BRAINWAVES

DIDACTIC GUIDE FOR TEACHERS

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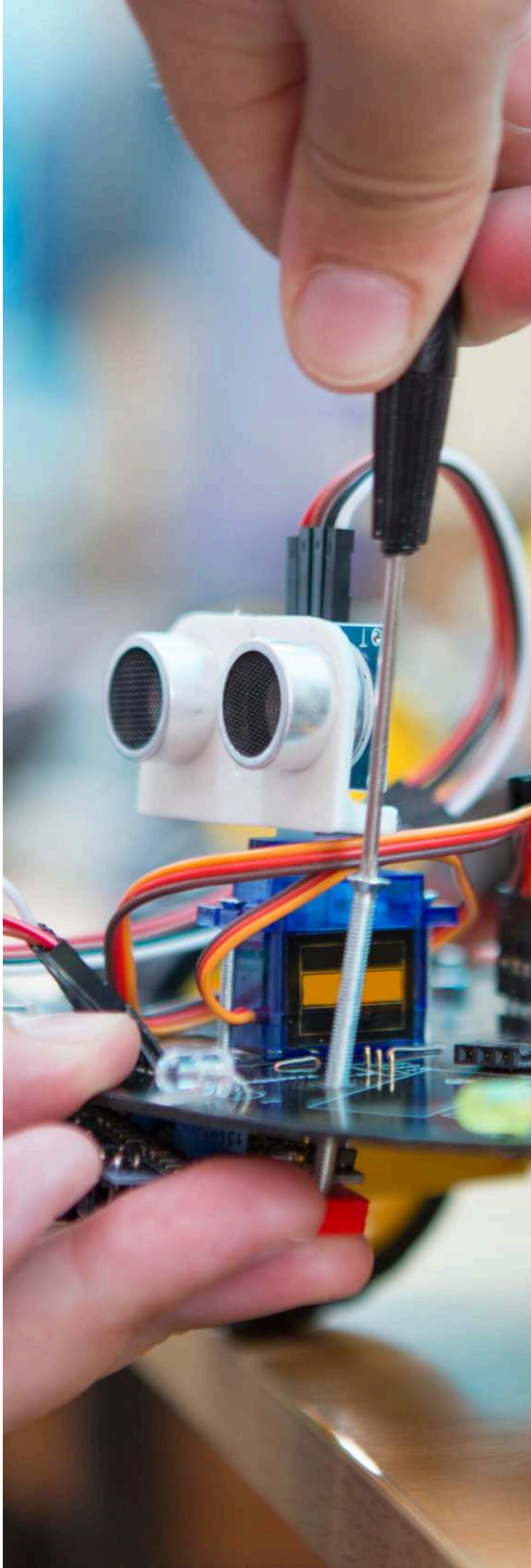

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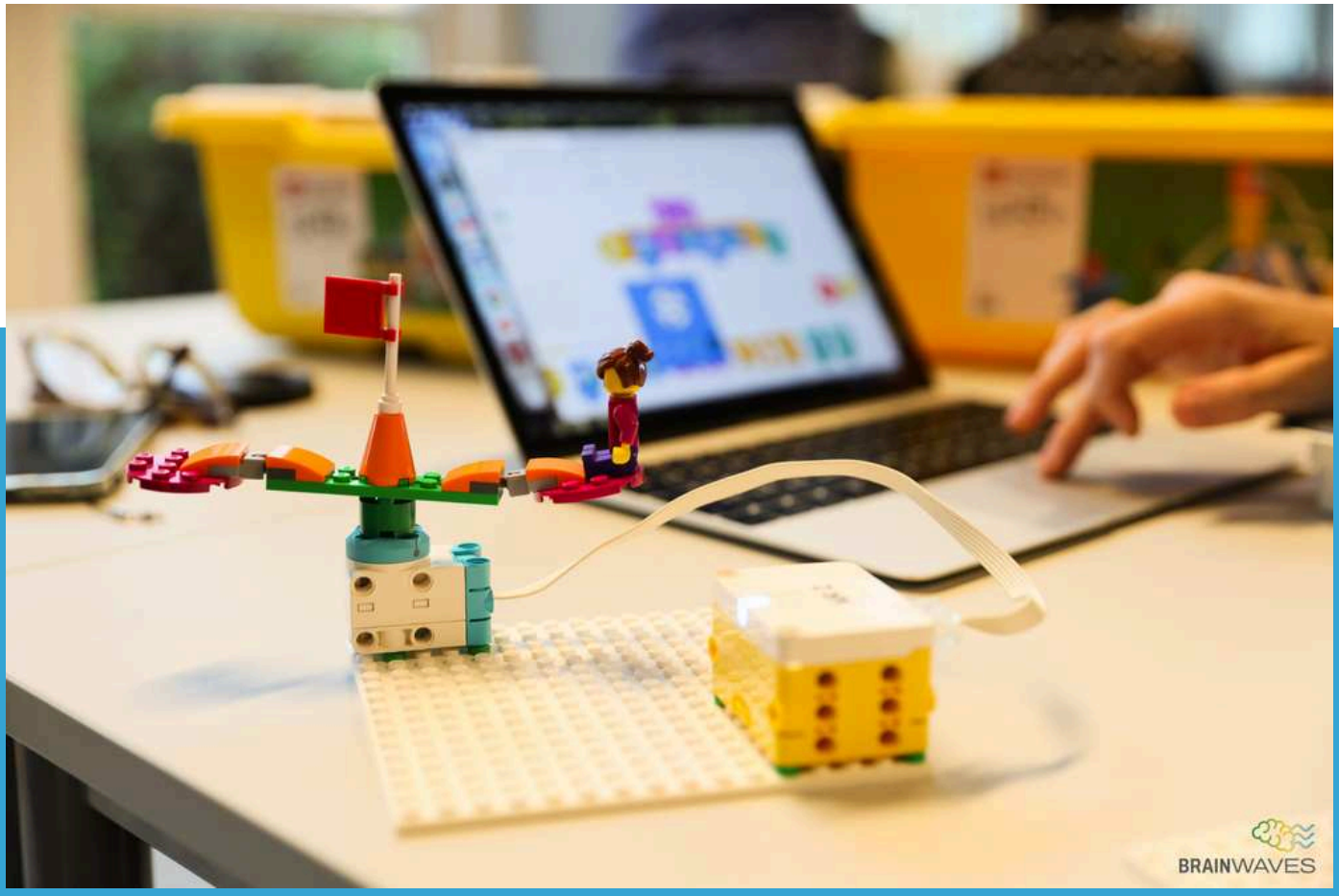

INTRODUCTION TO THIS MANUAL

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1. INTRODUCTION TO THIS MANUAL

The Brain Waves project, part of the European Erasmus+ initiative, is a collaboration between educational and social organisations from Denmark, Spain, Ireland and Italy. It aims to introduce students to a 'service learning' strategy in their programming and new technologies courses. This approach encourages them to apply their learning to develop products and applications that improve the accessibility of technology for people with disabilities.

Brain Waves aims to seamlessly integrate community service with academic studies, enabling students to hone their practical skills while positively impacting the lives and inclusion of people with disabilities through technology solutions.

At the heart of the project is a commitment to instilling in students the values of respect, tolerance and acceptance of diversity, which are essential to creating engaged and responsible global citizens.

The initiative thrives on international collaboration, fostering cross-cultural exchange and understanding. Over two years, the collective efforts of students and experts from various participating institutions have been instrumental in shaping the project:

- **Korup Skole,** a public school in Odense, Denmark.

- **ASPACE SEVILLA,** an association for people with cerebral palsy based in Seville, Spain.

- **Forum for Education and Development**, an educational institution in Seville, Spain.

- I **& F Education and Development,** known for its expertise in education and youth projects, based in Dublin, Ireland.

- **Base 3**, a social enterprise supporting social innovation projects, based in Umbria, Italy.

