as con una discapacidad auditiva. Este es el motivo por el que el análisis de los juguetes/juegos se realiza a partir de tres tablas diferenciadas, cada una de las cuales se centra en un tipo de discapacidad.

Tabla 1. Discapacidad auditiva: Discapacidad auditiva parcial – sordera

Las discapacidades auditivas corresponden a la pérdida de audición que impide a la persona recibir, a través de los oídos, los estímulos auditivos externos en su totalidad. Sus causas pueden ser congénitas o adquiridas. Los niños/as con pérdida auditiva pueden tener dificultades con materiales de lectura o conceptos matemáticos. Existen cuatro niveles de discapacidad auditiva: leve, moderada, severa y profunda.

- La discapacidad auditiva parcial se refiere a aquellas personas con una pérdida de audición que se encuentra entre los rangos de leve y severa. Puede afectar a uno o a los dos oídos y conlleva dificultades para seguir conversaciones o para oír sonidos fuertes.
- La sordera hace referencia a aquellas personas con una pérdida auditiva profunda, lo que implica muy poca o nula capacidad de audición.

Requisitos específicos de los juguetes/juegos

Los niños/as con discapacidad auditiva pueden acceder a un gran número de juguetes y tienen menos necesidad de ayudas externas o adaptaciones que los niños/as con discapacidad visual o motora. Pueden encontrar dificultades en juegos y juguetes que producen efectos sonoros.

En este caso, y **para todos los niveles de discapacidad auditiva**, los efectos sonoros deben ir acompañados de otro tipo de estímulos (luces, imágenes, movimientos, vibraciones, etc.). Los mensajes orales deben ir acompañados de una transcripción o versión escrita. En los juegos de reglas, las explicaciones gráficas o escritas deben ser muy fáciles de comprender.

Finalmente, el juguete debe tener un mecanismo de control del volumen que permita adecuarlo al nivel auditivo residual del usuario o disponer de una entrada opcional para auriculares.

Tabla 2. Discapacidad visual: Baja agudeza visual- ceguera/daltonismo

Las discapacidades visuales comprenden un rango que va desde la visión reducida hasta la pérdida total de visión. La pérdida de visión en niños/as puede ser prenatal (anomalías congénitas), perinatal (parto prematuro, asfixia) o postnatal (traumatismos o tumoraciones). Existen cuatro niveles de discapacidad visual: leve, moderada, severa y profunda.

- La visión reducida hace referencia a personas con una discapacidad visual que se encuentra entre los rangos de moderada y severa.
- La ceguera hace referencia a la pérdida total, o casi, de visión.

El daltonismo es una anomalía genética de la percepción de los colores. La mayoría de niños/as daltónicos, principalmente niños varones, pueden ver claramente, pero no son capaces de diferenciar los colores rojo y verde, en ocasiones el azul.

Requisitos específicos de los juguetes/juegos

La falta de visión causa una falta de motivación en los niños/as a utilizar los objetos, así como una cierta pasividad. Progenitores y cuidadores deben motivarlos hacia el juego invitándolos a explorar y manipular los juguetes/juegos, explicarles dónde están, cómo son, y cómo usarlos.

Para niveles moderados de discapacidad visual, es recomendable que el juguete/juego tenga efectos sensoriales (sonidos, vibraciones, movimientos, olores, texturas, etc.) que motiven y guíen a los niños/as a entender la finalidad del juego con dicho juguete. Estos efectos sensoriales deben ser realistas y reconocibles mediante el tacto o el oído en caso de ceguera o de una discapacidad visual severa.

Para niños/as con visión reducida, el juguete/juego debe tener colores vivos y/o muy contrastados. Los elementos necesarios para su activación (botones, palancas, etc.) deben ser de colores bien diferenciados del color del soporte o de los fondos. El juguete/juego debe tener distintas texturas, relieves, luces y materiales diferentes que sean apropiados para entender el objetivo del juego/juguete:

Ejemplo 1: Muñeca para vestir y desvestir. Las prendas con diversas texturas ayudan al niño/a a identificarlas y colocarlas de la forma correcta.

Ejemplo 2: Muñeco de tela. Las diferentes texturas le ayudarán a identificar las partes del cuerpo o de la cara.

El juguete/juego debe tener una estructura suficientemente compacta y una base suficientemente grande para asegurar su estabilidad.

Para niños/as con ceguera o con discapacidad visual severa, el juguete/juego debe tener una forma realista y reconocible, y sus componentes (manillas, botones, interruptores, conectores, piezas, imágenes, etc.), deben ser fácilmente identificables mediante el tacto. Los elementos del juguete/juego o sus accesorios (bloques, piezas de ropa, etc.) deben poder colocarse en un compartimento previsto a tal efecto, y ser lo suficientemente grandes como para que no puedan salir del alcance del entorno inmediato, abarcable por los brazos del niño/a.

Para los niños/as que sufren daltonismo, el rojo y el verde no deben ser usados juntos en juegos de mesa.

Tabla 3. Discapacidad motora en las extremidades superiores: leve, moderada, severa

La discapacidad motora en las extremidades superiores es una discapacidad de naturaleza transitoria o permanente que limita la habilidad motora de las manos y de las extremidades superiores. Puede ser de naturaleza congénita o adquirida. Con frecuencia es consecuencia de una parálisis cerebral, una atrofia muscular espinal (AME) o una lesión cerebral traumática. Los posibles niveles de discapacidad (leve, moderada o severa) pueden estar relacionados con:

- El abarque físico de la discapacidad (p.ej. si implica una o dos extremidades, la presencia o no de espasmos, etc.).
- La manera de utilizar las manos cuando se manipulan objetos. Los ejemplos siguientes son adaptados de la clasificación de habilidad manual www.macs.nu:

Leve: Manipula la mayoría de objetos, pero de manera cualitativamente reducida y/o restricción de velocidad en la consecución del objetivo.

Moderada: Manipula objetos con dificultad.

Severa: Maneja una selección limitada de objetos fácilmente manipulables y tiene una habilidad limitada para llevar a cabo acciones sencillas.

Requisitos específicos de los juguetes/juegos

La manera en la que juegan los niños/as con discapacidad motora depende sobretudo de sus habilidades motoras y de su capacidad de desplazamiento, así como del tipo de recursos a los que tienen acceso. En general, la mayoría de las veces tienen dificultades para manipular los juegos y juguetes. Por este motivo se seleccionarán aquellos que los niños/as puedan controlar por sí solos.

Para los niños/as con una discapacidad motora de leve a moderada: El juguete/juego debe ser fácil de manipular. Las partes importantes del juguete (manillas, botones, interruptores, conectores, piezas) deben ser fáciles de presionar, encajar, agarrar, activar, etc. Las dimensiones y el peso de los diferentes elementos del juguete/juego deben permitir que los niños/as puedan manipularlos de forma fácil. Además, deben ser acolchados o suficientemente ligeros para evitar impactos dolorosos.

Las discapacidades más severas requieren diseños con formas que permitan múltiples áreas para su agarre, de forma que el niño/a pueda sostener el juguete/juego en muy distintas posiciones. Sus componentes deben ser fáciles de ensamblar, con elementos sencillos de conexión como utilizando el Velcro o los imanes. El juguete/juego debe tener una estructura compacta y una base grande que asegure su estabilidad. Las dimensiones del juguete deben permitir el acceso para niños/as con silla de ruedas u ofrecer la posibilidad de ser desmontados en módulos para que se pueda jugar con ellos sobre una superficie. Las partes o piezas del juguete no deben tener un tamaño inferior a 2 cm de anchura, longitud y/o profundidad.

Para un niño/a con discapacidad motora ser capaz de activar un juguete apretando un botón no es una acción aislada sino el primer paso para acceder a otros dispositivos como pueden ser un ordenador, una tablet, un dispositivo de comunicación, un mando a distancia, etc. Este es el motivo por el que es altamente recomendable proponer juguetes/juegos que dispongan de amplios botones que los propios niños/as puedan presionar o bien que permitan incorporar un interruptor externo.