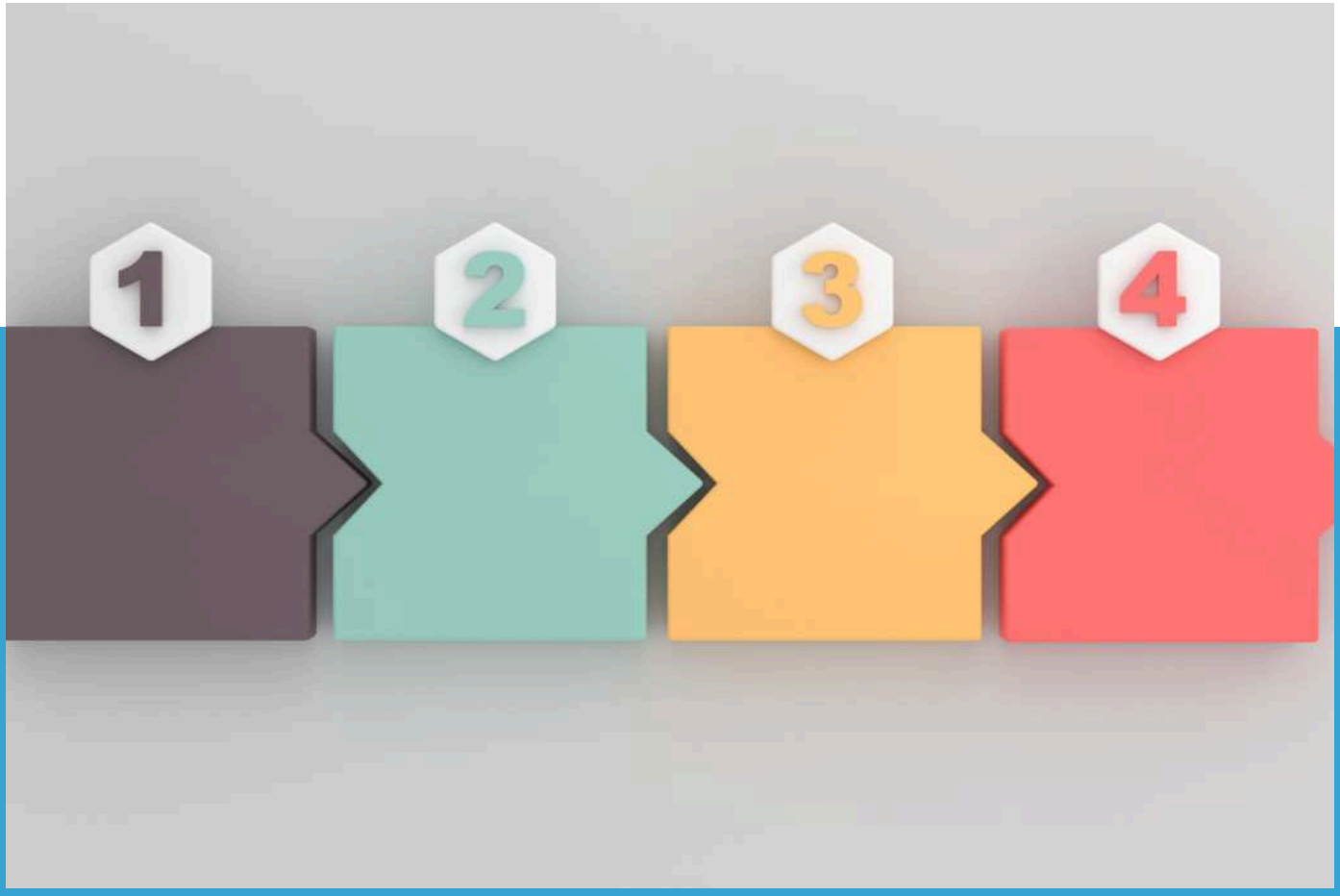
The collaboration has resulted in the production of a comprehensive teaching guide. This guide provides teachers with detailed instructions on how to integrate the BRAIN WAVES project into their curriculum, including project objectives, procedural steps, suggested activities and resources required.

In addition, the guide enriches the teaching experience by providing pedagogical resources and examples of activities to ensure the successful implementation of the project in the classroom.

Find out more:

http://

PROJECT WEBSITE:
WWW.BRAINWAVESPROJECT.EU



BRAIN WAVES METHODOLOGY

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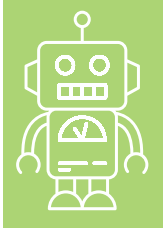

2. BRAIN WAVES METHODOLOGY

This handbook aims to provide a comprehensive introduction to the Brain Waves project, tailored for use by teachers in the classroom. It's designed to facilitate the introduction and integration of the project into educational environments. Here we will explain the nature of Brain Waves, highlight the benefits of incorporating this project into classroom activities with students, outline the objectives we aim to achieve and describe the methodology we recommend for achieving these objectives.

2.1 WHERE THE PROJECT COMES FROM

This project is based on the belief that students can be taught to use technology responsibly, while developing essential digital skills for today and the future. In the modern world, digital literacy is not only beneficial, it's necessary. Brain Waves is dedicated to enhancing the digital and entrepreneurial skills of students, encouraging them to create a positive social impact. This in turn helps to foster a culture within schools and communities that values respect and tolerance for diverse individual differences.

Through teamwork and collaboration on projects to make technology more accessible to people with disabilities, students gain insight into different disabilities, fostering a deep sense of empathy and understanding for the experiences and needs of others.

This initiative aims to instil values of respect and tolerance in young learners, equipping them with the attitudes and skills needed to contribute to a fairer and more understanding society - a step towards a better world.

2.2 OBJECTIVES

- **Improving pupils' digital literacy and digital competences**
- **To raise students' awareness of the needs of people with disabilities**
- **Developing key competences among students such as communication, teamwork and problem solving**
- **Promote awareness and incorporation of Service Learning as a key tool to be used in the classroom.**

2.3 SERVICE-LEARNING METHODOLOGY

The project is based on the **'Service Learning Methodology',** an experiential learning approach that integrates community service with academic education.

Within this framework, students are motivated to reflect on their own experiences and link them to their academic pursuits and commitment to community service. Such a method not only enhances the learning experience, but also cultivates a sense of civic duty and encourages the formation of community bonds.

The initiative begins by providing students with an understanding of different disabilities or, for projects with a more individual focus, the specific needs of a person with a disability. Teams of students then use the technical skills they have learnt in the classroom to create an application or activity that makes technology more accessible to people with disabilities.

This model not only fosters the growth of initiative and entrepreneurial skills in students, but also hones their ability to work effectively as part of a team, preparing them for future professional environments.

In essence, Brain Waves advocates a values-led education that challenges students to become socially-conscious digital innovators who use their technical skills for the betterment of society, thereby cultivating a more inclusive and diverse world.

2.4 IMPACT

BRAIN WAVES has the potential to generate significant impact in several dimensions, creating positive social impact experiences in different sectors:

ON STUDENTS

By facing real challenges and participating in collaborative projects, students can strengthen their problem-solving skills, teamwork, communication and application of knowledge in real-world situations. BRAIN WAVES enriches student learning by providing meaningful, hands-on experiences that complement their formal education.

ON SCHOOL CULTURE

This project promotes values such as empathy, respect, solidarity and civic responsibility, thus improving school culture. BRAIN WAVES seeks the active participation of people with disabilities within schools and the collaboration of students' families, extending its reach to a wider school context.

ON PEOPLE WITH DISABILITIES

The projects developed can be shared for use by people with disabilities, improving their access to and use of technology and providing customised solutions according to specific needs.

GETTING CLOSER TO THE MATTER

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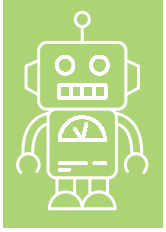

3. GETTING CLOSER TO THE MATTER

In this section we provide essential data for the development of our project. We present a classification of the main types of disability, divided into categories. We then present a recommended vocabulary of key terms to refer appropriately to people with disabilities. Finally, this section also includes links to useful websites for further reading, where you can find explanatory videos on the subject.

3.1 DEFINITION OF DISABILITY

There are multiple definitions of the term, as well as a number of internationally recognised categories. These categories have been established on the basis of different factors considered to differentiate between the various types of disability.

At this point, we will use the classification made by the World Health Organisation, which has developed a tool called the International Classification of Functionality through which it aims to bring together and standardise terminology and which offers us a grouping of people with disabilities into four main types

According to the WHO, persons with disabilities are those who have long-term physical, mental, intellectual or sensory impairments that may hinder their full and effective participation in society on an equal basis with others.

According to the World Report on Disability, about 15% of the population lives with a disability.

The WHO classifies types of disability according to the area of the body that is affected. It also recognises that disability is not only determined by a person's health condition, but is also influenced by social and environmental factors.

KEY IDEA: A PERSON IS CONSIDERED TO HAVE A DISABILITY WHEN HE OR SHE SUFFERS FROM SOME KIND OF CONDITION THAT LIMITS OR PREVENTS HIM OR HER FROM LIVING INDEPENDENTLY

3.2 THE MOST COMMON TYPES OF DISABILITIES

1 PHYSICAL OR MOTOR DISABILITY

Physical or Motor Disability Physical disability is a disability that occurs when a part of the body is missing or has very little left, which prevents the person from functioning in the conventional way. Its origin may be due to a health condition or a disorder affecting the person's musculoskeletal and neuromuscular system.
The degree and extent may vary and the impairment may be in one or more parts of the body. Difficulty in walking, limitations in mobility to move around or to use certain parts of the body are some of the limitations often experienced by people with physical disabilities.

2 SENSORY DISABILITY

This type of disability implies the presence of limitations in one of the senses, which leads to problems in the perception of information from the environment. Sensory disability may include, in turn:

- **Visual impairment,** with limitations in vision, ranging from partial to total blindness. It affects the ability to read or move around safely.
- **Hearing impairment.** From difficulty in hearing sounds to complete deafness. It affects the ability to communicate verbally.
- **Olfactory disability.** This involves the loss of the sense of smell, with a possible impact on the perception of the environment and the safety of those who suffer from it.
- **Taste impairment.** Loss of the sense of taste can lead to nutritional complications.

3 INTELLECTUAL DISABILITY

Intellectual disability is a disability that presents a series of limitations in the daily skills that a person learns and serves him/her to respond to different situations in life.It is easier to cope if their environment helps to make things easier for them. The main consequences are the difficulty in learning, the delay in the development of language or motor skills or difficulties in social and communication skills. People with intellectual disabilities find it more difficult to learn, understand and communicate.

4

PSYCHIATRIC DISABILITY

This type of disability addresses mental health problems that can affect people's emotional and social well-being.

Psychological disability involves difficulties in people's mental and emotional functioning and may affect their ability to manage emotions or interpersonal relationships.

As mentioned above, this classification has been standardised to cover a wide range of disorders, grouping them into four main categories. Given the complexity of determining under which category some of the most common disorders, such as Autism, ADHD (Attention Deficit Hyperactivity Disorder) or cerebral palsy, could be classified, we offer a complementary classification. This is divided into 10 types of disability and includes references to the most prevalent conditions in society.

1. **Physical disability: I**ncludes conditions that affect mobility and physical functioning, such as paralysis, amputations, spina bifida and spinal cord injuries.
2. **Visual impairment:** This involves total or partial loss of vision, ranging from total blindness to low vision.
3. **Hearing impairment:** Refers to total or partial hearing loss, ranging from total deafness to partial hearing loss.
4. **Intellectual disability:** This is characterised by limitations in intellectual and adaptive functioning, which may affect learning, reasoning and communication skills. This could include Down Syndrome or Rett Syndrome.
5. **Developmental disability**: Includes a variety of conditions that affect physical, cognitive, emotional or social development, such as autism and Asperger's syndrome.
6. **Speech and language disability:** Involves difficulties in speech production or comprehension, such as stuttering, aphasia or dyslexia.
7. **Psychosocial disability:** Refers to disabilities that affect mental and emotional health, such as depression, anxiety and bipolar disorder.
8. **Learning disability:** Refers to academic learning difficulties, such as dyslexia and attention deficit hyperactivity disorder (ADHD).
9. **Cognitive disability:** Includes problems with cognitive function, such as memory, attention and information processing, as in the case of dementia or Alzheimer's disease.
10. **Multiple disabilities:** Some people may experience multiple disabilities that affect different areas of their life, requiring a holistic approach to support such as cerebral palsy or ALS.

KEY IDEA: : THESE CLASSIFICATIONS ARE NOT INTENDED TO LABEL PEOPLE. THEY ARE INTENDED TO PROVIDE A FRAMEWORK TO HELP UNDERSTAND SUFFERERS AND TO DESCRIBE THE LIMITATIONS THEY MAY FACE.

ADVICE ON TERMINOLOGY TO BE USED

The way we speak, write or communicate can influence the way our ideas or projects are perceived, language is never innocent and we must use it to positively influence others.

The way in which we refer to people with disabilities in the classroom can have different effects on learners, so here are some recommendations regarding the terminology and communication style to be used:

People with disabilities

We will always use this term before the word person, in order to launch the idea that the priority is the dignity and individual rights of each person, above the circumstances or disorders that have caused their disability.

Personal descriptions in positive terms

When describing a person we should try to focus on their skills and abilities and not give a clinical view in which we only mention their limitations or impairments. We can describe a person by including their personal characteristics, likes and hobbies and not only their conditions, difficulties or disorders.

Use of images or photographs:

When providing images in our work or descriptions, it is also preferable to convey positive concepts and avoid those that focus on their difficulties or even reflect drama or sensationalism.

To emphasise our recommendation on the use of these terms, we include similar information on concepts to avoid that may convey a pejorative image of a person with a disability:

- **Avoid negative terms:** Words that label and violate the dignity of the person, such as Disabled, Handicapped, or Handicapped, these terms do not put the focus on the person, reducing their value and dignity.

- **Avoid negative descriptions of the person:** Focusing on their difficulties, what they cannot do or their disorders or health problems is often a way in which people with disabilities are described and, in doing so, we are creating a negative social image that hinders their social inclusion.

- **Avoid exaggerated descriptions:** Falling into sensationalism or exaggeration, even if it is to communicate positive terms, can produce a contradictory effect and detract from the merits acquired by valuing them disproportionately

TO FIND OUT MORE:

Disability : overview

Different types of disabilities

Union of equality: Strategy for the rights of persons with disabilities 2021-2030

People with disabilities

CONCEPT MAP

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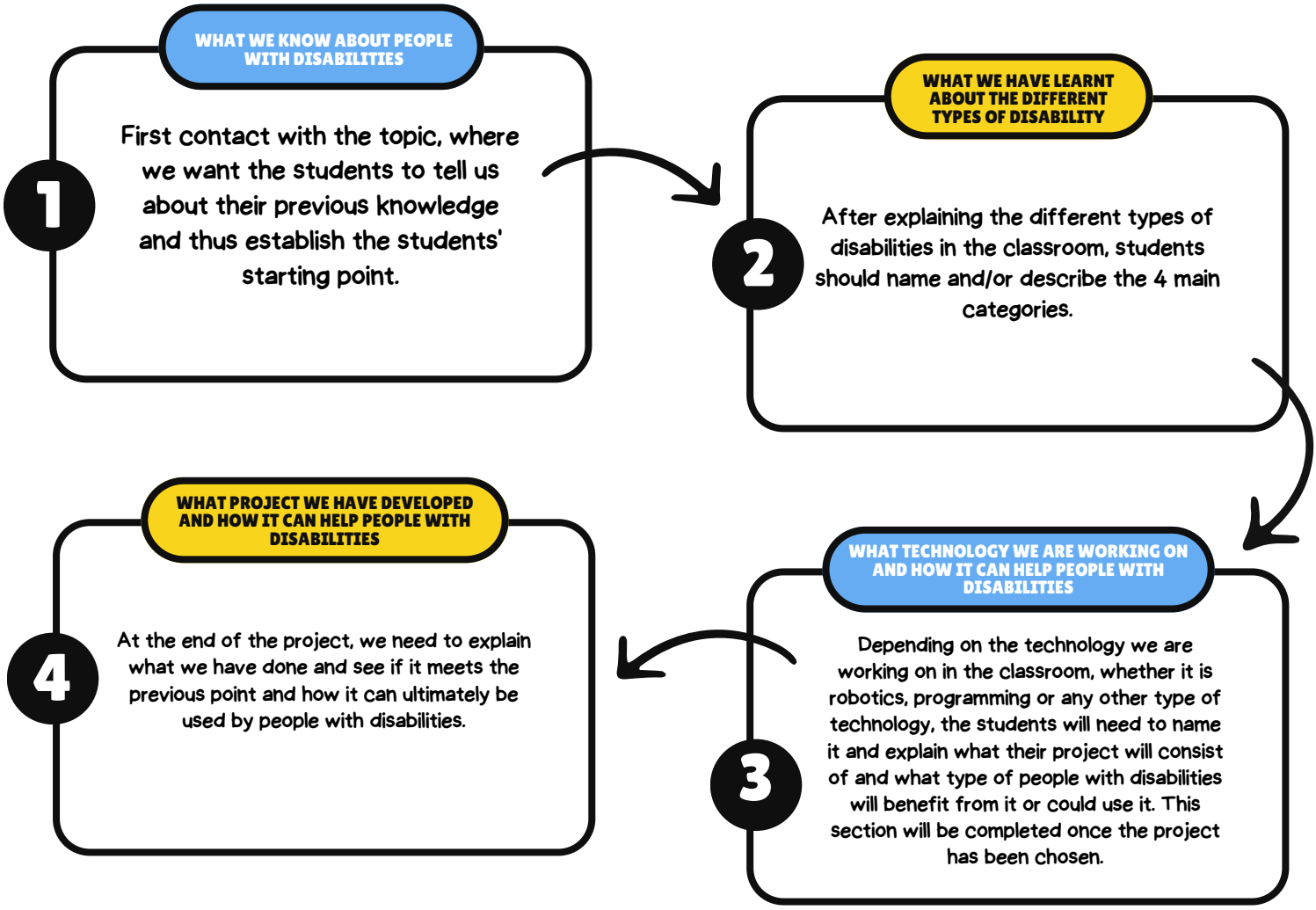
4. CONCEPT MAP

Creating a concept map will help us to organise and visually represent the content of our project, allowing students to better structure their learning.

In this guide, we will show an example developed for Brain Waves, where we intend to start from the students' previous knowledge about people with disabilities, so that later, when we use the technological tools, we can reflect on whether the activities we develop meet the needs of people with disabilities in terms of access to and use of technology.

The conceptual map proposed for this project will include the following sections:



Our advice is that each project should have its own concept map, although a larger one can be developed showing all the projects created.. We also advocate that the information and descriptions should be brief and, if possible, include a picture of the projects created for each team or group of students.

See attached : Concept Map sheet

5. STAGES IN THE CREATION OF THE DIGITAL PRODUCT

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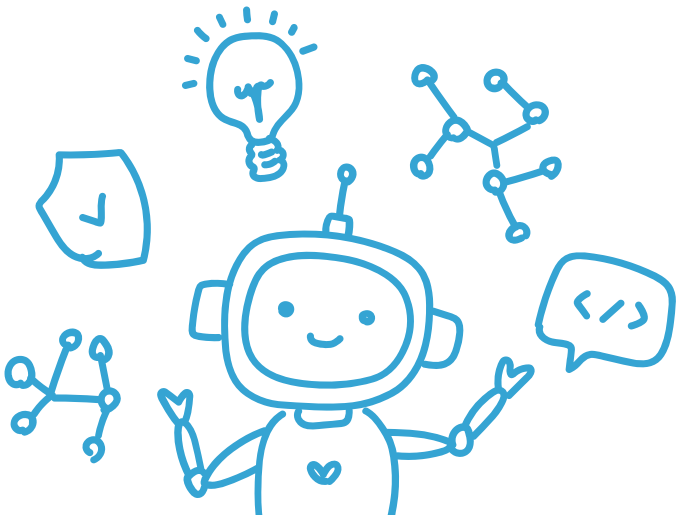
5. STAGES IN THE CREATION OF THE DIGITAL PRODUCT

In this section, we present our didactic proposal, carefully designed to ensure the successful execution of our project.

Our project is outlined in different phases, strategically designed to enhance the learning process. Below, we outline the essential **strategic guidelines** to maximise the educational experience:

- **Start by motivating the students** based on their prior knowledge and establish this as the first stage of the project.
- **Encourage teamwork** by carrying out all activities in groups to encourage collaboration.
- **Develop a concept map** for each team so that they can clearly visualise the proposed learning strategy as they progress through the project phases.
- **Encourage students** to be creative in finding solutions and designing activities.
- **Set aside a time for final reflection**, where teams evaluate whether the hypotheses of their project have been fulfilled, based on their concept map, and support their conclusions.
- **Involve the families in the results** to emphasise the idea of service-learning and to increase the students' satisfaction with the work done.
- **Use group dynamics** in the initial stages to promote empathy towards people with disabilities, using specific examples or any other activity that teachers consider relevant.

These guidelines are designed to enrich the educational process by making learning more interactive, reflective and service-oriented to the community.



Students' background knowledge and initial assessment

STAGE 1

WHAT IS IT?	Initial phase in which we will explain the project to the students and check their previous knowledge about disability, the contact they have had so far with people with disabilities and their initial perception of how technology can help people with disabilities and how they can participate in this process.