9.2.3. ¿Cómo complimentar las 3 tablas?

Preguntas en negrita: 1.1.1. /2.1.1. /3.1.1

Para responder a los apartados 1.1.1. / 2.1.1. / 3.1.1., debemos tener en consideración el nivel de discapacidad del grupo de niños/as al que se destina el juguete/juego. Si estos niños/as no son capaces de lograr el objetivo de juego de un juguete en concreto (A2), debemos contestar NO, ya que no conseguirán realmente disfrutar con él. En este caso, lo mejor es proponerle otro juguete. Estas preguntas en negrita son muy importantes para tomar nuestras decisiones puesto que nos permiten establecer la correspondencia entre las habilidades de un grupo de niños/as con una discapacidad específica y la finalidad de un juguete/juego.

Respuestas: 'Sí', 'No', o 'No aplica'

La primera fase del análisis consiste en verificar si el ítem o pregunta es pertinente para el juguete/juego. Por ejemplo, para discapacidad visual, en el punto 2.2.3.: 'El juego de mesa evita el uso simultáneo de los colores rojo y verde (daltonismo)', si el juguete a evaluar no es un juego de mesa, se debe marcar la casilla 'no aplica' y pasar al siguiente punto. Otro ejemplo, para discapacidad auditiva, en el punto 1.2.1. 'Los efectos de sonido van acompañados de otros efectos (luces, imágenes, movimientos, vibración, etc.)'. Si el juguete evaluado no tiene efectos sonoros (por ejemplo, una muñeca sin sonido), se deberá marcar la casilla 'no aplica'. Si el juguete produce algún tipo de sonido, entonces debe elegir entre marcar las casillas 'sí' o 'no', dependiendo de si considera que el juguete o juego se ajusta a esta afirmación o no.

Cálculo de los resultados del análisis

Para completar el análisis, se debe sumar el número total de respuestas 'sí' y respuestas 'no', ignorar la columna de 'no aplica' y escribir un total al final de cada columna. Esta suma servirá para determinar si el juguete/juego es '**utilizable**' (mayor número de respuestas en la columna del 'sí' que del 'no') o '**no utilizable**' (mayor o igual número de respuestas en la columna del 'no' que del 'sí').

A mayor número de respuestas positivas obtenidas en la tabla, mayor será el nivel de usabilidad del juguete/juego por parte del grupo al que va dirigido. En el caso de discapacidades adicionales asociadas (comorbilidad) deben ser sumados los resultados de varios apartados (Tablas 1, 2 o 3) para obtener un resultado final.

La obtención de respuestas positivas en las tres tablas supone un alto grado de usabilidad del juguete/juego por parte de un amplio grupo de niños/as con o sin discapacidades.

Sin embargo, con determinados grupos de niños/as será necesario hacer un análisis más cualitativo. En ocasiones, a pesar de tener un elevado número de respuestas positivas, se puede considerar que un juguete es "Inutilizable" ya que no se cumple un criterio esencial para que dichos niños puedan jugar con él. La evaluación se debe realizar teniendo en cuenta el contenido de las respuestas más que la simple suma de respuestas "sí" o "no". Es indispensable tener en mente el objetivo de juego del juguete/juego para poder realizar la evaluación final. Como regla general, cuando los resultados cuantitativos nos hacen dudar entre "Inutilizable" y "adaptable", es recomendable mantener el resultado de "adaptable" y proponer soluciones para adaptar el juego o juguete.

Evaluación: Utilizable/ No utilizable/ Adaptable

Un juguete/juego es **utilizable** por un grupo de niños/as determinado si puede ser usado para el objetivo para el que fue concebido y por el placer de jugar.

Un juguete/juego es **adaptable** si puede convertirse en "Utilizable" con una simple modificación que no altere su función primaria o su objetivo/finalidad de juego. Ejemplo de adaptación: incorporar tiras de velcro coloreadas en los botones de un juguete para que sean más fáciles de identificar. Pero cuando, por ejemplo, una muñeca es de tamaño demasiado pequeño de forma que es necesario proponer una muñeca más grande o accesorios más voluminosos, esto no se considera una adaptación sino ¡otro juguete!

Algunos juguetes/juegos son definitivamente **inutilizables** para ciertos niños/as. Lo mejor que podemos hacer cuando un juguete o juego no es utilizable es intentar buscar otro de su misma categoría (A3 – C.O.L) que sí pueda ser utilizado por estos mismos niños/as.

¡Por último, es necesario recordar que TUET es simplemente una herramienta! Puede ser una ayuda significativa para crear o seleccionar juegos y juguetes por el placer de jugar, pero no puede reemplazar las decisiones de los adultos/as que tienen conocimiento directo de los niños/as y de sus capacidades.

Evaluador: Nombre o código _____ Fecha _____

A.1 **Nombre del juguete/juego:** _____ **Fabricante** _____

A.2 **Objetivo del juguete/juego:** En este juego/juguete, ¿cuál es el elemento principal que provoca el placer de jugar? (Por ejemplo, para una pelota, el placer se encuentra en lanzarla y cogerla, en hacerla rebotar, etc.). Listar por orden de importancia los diferentes elementos que pueden suscitar el placer de jugar para precisar cuál es el principal objetivo de juego con este juguete/juego. Mantener este objetivo en mente al realizar la evaluación final del mismo.

A.3 **Categoría del juguete/juego:** ¿Cómo clasificaría este juguete/juego?
 Marque **una** de las cuatro categorías de clasificación C.O.L. Para elegir una categoría, **es necesario verificar cuál es el tipo de juego que predomina en este juguete/juego.**

- Juguetes para el juego de ejercicio:** Juguetes utilizados durante actividades de sensoriales y motrices por el placer de obtener efectos o resultados inmediatos. (Juguetes sensoriales /j. de motricidad /j. de manipulación).
- Juguetes para juego simbólico:** Juguetes que permiten al jugador reproducir o inventar acciones, situaciones, acontecimientos, o escenas, utilizando su imaginación; e inspirándose en su conocimiento y comprensión de la realidad (juguetes de rol /juguetes de escenificación /juguetes de representación).
- Juegos de reglas:** Juegos que requieren de convenciones u obligaciones conocidas y aceptadas por los jugadores. (Juegos de asociación /Juegos de circuitos /Juegos de expresión /Juegos de combinación /Juegos de habilidad y deportes /Juegos de reflexión y de estrategia /Juegos de azar /Juegos de preguntas-respuestas).
- Juguetes para juegos de ensamblaje:** Elementos de juego que se juntan para realizar una nueva creación (Juegos de construcción /juegos de posicionamiento /juegos de experimentación /juegos de fabricación).

B. USABILIDAD DEL JUGUETE/JUEGO

Tabla 1 **Ítems relevantes para niños/as con DISCAPACIDAD AUDITIVA**
Discapacidad auditiva parcial – sordera

1.1 FINALIDAD DE JUEGO CON EL JUGUETE/JUEGO					
1.1.1 El objetivo con este juguete/juego puede ser alcanzado utilizando principalmente capacidades visuales y motoras o capacidades auditivas residuales (tener en cuenta el grado de discapacidad auditiva de los destinatarios y marcar 'Sí' si considera que estos pueden lograr el placer de jugar con este juguete/juego específico).	<table border="0"> <tr> <td style="padding: 0 10px;">Sí</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	Sí	NO	<input type="checkbox"/>	<input type="checkbox"/>
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1.2 EFECTOS SENSORIALES																
1.2.1 Los efectos sonoros están acompañados de otros efectos (luces, imágenes, movimientos, vibración, etc.).	<table border="0"> <tr> <td style="padding: 0 10px;">NO APLICA</td> <td>SÍ</td> <td>NO</td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> <tr> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> <td style="text-align: center;"><input type="checkbox"/></td> </tr> </table>	NO APLICA	SÍ	NO	<input type="checkbox"/>											
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1.2.2 El volumen puede ser controlado (control de volumen) y/o permite conectar auriculares.																
1.2.3 Los mensajes hablados son inteligibles y/o van acompañados de una versión escrita.																
1.2.4 En juegos de reglas, las explicaciones escritas o gráficas son fáciles de entender para el público destinatario.																
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CONCLUSION: Para el grado de discapacidad AUDITIVA de los destinatarios, el juguete/juego es:

UTILIZABLE NO UTILIZABLE ADAPTABLE

¿Existen adaptaciones posibles que no modifiquen el objetivo del juguete/juego? ¿Cuáles?