PROPOSED ACTIVITIES:

First of all, we are going to explain the objective of the Brain Waves project and the methodology we are going to use to carry it out.

To do this, we can use the presentation document (in the appendix) and the **video** of the project carried out by ASPACE SEVILLA, which we will leave in the link to the resources used.

As this is an Erasmus+ project, it is an excellent opportunity to enrich the educational experience by incorporating additional concepts. It is suggested to encourage students to share personal knowledge and experiences about the countries involved in the project. Encourage students to introduce themselves and reflect on any personal connections they may have with one of the partner countries. (if they have ever visited the country, what their favorite country is, any cultural experiences they've had related to that country, or if they know any interesting facts about it).

Next, we introduce the conceptual map of the project and explain how we will use it to visualise the knowledge we have before the project starts, what we will learn during the project and how we will apply this learning. We also preview the technological tools we will be using, such as Scratch, Lego, Makey Makey, Bee-Bots and others, and explain their importance not only in learning technology, but also in using it responsibly to benefit people with disabilities.

We motivate the students by highlighting the relevance of their work, which could directly benefit a specific person, be it someone from the school or another organisation, or a wider group of people with disabilities, as the projects will be shared on the BRAIN WAVES project website.
We then asked general questions to find out their perceptions and previous experiences of people with disabilities: how many they know, what experiences they have had, what they think people with disabilities can or cannot do, whether they use technology and how they think it can help them. The aim of this dialogue is to raise awareness and create a reflective starting point about the abilities and needs of people with disabilities, and to emphasise the importance of inclusive use of technology.
Their answers will be reflected in the general concept map for the classroom.

After the initial introduction, we will instruct the students to divide into working teams. [1] Each team will be provided with poster board and various materials to develop their own concept map and to answer the initial project questionnaire together. This approach encourages collaboration at an early stage and allows students to reflect and consolidate their knowledge and expectations of the project.

At the end of this phase we will give each team a project presentation document. This document is intended to be taken home and presented to their families, with the aim of involving them in the learning process from the outset. This strategy aims to extend the educational impact beyond the classroom, promoting dialogue and family involvement in the Erasmus+ project and in the students' educational process.

GROUP DYNAMICS	At the end of the second session, we will implement a group dynamic focused on understanding the experiences of people with visual impairment. In each team, one student will be blindfolded with a handkerchief or similar material. This student, sitting in front of another student, has to identify his or her partner by touching only one part of the body, such as hair, hands or face. The other team members then choose an object from the class and place it in front of the blindfolded student to identify by touch. Participants take turns so that everyone experiences the exercise. The teacher can add variations to the activity, such as moving around the classroom blindfolded, trying to leave the classroom or going to another part of the school, always ensuring the safety of the pupils. We will conclude the exercise by bringing the whole class together for a discussion. The teacher will ask the students how they felt during the activity, whether they found the exercise easy or difficult and ask them to think about what everyday life should be like for a visually impaired person. This discussion should encourage empathy and recognition of the skills that visually impaired people develop to navigate their environment.
RESOURCES USED:	Document Explanation of the project to the students Presentation videos: https://www.youtube.com/watch?v=AQ9r2lLXVeo General Concept Map Concept map by teams Initial assessment questionnaire Explanation of the project to families Materials for Group Dynamics. Tissues or something to cover the pupils' eyes.
TIME USED:	2 sessions. 1 for the group work and presentation of the project and another for the division into working teams, the elaboration of the team's conceptual map, the elaboration of the questionnaire and the group dynamics

Knowing the different disabilities

STAGE 2

WHAT IS IT?	A theoretical approach to disability in which we aim to explain to students the different types of disability, grouped according to the consequences they have on people.

PROPOSED ACTIVITIES:

In order to bring the subject of disability closer to the pupils and to facilitate their understanding, we will use the information contained in section 3 of this guide as a reference. It is suggested to complement this information by watching a video or reading a story chosen by the teachers, taking into account the availability of materials in the appropriate language for each European context.
We recommend the story "Por 4 esquinitas de nada" by Jérôme Ruillier, available in several languages, as a valuable teaching resource. This story can be presented and narrated to the pupils, inviting them to share their interpretations and reflections on the reading.
In addition, we suggest the use of other interesting videos, available in different languages, which can stimulate discussion. Although we do not specify specific titles due to the diversity of linguistic contexts in Europe, we encourage teachers to select the resources they consider most appropriate and accessible in their language, always with the aim of enriching learning and promoting constructive discussion about disability and inclusion.

- The Present - CGI Awarded short film (2014)
- El Cazo de Lorenzo. Cortometraje animado sobre la discapacidad.

After explaining and learning about the different categories of disability, we will proceed to write them on the general conceptual map of the classroom, specifically in the second box provided. This step is crucial to visualise and consolidate the knowledge acquired about the classification of disabilities.
In the case of each team's concept maps, they will be further completed by linking the information in the second box with the information in the third box. This integration will ensure that the concepts mentioned are related and well understood by the students, facilitating a deeper and more applied understanding of the topic.

To conclude the session, we propose an active and reflective dynamic: the different teams will explore the school to identify barriers or difficulties that people with disabilities might face. This activity not only promotes empathy and awareness of accessibility, but also teamwork and critical observation of the environment. The results of this exploration will then be shared with peers, enriching collective learning.
The duration of this activity can be adjusted as needed, limiting the exploration to a specific area of the school, setting a specific time for its completion, or focusing on identifying a specific number of barriers, e.g. three. This flexibility allows the dynamics to be adapted to the specific conditions of the school and the time available, ensuring a meaningful and practical educational experience.

GROUP DYNAMICS	Walking through the building and identifying barriers
RESOURCES USED:	Theoretical material presented in chapter 3 Videos or stories in local language or story by Jérôme Ruillier
TIME USED:	1 or 2 sessions, depending on the number of materials you wish to use and the time you wish to devote to group dynamics. We recommend that you focus on learning and devote two sessions to this.

Getting to know a person with a disability

STAGE 2.1

WHAT IS IT?	In order to effectively develop the selected project, it is essential to gather detailed information about the person with a disability at the centre of the project, focusing in particular on their likes, hobbies and experiences with technology. This process will enable the design of a solution or product that is not only accessible and useful, but also personalised and meaningful to the person involved

PROPOSED ACTIVITIES:

If the project can be addressed to a specific person with a disability, rather than to a group or category of people with disabilities, we will devote some time to getting to know them and gathering information about their personality, tastes, hobbies, needs and abilities. We will use this information as a basis for developing the application or activity that makes up the project.
To gather information, we will first have the pupils prepare an interview script, which will be the main activity in this phase.
We will tell them that the aim is to get to know the person better at the end and that they should work on 10 questions that they should agree among the members of the team or class.
We will leave them free to write their script, although depending on the experience of the group and the teacher's criteria, we can give them some guidelines or categories in which to group their 10 questions, such as personality - likes, activities I do on a daily basis or experience with technology.
Once the questions have been carefully developed, the method of asking them will depend directly on the situation and availability of the person with a disability chosen for the project. The options are varied and can be adapted to each specific case:
1. **Personal interview:** If the person with a disability is a member of the school or lives nearby, a face-to-face interview would be ideal. This approach allows for direct communication and the possibility of observing any non-verbal reactions that may be relevant to the project.
2. **Video call:** For people who are physically inaccessible due to distance or health restrictions, video calls offer a practical alternative. This modality allows for real-time visual and audio interaction, facilitating a fluid and personal dialogue.
3. **Intermediation by professionals:** In cases where the person with a disability is unable to communicate directly due to specific limitations, or if it is simply preferable, questions can be referred to professionals in the centre or institution to which he or she belongs. These may be therapists, educators or carers who are familiar with the person and can provide detailed and accurate answers.

Each of these methods has its own advantages and can be chosen according to the comfort and preference of the person with a disability, as well as the logistical possibilities of the project team. It is important to ensure that the process is respectful, inclusive and designed to gather the necessary information in the most effective and sensitive way.

RESOURCES USED:	Script of the interview conducted by the students
TIME USED:	1 session

Choosing the project

STAGE 3

WHAT IS IT?	This phase is carried out in parallel with the learning process of the technology we are working on in the classroom. The teacher, depending on the technology, will choose the ideal moment to develop it and will consist in choosing the project, defining the work to be carried out and the people with disabilities to whom it will be addressed. A category or group of people with disabilities will be chosen, unless it is a design adapted to a specific person.

PROPOSED ACTIVITIES

At an advanced stage of the course, having acquired the necessary technological knowledge, students will organise themselves into groups to select and define their projects. This session will be dedicated to team discussion and decision-making, during which students will be asked to
- Decide on the **type of project** to develop.
- Decide which **people with disabilities** the project will target.
- Define the **objectives** they want to achieve with the project.

The teacher will play an active role in this process, providing guidance and examples of previous projects as a reference to clarify learning objectives and implementation. These examples will serve to inspire and guide the students in their creative and decision-making process.

Each team will first present their idea to the teacher and then document their decision in boxes 2 and 3 of the team concept map. This not only makes it easier to organise the ideas, but also ensures that all team members are aligned with the project objectives.
If students find it difficult to decide or generate ideas, they are encouraged to reflect and discuss between sessions, giving them extra time to consolidate their proposals. This flexibility is intended to encourage collaboration and commitment to the project, as well as to allow for a deeper exploration of the possibilities.

In the following session, the teams finalise their ideas and present them to the class, explaining the concept of their project, its relevance and how it could benefit the selected people with disabilities. After each presentation, the teacher will encourage reflection on the challenges faced during the decision-making and collaboration process, thus promoting deeper learning about teamwork and conflict resolution.

RESOURCES USED	Conceptual map Examples of activity sheets It will also be possible to search for information and ideas on the web.
TIME USED	2 Sessions, one for work on the idea and one for presentation to the teacher and the rest of the class.

Development

STAGE 4

WHAT IS IT?	This is the process of creating and developing the solutions proposed in the previous phase.

PROPOSED ACTIVITIES

At this stage of the project, the approach becomes more technical, with the teacher guiding the practical application of the technological tools studied in the classroom. Despite this technical approach, the project continues to emphasise and work on the core values it seeks to promote, such as awareness and inclusion. This is achieved through different actions during the project creation process:

1. **Identification and definition of needs:** Begin by identifying and explaining the need behind each proposed solution, discussing why they were chosen and how they specifically address the needs of the target group.

2. **Preparation and familiarisation with the target group:** By developing the solutions, students become more familiar with the people they are designing for and better understand their specific challenges and needs. This process helps students to connect with the target audience on a more personal and meaningful level.

The role of the teacher is key in ensuring that project designs are developed taking into account the characteristics and needs of the people with disabilities who will be the final recipients. This requires a deep and empathetic understanding, putting oneself in the shoes of people with disabilities to ensure that solutions are truly useful and accessible.

To facilitate the understanding and application of these principles, the worksheets or examples presented in section 7 can be used as a reference. These examples serve not only to illustrate the practical purpose of this phase, but also to inspire students to think innovatively and empathetically in their own projects.
This integrated approach ensures that although the phase is technically oriented, the values of awareness, empathy and inclusion remain central, reinforcing the idea of service learning and the importance of designing with and for people with disabilities

RESOURCES USED	Theoretical material specific to the subject to be taught Example activity sheets
TIME USED	At the discretion of the teaching staff depending on the type of subject taught.

Presentation of the project

STAGE 5

WHAT IS IT?	Presentation of the work carried out

PROPOSED ACTIVITIES

At the end of the project, we propose three activities to share and disseminate the results obtained:

1. Presentation to other students: At the end of the project and after completing the last section of the concept map, which details the design and checks that it corresponds to the original vision, each team will present its work and concept map to the rest of the class. The teacher will ask questions about the creative process, the dynamics of teamwork and the lessons learned about people with disabilities during the project.
2. Presentation to family and community: It is suggested to organise a meeting with the families so that the teacher can present the project and the students can give the same presentation they gave to their classmates. Alternatively, a video of all the projects and the students' reflections could be made and shared with the families if this is more convenient.
3. Handing over the project to the person with a disability or to a related institution: This activity is optional and depends on whether the project was designed for a specific person with a disability. In this case, the project will be given directly to him/her, explaining how it works and how he/she can benefit from the technology developed. If the project is aimed at a wider group, an organisation representing people with the disability in question could be contacted to present the work to them. There is also the possibility of including the projects on the Erasmus+ project website, which requires the teams to send their work to a specific address.

These activities not only serve to share the project's achievements and learning, but also promote inclusion, raise awareness of disability and reinforce the importance of working together and serving the community.

RESOURCES USED	We recommend the production of an informative video of the work carried out.
TIME USED	The presentations may last between 2 and 3 sessions, as they will include a presentation in the classroom, a presentation to families and the production of an informative video.
GROUP DYNAMICS	We recommend the production of an informative video of the work carried out.

Impact

STAGE 6

WHAT IS IT?	Measuring project impact
We will have an assembly in the classroom with all the pupils to share our feelings and what we have learnt during the project, we will review the general conceptual map of the class, including the names of the projects carried out, and we will fill in the final questionnaire of the project. It would be interesting for everyone to evaluate their answers in the initial or final questionnaire, or for the teacher to do it, and check how their impressions and knowledge about people with disabilities and their access to and use of technology have changed during the course of the project. We will conclude with some group dynamics, which will consist of printing an alphabet in sign language and the pupils can practise spelling their name or the name of their project, or they can play a game of hangman, where instead of naming the letter, the pupils have to spell it in sign language	
GROUP DYNAMICS	Sign language
RESOURCES USED	Final evaluation questionnaire Classroom concept map
TIME USED	1 session

PHASES	STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5	STAGE 6
NO. SESSIONS	2	2	1	VARIABLE	2	1
ESTIMATED DURATION	Duration variable depending on the subject or technological tool worked on, estimation: Project with an estimated duration of 12 sessions or classes What about having at least 10 sessions/ classes?					

6. PROJECT MATRIX

Phase 1. Experience of/with people with disabilities

Content

Students will hear a presentation by a teacher about the project and its purpose. Here, films are shown to support student understanding. Students will meet a partner from Odense Atletikstadion who will talk about athletics for people with disabilities.

The students will go on a trip to Odense Athletics Stadium, where a partner will welcome and guide the students through athletics exercises that they must perform as a person with a disability. This could be blindball, where students are blindfolded and have to play ball with a bell in it.

Students, teachers and partners should engage in an open dialogue about the project together. There must be room for questions and curiosity about the specific tasks the students will perform, the new knowledge they gain about people with disabilities, and the associations and thought processes that may arise in the individual student that give rise to curiosity and wonder.

Knowledge

Students will learn about different disabilities. Through conversation, films and presentations, they will learn about being blind, deaf or missing a limb. Learn about people with disabilities and their everyday lives. Experience what it's like to be disabled. The ethical issue of supporting and helping people with disabilities to be equal participants, rather than depriving them of participation.

Skills

Learners should have a beginning understanding of what everyday life can also look like for a person with a disability. Students have to work together in different exercises. Students need to listen and engage in dialogue with classmates around the topic.

Phase 1. Experience of/with people with disabilities

Education

Students need to have a more nuanced picture of what it means to have a disability. In addition, the project must help broaden the pupils' view of humanity, cf. the primary and lower secondary school's purpose §1 paragraph 3 "The primary and lower secondary school shall prepare pupils for participation, co-responsibility, rights and duties in a society of freedom and democracy. The school's activities shall therefore be characterised by intellectual freedom, equality and democracy."

Phase 2. Technology understanding at child level

Content

Students should be introduced to the following technologies: Makey Makey, Lego and Scratch by their teacher. Students will try out the technologies and test their already acquired skills in each technology field. In their previous school years, students have worked with technology in various subjects and topics and therefore already have a greater or lesser knowledge of technology and its capabilities. Therefore, for most students, this phase is an extension of the experience they have already gained from previous technology lessons.

Knowledge

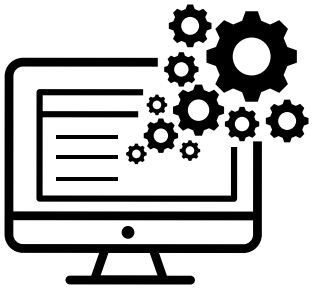
Introduction to the following technologies: Makey Makey, Lego and Scratch. Students need to gain experience with the different technologies. They need to get to know the programmes and processes to be able to work with the technologies based on their own thinking. Students will watch a film that shows what to look out for when working with technology.

Skills

Students should have a beginning understanding that their work with technology needs to be clarified and deepened in order to achieve the desired results in their project.

Education

Experiences with error processes in coding, for exmple, when you are not clear enough or nuanced enough



Phase 3. Problem solving through technological platforms

Content

Students will use their acquired knowledge from Phase 1 and 2 to build/design/code/create one of the scaffolded projects. This is done in smaller groups that are put together based on who works well together and plays well with each other. Templates are created within each technology so students can work from the template and with a given technology. Each template concretises a need or problem to be solved. The starting point is a need or problem for a person with a disability that the students must consider and work from.

The templates are scaffolded for learners to work with the technologies based on different assumptions and skills. Students who need extra support and/or guidance can work from a tightly scaffolded template, whereas other students are able to work with a more open framework where their own knowledge and experience can be incorporated into their template/project.

Knowledge

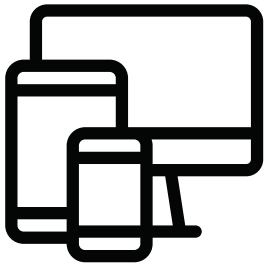
Learners use knowledge from previous technology training, recently taught technology presentations and knowledge about people with disabilities to frame their work with the scaffolded templates.

Skills

Students are working in their zone of proximal development as they work with the knowledge they have acquired through previous learning and are ready to learn and build on their knowledge of the technologies.

Education

Beginning to understand the potential impact of technology on people with and without disabilities.



Phase 4. Lessons leanrt and possible development of new projects

Content

Students work on their projects for x number of lessons over the course of a week.
The groups work in a project-orientated way. They need to gain experience while working with the templates. They will learn from their mistakes and form new hypotheses and solutions to any issues. They will revisit their work and possibly further develop their template.

As mentioned earlier, students work from different backgrounds. Therefore, some students will be equipped to create their own problem and solution to meet the needs of a person with disabilities. Other learners benefit from having a framework and guidance and will therefore develop best within the teacher-led templates.

Knowledge

Students use their knowledge and skills in disability and technology to work on issues and solutions for people with disabilities. Learners continuously gain more experience with the project-based methodology. They become more confident in the execution of the different templates and can start to transfer their own thoughts and wonderings into new concrete projects that can be developed in one of the 3 technologies.

Skills

Learners can bring in ideas from their own experiences to create new possible problems to work on. They can sort through their ideas and choose which problems they can best work on based on their knowledge and skills.

Education

Experience and acceptance of how processes work. That mistakes and new experiences help shape and develop the individual learner.

Phase 5. Technology review

Content

Students continue to work on their projects, both scaffolded and less scaffolded. They test, gain experience, get input and new ideas for solutions or changes to their project. They retool and retest their adjustments.

Knowledge

Students continuously gain more experience with the project-based methodology. They work in a solution-orientated way and constantly gain new experiences with their choices in the project. They further develop and test their choices anew.

Skills

Continued learning about your own chosen issues, technologies and ethical dilemmas in relation to people with disabilities. people with disabilities.