Tabla 2 Ítems relevantes para niños/as con DISCAPACIDAD VISUAL Baja agudeza visual- ceguera/daltonismo

<p>2.1 FINALIDAD DE JUEGO CON EL JUGUETE/JUEGO</p> <p>2.1.1 El objetivo del juguete/juego puede ser alcanzado utilizando principalmente capacidades auditivas y motoras o capacidades visuales residuales (Tener en cuenta el grado de discapacidad visual de los destinatarios y marcar 'Sí' si considera que éstos pueden lograr el placer de jugar con este juguete/juego específico).</p>	<table border="1"> <tr> <td></td> <td>SÍ</td> <td>NO</td> </tr> <tr> <td></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>		SÍ	NO		<input type="checkbox"/>	<input type="checkbox"/>												
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<p>2.2 COLORES Y TEXTURAS</p> <p>2.2.1 El juguete/juego tiene colores vivos y/o muy contrastados (amarillo y azul oscuro / negro y blanco /rojo y blanco).</p> <p>2.2.2 Los elementos necesarios para la utilización del juguete (botones, manillas, orificios) están claramente contrastados y/o se diferencian fácilmente del color del fondo.</p> <p>2.2.3 En los juegos de mesa se evita el uso simultáneo de los colores rojo y verde (daltonismo).</p> <p>2.2.4 El juguete/juego tiene diferentes texturas, luces, relieves o materiales, que son apropiados para el objetivo del juguete/juego.</p>	<table border="1"> <tr> <td>NO APLICA</td> <td>SÍ</td> <td>NO</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	NO APLICA	SÍ	NO	<input type="checkbox"/>														
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<p>2.3 FORMAS Y COMPONENTES</p> <p>2.3.1 El juguete/juego (estructura general) tiene una forma realista y reconocible, fácilmente identificable al tacto.</p> <p>2.3.2 Los componentes específicos del juguete/juego (por ejemplo, manillas, botones, interruptores, conectores, piezas, imágenes, etc.) son fácilmente identificables al tacto.</p> <p>2.3.3 El juguete/juego tiene una estructura suficientemente compacta o un sistema de anclaje que permite que las piezas no se desmonten por azar.</p> <p>2.3.4 El juguete/juego tiene una base suficientemente grande para asegurar su estabilidad.</p> <p>2.3.5 Los elementos o accesorios incluidos en el juguete/juego (p.e., bloques, prendas de ropa, etc.) están colocados en un compartimento previsto a tal efecto, o son lo suficientemente voluminosos (mínimo 2cm) para permanecer cerca del alcance del niño/a.</p>	<table border="1"> <tr> <td>NO APLICA</td> <td>SÍ</td> <td>NO</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	NO APLICA	SÍ	NO	<input type="checkbox"/>														
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<p>2.4 EFECTOS SENSORIALES</p> <p>2.4.1 El juguete/juego produce efectos sensoriales adicionales, además de o en lugar de mensajes visuales, tales como sonidos, vibraciones, movimientos, etc.</p> <p>2.4.2 El juguete/juego tiene efectos y/o mensajes sonoros realistas (por ejemplo, las vacas muñen no maúllan).</p> <p>2.4.3 Las acciones y/o los efectos visuales del juguete/juego son fácilmente identificables al tacto (por ejemplo, elementos que aparecen y desaparecen).</p>	<table border="1"> <tr> <td>NO APLICA</td> <td>SÍ</td> <td>NO</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	NO APLICA	SÍ	NO	<input type="checkbox"/>														
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CONCLUSION: Para el grado de discapacidad VISUAL de los destinatarios, el juguete/juego es:

UTILIZABLE NO UTILIZABLE ADAPTABLE

¿Existen adaptaciones posibles que no modifiquen el objetivo del juguete/juego? ¿Cuáles?