Education

Experience and acceptance of how processes work. That mistakes and new experiences help shape and develop the individual learner.

Phase 6. Presentation and knowledge sharing

Topics

Students present their projects to classmates, teachers and possibly other relevant citizens. This happens regardless of whether students are working with one of the guiding templates or whether they have created their own problem that they have worked from.

Students present their projects knowing that they may not have completed their project. They may not have been able to solve the problem they have been working on. However, along the way, students have gained a lot of experience and knowledge about their projects that they can share with their classmates. This can lead to new ideas or approaches that students can take with them and apply to their projects and possibly find a solution.

Knowledge

Students share knowledge with each other and contribute to their own and others' projects. Some may have solutions to other people's problems.

Skills

Present and explain a project based on working with technologies, troubleshooting and ongoing adjustments.

Education

Experience with presentations. Acceptance of how processes work. That mistakes and new experiences help shape and develop the individual learner. Open to others' suggestions and possible solutions to a given problem.

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: DAILY ROUTINE VISUAL SCHEDULE WITH SCRATCH

Age/educational level of participants: 8/9 years old

What skills or knowledge are students expected to develop?

- Students will learn how to organise tasks and activities in a sequential order, reflecting their daily routines. This helps develop their understanding of time management and the concept of a schedule.
- Students will develop basic programming skills, such as sprite manipulation, event handling, and block-based coding.
- Throughout the activity, students will encounter challenges and obstacles that require problem-solving skills to overcome.
- By using the visual schedule to guide their daily routines, students will develop independence and self-management skills.

Estimated Duration: 1h

Learning Objectives:

One of the most challenging aspects for people with autism is managing timing and organizing tasks. Many students with autism benefit from having a structured visual schedule to help them navigate their daily routines. However, traditional visual schedules may not always be readily accessible or customizable.

Materials needed

- Computer or tablet with internet access and Scratch installed (Scratch can also be accessed online).
- Scratch account (optional, but recommended for saving and sharing projects).
- Images or icons representing various daily activities (e.g., waking up, brushing teeth, eating breakfast, going to school, etc.).
- Scratch Cat or other sprites for programming.

Description of the Disability

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by challenges in social interaction, communication, and repetitive behaviors. Individuals with autism may have difficulty understanding and interpreting social cues, which can impact their ability to navigate daily routines and tasks. Additionally, they may exhibit sensory sensitivities or preferences, such as sensitivity to certain sounds, textures, or visual stimuli.

Pre-Activity Preparation

- Prepare the environment: ensure the workspace is free from distractions and clutter to minimise sensory overload.
- Provide a quiet and comfortable seating area with appropriate lighting.
- Set up a computer or tablet with Scratch installed and ready to use.
- Prepare any additional materials needed for the activity
- Enlarging text and buttons for easier visibility if necessary
- Simplifying the interface by hiding unnecessary features or menus.
- Familiarise the student with the Scratch interface and basic functionalities before starting the activity.

Development of the activity

Introduction Explain the concept of a visual schedule to the student, emphasizing its role in helping them organize their day. Discuss why having a visual representation of tasks can be beneficial.

***Set up* (10 MINUTES):** Together with the student, brainstorm a list of their daily activities and routines. Students can collect this information during the interview they will do with the student with disability. Encourage them to think about both weekday and weekend routines.

***Create the visual schedule* (30-40 MINUTES):** Open scratch and start a new project. Use the sprite library or upload custom images/icons to represent each activity from the brainstorming session. Arrange the sprites on the Scratch stage to create a sequential visual schedule, mimicking the student's daily routine. Add text labels or speech bubbles to provide additional information or instructions for each activity. Use Scratch blocks to program interactive features, such as clicking on a sprite to hear audio instructions or marking completed tasks.

***Customization* (10-15 MINUTES)**: Allow the student to personalize their visual schedule by choosing colors, fonts, and background images that appeal to them. Encourage them to add any additional features or functionalities they think would enhance their experience.

***Testing* (10 MINUTES)**: Test the visual schedule with the student, guiding them through each step of their daily routine. Encourage the student to provide feedback on the usability and effectiveness of the schedule. Make any necessary adjustments based on their input.

***Implementation* (5 MINUTES) :** Once the visual schedule is finalized, show the student how to save and access it on their computer or tablet. Encourage them to use the visual schedule daily as a tool for organizing their routines and fostering independence

Support and Facilitation:

- Pair students with and without disabilities together to work on creating their visual schedules with Scratch.
- Encourage them to support each other, share ideas, and collaborate on designing and customizing their schedules.
- Encourage students to take turns teaching each other how to use Scratch and navigate the visual schedule.
- Students without disabilities can support their peers by providing explanations, demonstrations, and troubleshooting assistance.
- Encourage students to listen to each other's perspectives, ask questions, and collaborate on finding creative solutions.

Ideas for modifying the activity for different ability levels and types of disabilities.

- Note: It's essential to consider the individual preferences and needs of the student when designing the visual schedule. Additionally, ongoing support and reinforcement may be necessary to help the student effectively utilize the schedule in their daily life.

- Provide alternative input devices, such as adapted keyboards, switches, or touch screens, for students with limited mobility or dexterity.

- Incorporate voice commands or gesture-based controls for students who may have difficulty using traditional input devices.

- Offer options to adjust the volume, speed, and intensity of sounds and animations within the Scratch project.

- Offer alternative modes of communication, such as visual supports, augmentative and alternative communication (AAC) devices, or sign language, for students with communication disorders.

Additional Resources

- Scratch per Educatori
- https://www.youtube.com/results?search_query=scratch+tutorial

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: CREATE WASTE SORTING GAME WITH SCRATCH TO HELP STUDENTS WITH DISABILITIES TO DO WASTE SORTING

Age/educational level of participants: 8 years old /2nd primary

What skills or knowledge are students expected to develop?

- Understanding waste sorting
- Basic coding skills

Estimated Duration: 1h

Learning Objectives:

Students will be able to identify and categorize different types of waste

Materials needed

- Scratch
- Laptop

Description of the Disability

Student with intellectual disability

Pre-Activity Preparation

- Accessible space : classroom or workspace organised in a way that allows for easy access
- Adjust the font size and colour contrast to make text and visuals easier to read for students with visual impairments.
- Power point to present the activity and scratch

Development of the activity

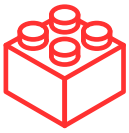
Introduction After an introduction regarding the importance of Waste sorting, ask questions to engage students, such as, "Who knows what can be recycled?" or "Can anyone tell me why composting is important?"
Then, ask the student to imagine a student named Alex who has autism. Alex doesn't communicate using words, but he's really good at understanding pictures. This means we can help Alex communicate by using images.

This way of communicating is called a 'communication board,' and it helps Alex share his thoughts and needs with everyone around him. Then we will work together to create a waste sorting game that everyone can understand and enjoy.

Design **(10 MINUTES):** Allow students time to brainstorm ideas for the visual interface and discuss how they want to implement the waste sorting game in Scratch. Students can collect this information during the interview they will do with the student with disability. Provide guidance and support as needed.

Programming (30-45 minutes): Students begin programming the Scratch project based on their design and planning. They will need to create the visual interface, program the interactive elements and test the functionality.The project will include:

- different elements for waste items
- Bins for sorting waste items
- scripts that allow sorting items by dragging and dropping or another interactive method



Testing (15-20 minutes): Once the programming is complete, students test the Scratch waste sorting game to ensure that it functions as intended.

Discussion (10-15 minutes): Conclude the activity with a reflection session where students share their experiences, discuss what they learned, and provide feedback on the process.

Support and facilitation:

- Provide individualized support to students as needed, offering assistance with programming tasks, navigating Scratch, or using assistive technologies
- Foster collaboration between students with and without disabilities

Ideas for modifying the activity for different ability levels and types of disabilities.

The activity can be tailored to accommodate different ability levels and types of disabilities by providing flexible options for participation. Depending on the individual's preferences and abilities, they can choose the method that best suits them.

Additional Resources

https://scratch.mit.edu/

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: DISCOVER AND SHOW YOUR EMOTIONS THROUGH LEGO

Age/educational level of participants: 8 years old /2nd primary

What skills or knowledge are students expected to develop?

- To explain their emotions using LEGO
- To improve creativity and problem-solving skills
- To stimulate visual and auditory senses, promoting sensory integration and awareness.

Estimated Duration: 1h

Learning Objectives:

To help the student identify and express their emotions through LEGO
To encourage emotional expression through a non-verbal medium, which can be easier for some individuals with autism.
To promote creativity and imagination.
To enhance fine motor skills through manipulating LEGO bricks.
To provide a structured activity that can help in reducing anxiety and promoting focus.

Materials needed

- LEGO Spike essential
- Emotion cards

Description of the Disability

Student with intellectual disability/ Autism intellectual disability

Pre-Activity Preparation

It's essential to create a supportive environment during the activity, allowing the student to express themselves freely without pressure. Additionally, adapt the activity as needed based on the student's preferences and abilities.

Introduction (5 minutes): Introduce the concept of emotions using visual aids or simple explanations. Show the student the emotion cards and briefly discuss each emotion.

Setup (10 minutes): Set up the LEGO Spike Essential set and connect it to the computer or tablet with the Spike Prime app. Familiarize the student with the different components of the set and how they work together.

Emotion card selection (5 minutes): Spread out the emotion cards and ask the student to choose one that represents how they're feeling at that moment.

Programming Phase (20-25 minutes):

- Guide the student to use the Spike Prime app to create a program that will activate specific LED lights and sounds based on the chosen emotion.
- For example, if the student selects the "happy" card, they can program the LED lights to glow in bright yellow and play a cheerful tune. If they select the "sad" card, the lights might turn blue and play a gentle melody.

Testing and adjustments (10 minutes): Allow the student to test their program and make adjustments as needed to ensure that the lights and sounds accurately represent the chosen emotion.

Sensory exploration (10 minutes): Encourage the student to explore the sensory experience created by their program. They can observe how the lights change color and how the sounds evoke different emotions.

Reflection (10 minutes): After the sensory exploration, facilitate a discussion with the student about their experience. Ask them to reflect on how the lights and sounds made them feel and whether it accurately represented the chosen emotion

Ideas for modifying the activity for different ability levels and types of disabilities.

Provide support and encouragement to the student throughout the activity, especially during the programming phase.
Adjust the complexity of programming tasks based on the student's skill level and familiarity with the Spike Prime app.

Additional Resources

https://scratch.mit.edu/

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: CREATE A TAP SIMULATOR THAT HELPS STUDENTS WITH DISABILITIES TO DISTINGUISH BETWEEN HOT AND COLD WATER THROUGH VISUAL AND AUDITORY FEEDBACK.

Age/educational level of participants: 8 years old /2nd primary

What skills or knowledge are students expected to develop?

- By learning to distinguish between hot and cold water in a simulated environment, students with disabilities gain practical knowledge that can contribute to their independent living skills.
- Problem-solving skills
- Students will gain proficiency in using Scratch to create interactive simulations

Estimated Duration: 1h

Learning Objectives:

- Students will develop sensory perception skills
- Collaboration and teamwork skills

Materials needed

- Scratch Tap Simulator
- Laptop

Description of the Disability

Student with intellectual disability/ Autism

Pre-Activity Preparation

- Accessible space : classroom or workspace organised in a way that allows for easy access
- Adjust the font size and colour contrast to make text and visuals easier to read for students with visual impairments.

Development of the activity

Provide an overview of Scratch and demonstrate how to access the Scratch Tap Simulator

Design (15-20 minutes) : Allow students time to brainstorm ideas for the visual interface and discuss how they want to implement the feedback mechanisms for hot and cold water. Encourage them to consider accessibility features and how the simulator can accommodate students with disabilities

Programming (30-45 minutes): Students begin programming the Scratch project based on their design and planning. They will need to create the visual interface, program the interactive elements (such as the knobs and feedback), and test the functionality of the simulator.

Suggestion: students could add sound feedback for each knob. For example, when a student selects the hot water knob, a sound suggesting warmth, **such as the sound of a boiling kettle**, could be emitted. Conversely, when the **cold water knob is selected, a sound suggesting coolness, such as the sound of water flowing from a stream**, could be emitted. Moreover students could program the interface so that when a student selects the hot water knob, the tap graphic turns red or emits a red light. Similarly, when the cold water knob is selected, the tap turns blue or emits a blue light.

Testing (15-20 minutes): Once the programming is complete, students test the Scratch Tap Simulator to ensure that it functions as intended.

Discussion (10-15 minutes): Conclude the activity with a reflection session where students share their experiences, discuss what they learned, and provide feedback on the process.

Support and Facilitation:

- Provide individualized support to students as needed, offering assistance with programming tasks, navigating Scratch, or using assistive technologies
- Foster collaboration between students with and without disabilities

Ideas for modifying the activity for different ability levels and types of disabilities.

The activity can be tailored to accommodate different ability levels and types of disabilities by providing flexible options for participation. Depending on the individual's preferences and abilities, they can choose the method that best suits them.

Additional Resources

https://scratch.mit.edu/

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: COMMUNICATION WITH SOUNDS

Age/educational level of participants: 6 years old / 1st year of primary school

What skills or knowledge are students expected to develop?

- Science
- Technology
- Engineer
- Mathematics
- Linguistic communication

Estimated Duration: 45-90 minutes

Learning Objectives:

- Design and build devices to communicate.
- Submit your designs

Materials needed

- Set SPIKE
- Device with Lego SPIKE app

Description of the Disability

People with visual impairment.

Pre-Activity Preparation

The materials will be placed on the table and you will have the support of the reference person who will bring the materials close to you for you to manipulate them, so that you can identify them within your perimeter of vision.
The operating system will be adapted and set to high contrast if necessary and the font size will be changed.

Pre-Activity Preparation

There will be an explanation of what visual impairment is. The teacher will ask what kind of adaptations a person with this disability could have at home, in their mobile phone and in their daily life. Brainstorm ideas.

Presentation of a case study of a visually impaired person. Maria buys her first mobile phone. What will she have to put on it when her father or mother calls her? And at home when she is alone and the postman calls?

They will get into groups of 2 or 3 and brainstorm for 10 minutes what they want to build or programme for Maria's case. Once they have come up with the idea they want to achieve, they will start programming for about 25 minutes.

Plan some ways to use a sound as a code.

Design and build a device that emits sounds.

Presentation of each work in groups.

Support and Facilitation:

Encourage the individual to engage in discussion and brainstorming with peers.

Ideas for modifying the activity for different ability levels and types of disabilities.

If the person who is going to do it also has an intellectual disability. Explain that in everyday life sounds are used to send signals such as fire engines, police cars, mobile phones. Plan ways to use sounds and create a code.

Additional Resources

https://education.lego.com/es-es/lessons/spike-essential-science-see-it-hear-it-build-it/spikeessential-communicate-with-light-and-sound/

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: COMMUNICATION WITH LIGHT

Age/educational level of participants: 6 years old / 1st year of primary school

What skills or knowledge are students expected to develop?

Accounts and operations
Technology
Linguistic communication
Engineer and Math

Estimated Duration: 45-90 minutes

Learning Objectives:

Design and build devices to communicate. and submit your designs

Materials needed

Set SPIKE
Device with Lego SPIKE app

Description of the Disability

Motor disability. Triplegia, affects one upper limb and the lower limbs. He has repetitive and uncontrollable movements.

Pre-Activity Preparation

For the use of the computer, the keyboard, which will have a cover, will be attached to the table by means of Velcro. The mouse will have to activate mouse keys to use the numeric keypad and move the pointer with the mouse. There is also the possibility to attach a ball mouse.

Development of the activity

Introduction There will be an explanation of what hearing impairment is. The teacher will ask what kind of adaptations a person with this disability could have at home, in their mobile phone and in their daily life. Brainstorm ideas.

Presentation of a case study of a hearing impaired person. Maria buys her first mobile phone. What will she have to put on it when her father or mother calls her? And at home when she is alone and the postman calls?

They will get into groups of 2 or 3 and brainstorm for 10 minutes what they want to build or programme for Maria's case. Once they have come up with the idea they want to achieve, they will start programming for about 25 minutes

Plan some ways to use lights as code.

Design and build a device that emits light.

Presentation of each work in groups.

Support and facilitation:

Encourage the individual to engage in discussion and brainstorming with peers.
Support in the programming process and in placing the necessary tools within reach.

Ideas for modifying the activity for different ability levels and types of disabilities.

If the person who is going to do it has an intellectual disability. Explain that in everyday life people use light codes for traffic lights, harbour lighthouse, etc.

Additional Resources

Comunicar con luz y sonidos

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: COMMUNICATION WITH LIGHT

Age/educational level of participants: 6 years old / 1st year of primary school

What skills or knowledge are students expected to develop?

Accounts and operations
Technology
Linguistic communication
Engineer and Math

Estimated Duration: 45-90 minutes

Learning Objectives:

Design and build devices to communicate. and submit your designs

Materials needed

Set SPIKE
Device with Lego SPIKE app

Description of the Disability

Hearing impairment.
The child is 6 years old with moderate hearing impairment, has a hearing aid.

Pre-Activity Preparation

The classroom will be supported by an FM system. Attempts should be made to control noise levels in the classroom. Seat the child close to the teacher. If necessary, visual support cards can also be made.
In the software we will adapt in accessibility the hearing section and select Show sound alerts visually.

Development of the activity

Introduction There will be an explanation of what hearing impairment is. The teacher will ask what kind of adaptations a person with this disability could have at home, in their mobile phone and in their daily life. Brainstorm ideas.

Presentation of a case study of a hearing impaired person. Maria buys her first mobile phone. What will she have to put on it when her father or mother calls her? And at home when she is alone and the postman calls?

They will get into groups of 2 or 3 and brainstorm for 10 minutes what they want to build or programme for Maria's case. Once they have come up with the idea they want to achieve, they will start programming for about 25 minutes

Plan some ways to use lights as code.

Design and build a device that emits light.

Presentation of each work in groups.

Support and facilitation:

Encourage the individual to engage in discussion and brainstorming with peers.
Support in the programming process and in placing the necessary tools within reach.

Ideas for modifying the activity for different ability levels and types of disabilities.

If the person who is going to do it has an intellectual disability. Explain that in everyday life people use light codes for traffic lights, harbour lighthouse, etc.

Additional Resources

Comunicar con luz y sonidos

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: EXPRESSION OF EMOTIONS

Age/educational level of participants: 12 years old / 6th grade of primary school

What skills or knowledge are students expected to develop?

- Schedule interactions
- Carrying out specific actions
- Creative skills

Estimated Duration: 1 hour

Learning Objectives:

- Designing an emotion board
- Encouraging emotional expression
- Improving social skills
- Promoting creativity

Materials needed

Scratch

Description of the Disability

People with physical and intellectual disabilities.

Pre-Activity Preparation

It shall ensure that the person has within reach everything that is to be used, from material objects such as a desk and computer, to items that contain scratches.

Development of the activity

Introduction We begin by talking about feelings and emotions. We will discuss how they are expressed on a day-to-day basis, whether we have any difficulties in expressing them, whether we consider them important and how we express them to others.

Class group: 15 minutes. Presentation of a practical case of a person from ASPACE Seville, who has difficulties in expressing their emotions and feelings. In order to collaborate with the person presented, an emotions board will be created, so that the person can express what they are feeling.
Next, a brainstorming session on emotions and feelings will take place. From this brainstorming you will be able to select the emotions and feelings that will appear on the created boards.