Tabla 3 Ítems relevantes para niños/as con DISCAPACIDAD MOTORA EN LAS EXTREMIDADES SUPERIORES Leve, moderada, severa

<p>3.1 FINALIDAD DE JUEGO CON EL JUGUETE/JUEGO</p> <p>3.1.1 El objetivo del juguete/juego puede ser alcanzado utilizando principalmente capacidades auditivas, visuales, y capacidades de los miembros inferiores o capacidades moderadas de los miembros superiores (Tener en cuenta el grado de discapacidad motora de los destinatarios y marcar 'Sí' si considera que éstos pueden lograr el placer de jugar con este juguete/juego específico).</p>	<p>SÍ NO</p> <p><input type="checkbox"/> <input type="checkbox"/></p>
<p>3.2 DIMENSIONES Y PESO</p> <p>3.2.1 Las dimensiones del juguete/juego, sus piezas o accesorios miden más de 2 cm de longitud/anchura/profundidad.</p> <p>3.2.2 El juguete/juego tiene una base suficientemente grande para asegurar su estabilidad.</p> <p>3.2.3 El peso del juguete/juego permite a un niño/a con discapacidad motora en miembros superiores jugar con él fácilmente.</p>	<p>NO APLICA SÍ NO</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>3.3 FORMAS Y COMPONENTES</p> <p>3.3.1 El juguete/juego tiene múltiples áreas para cogerlo, permitiendo sujetarlo en diferentes posiciones.</p> <p>3.3.2 El juguete/juego tiene una estructura compacta. Una vez está listo para jugar, no se desmonta fácilmente.</p> <p>3.3.3 Los componentes del juguete/juego (bloques, accesorios, prendas de ropa, etc.) son fáciles de ensamblar, con un sistema fácil de conexión como el Velcro o los imanes.</p> <p>3.3.4 El juguete/juego es lo suficientemente ligero y/o acolchado como para evitar impactos dolorosos.</p>	<p>NO APLICA SÍ NO</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
<p>3.4 MOVIMIENTOS Y GESTOS</p> <p>3.4.1 Las partes importantes del juguete/juego como manillas, botones, interruptores, conectores, piezas, etc. son fáciles de presionar, girar, encajar, agarrar, activar, etc., para los niños/as destinatarios.</p> <p>3.4.2 El tiempo de respuesta del juego puede ser ajustado para permitir realizar las acciones con gestos lentos.</p> <p>3.4.3 Los botones de activación del juguete/juego (para activar el audio, los elementos visuales, los movimientos, etc.), pueden ser accionados por los propios niños.</p> <p>3.4.4 El juguete/juego permite incorporar un interruptor externo para activarlo.</p>	<p>NO APLICA SÍ NO</p> <p><input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/></p>
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CONCLUSION: Para el grado de discapacidad MOTORA de los destinatarios, el juguete/juego es:

UTILIZABLE NO UTILIZABLE ADAPTABLE

¿Existen adaptaciones posibles que no modifiquen el objetivo del juguete/juego? ¿Cuáles?

The Toys & games Usability Evaluation tool (TUET) offers a new perspective on an under-evaluated subject: the **usability of toys and games for children with disabilities**. It will surely help toy companies, education and rehabilitation professionals, toy librarians, teachers and family members to design, select, and adapt toys and games to meet the needs of all children.

Drawing on an inclusive perspective, this unique tool supports children with the widest range of abilities -especially those with **hearing, visual and upper-limb motor impairments**- to play for the sake of play with easily accessible and usable toys and games. A quick analysis with TUET makes the identification of such play materials possible.

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Odile Périno is a play, toys and games specialist who has founded several play centres in France with an inclusive orientation, and the Play Training Centre in Lyon, France.

Sylvie Ray-Kaeser is a highly experienced paediatric occupational therapist, professor and researcher from the University of Applied Sciences and Arts of Lausanne, Switzerland.



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