Small groups (3-4 persons): 45 minutes
Groups will be formed where they will select those emotions and feelings they want to appear on their board.
We will look for emoticons or images that relate to the feeling/emotion and start with the design and programming of the emotion board.

*If one class is not enough to complete the task, it can be divided into two sessions and the second session can be used to make a presentation of what has been created to the classmates.

Support and facilitation:

Turns will be respected and everyone in the classroom will be facilitated to speak and participate in the brainstorming.
The working groups shall collaborate with each other, if requested by a group, and provide mutual assistance.

Ideas for modifying the activity for different ability levels and types of disabilities.

It can range from more general feelings and emotions, such as happy, sad... to more complex feelings and emotions such as uncertainty, worry, interest...
Different case studies can also be explained and boards can be customised to the person with a disability who presents himself/herself.

Additional Resources

- IDENTIFICACIÓN, EXPRESIÓN Y REGULACIÓN DE EMOCIONES CON SCRATCH
- Proyectos STEAM. Colores y emociones con Scratch
- https://https://scratch.mit.edu/projects/111567571/scratch.mit.edu/projects/111567571/

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: COMMUNICATION BOARD

Age/educational level of participants: 12 years

What skills or knowledge are students expected to develop?

- Science
- Technology
- Engineer
- Mathematic

Estimated Duration: 120 minutes approx.(can be divided into 2 classes)

Learning Objectives:

- Design and build devices for communicating with people with functional diversity.
- Submit your designs

Materials needed

Scratch

Description of the Disability

People with intellectual disabilities

Pre-Activity Preparation

Placing the person with a disability close to his/her peers so that he/she can interact and give support when necessary, as well as the teacher should pay attention to the demands he/she has.
Preparation of a visual presentation to explain the activity.

Development of the activity

Introduction The importance of communication in our daily lives will be explained. Verbal, non-verbal communication (sign language), written, visual (visual aids such as pictograms). Reference will be made to different types of disability and a debate will be opened thinking about how each of them can communicate. For example, deaf people or people who do not have oral communication.

Whole class, 10 minutes. Presentation of a practical case of a person with autism who does not communicate orally although he/she can interpret images. Then we will have to prepare a communication board for him/her so that he/she can communicate in his/her daily life. To make it more visual, put examples of images of communication boards and videos of a SAAC.

They will get into groups of 2 or 3 and brainstorm for 15 minutes what they want to build or programme for the case study. They should choose which words are the most frequent and which will go on their communication board. Do a search on the core vocabulary. Once they have come up with the idea they want to achieve, they will start programming for 45 minutes.

Designing the Alternative and Augmentative Communication System. Resolving doubts.

Presentation of each work in groups.

Support and facilitation:

Encourage the individual to engage in discussion and brainstorming with peers.
Support in the programming process.

Ideas for modifying the activity for different ability levels and types of disabilities.

Prepare a board of the routines of daily life activities. A schedule that is visual.

Additional Resources

- Sistemas de comunicación alternativos y aumentativos
- Max and Proloquo2Go - It really has become his voice
- Using An Augmentative and Alternative Communication (AAC) Device For Our Autistic 7 Year Old

TEMPLATE FOR STUDENT ACTIVITIES

NAME OF THE ACTIVITY: PRODUCTION OF SWITCHES.

Age/educational level of participants: 8 years / 2nd primary

What skills or knowledge are students expected to develop?

- Science and Technology
- Engineer
- Mathematics
- Linguistic communication

Estimated Duration: 90min

Learning Objectives:

- Design and build a device.
- Submit your designs

Materials needed

Makey makey
Cardboard
Pencil
Rubber bands
Clip
Brass bookbinders.

Description of the Disability

People with motor disabilities

Pre-Activity Preparation

Ample space for your movement. Accessible material always available and within easy reach. Adapted work table.

Development of the activity

Introduction Functionality of the switch. And how we can make a homemade one in an original way with the materials we have.

You already have the basic knowledge of how the makey makey works. Based on this we will work on how to make an interrupter. 1h

Drawn. Draw the interrumpor and make sure it has plenty of graphite, as it is electrically conductive. When the two drawings touch, a closed conductive circuit is created that allows electrons to flow. This makes your circuit a closed or complete circuit. When the drawings are separated, your circuit is open and no longer allows electrons to flow through the circuit.

With clips. When the two binder clips touch, the circuit is closed and complete! When you separate the binder clips, the circuit opens once more.

Paper clip button. Thread two brass binders through a small piece of cardboard. Place a paper clip on one fastener and bend it so that it does not touch the other fastener. Hold SPACE on the paper clip fastener and GROUND on the other. When you press the paper clip against the second fastener, you close the loop and complete the circuit. Presentation of each work in groups.

Support and facilitation:

They will need help to pick up the material so that they always find it in the same position they left it. You can work in pairs, facilitating collaboration between classmates.

Ideas for modifying the activity for different ability levels and types of disabilities.

Depending on the person who is going to carry out the activity, it will be executed in the way that is easiest for him or her to carry out, either by drawing, with paper clips or with a paper clip button.

Additional Resources

- Maker Class Lesson One: Crafting and Designing Switches

POSITIVE LEARNING AND COEXISTENCE

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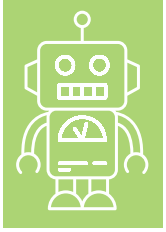


8.POSITIVE LEARNING AND COEXISTENCE

8.1. PARTICIPATION OF PEOPLE WITH DISABILITIES

The Brain Waves project aims not only to provide students with practical technology skills and to increase their self-esteem and confidence, but also to raise awareness of the abilities and needs of people with disabilities and to promote an inclusive school environment. It emphasises the active participation of people with disabilities in the development of the projects, which can be achieved in two complementary ways:

a. Individual solutions - person-centred learning:

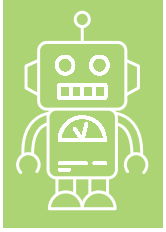
This approach involves choosing a person with a disability as the focus of the project. The process includes prior knowledge about this person in order to design a project that responds to their specific preferences and needs. This modality allows the solution to be delivered directly to the person and to be followed up, including a final evaluation. This approach not only benefits the learners by providing them with a practical and meaningful experience, but can also have a positive impact on the self-esteem of the person with a disability, motivate their interest in technology and expand their social network.

b. Group Solutions - Category Based:

This option involves selecting a category of disability that has been studied in the classroom and designing a project that meets the general needs of that group. This approach can be more flexible to implement in educational settings as it simplifies the prior research process. Students will have the opportunity to deepen their understanding of the people within the chosen category and develop solutions to improve their access to and use of technology. To increase impact and motivation, projects could be published on websites accessible to people with disabilities.

Whatever the approach, projects can be promoted and shared through the school's website or the Brain Waves project to promote greater visibility and outreach. In the project development process, it is crucial that students with disabilities are not only seen as beneficiaries, but also have the opportunity to actively participate in all stages of the project. This reinforces inclusion and equality within the educational environment.

The choice between developing individual or group solutions, as well as the degree of involvement of students with disabilities in the creation of these projects, will depend on the specific characteristics of the students, the capacities and partnerships of the schools, and the decisions of the teachers. This flexible approach ensures that the Brain Waves project can be adapted to a variety of educational contexts, maximising its positive impact on both students and the wider community.



8.2 FAMILY AND COMMUNITY INVOLVEMENT

Family and community involvement is an integral part of the Brain Waves project, strengthening the link between school and home, creating a sense of community and enriching students' educational experience. This contributes not only to their academic success, but also to their personal and social development. Here are some strategies to encourage this participation:

01 **Communicate the start of the project:** Pupils take home an introductory document that gives families an overview and initial information about the project. This serves to inform and generate interest and support from the outset.

02 **Concept map at home:** The concept map developed as a group can be rotated among team members to take home. This allows each student to share and explain the progress and objectives of the project to their family members, thus encouraging dialogue and family participation in the educational process.

03 **Presentation of the work:** At the end of the project, an event can be organised at school where students present their work to their families and peers. Alternatively, a video summarising the project and the work could be produced for those who are unable to attend the presentation in person. This approach allows students' achievements to be shared with a wider audience, increasing their sense of achievement and recognition

05 **Publish technology solutions:** Finally, students and their families are encouraged to visit the websites where the projects are hosted to see the published work and understand how it is available to benefit people outside the educational community. This not only demonstrates the practical impact of the project, but also promotes pride and satisfaction among students and their families.

Implementing these strategies strengthens the collaboration between students, families and the educational community and promotes an inclusive and participatory learning environment. The active involvement of families in the educational project is crucial in reinforcing the importance of service learning and disability awareness, thus contributing to a more inclusive and empathetic society.

EVALUATION

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9.EVALUATION

The use of questionnaires at the beginning and end of the Brain Waves project is a valuable strategy for assessing the impact of the project on students' perceptions and understanding of people with disabilities and their access to technology. This approach makes it possible to measure changes in students' attitudes, knowledge and understanding over the course of the project, providing a clear picture of the learning and personal development achieved.

STRUCTURE OF THE QUESTIONNAIRE

1. **Questions on Disability and Technology:** The initial questions will focus on assessing students' prior knowledge of people with disabilities and their relationship to technology. By repeating these questions at the end of the project, any changes or developments in students' understanding and perception can be effectively measured.

2. **Questions on Methodology and Usefulness of Learning:** The second part of the questionnaire will focus on assessing the methodology used in the project and how the learners perceive the usefulness of the learning acquired. This section seeks to collect opinions on the effectiveness of the service-learning approach and the impact of the project on the development of practical and technological skills.

3. **Questionnaire Format:** To facilitate analysis and ensure clear answers, the questionnaire will be closed-ended, limited to 10 questions. However, a final section for comments and observations will be included, allowing students to freely express any additional opinions or suggestions on the project.

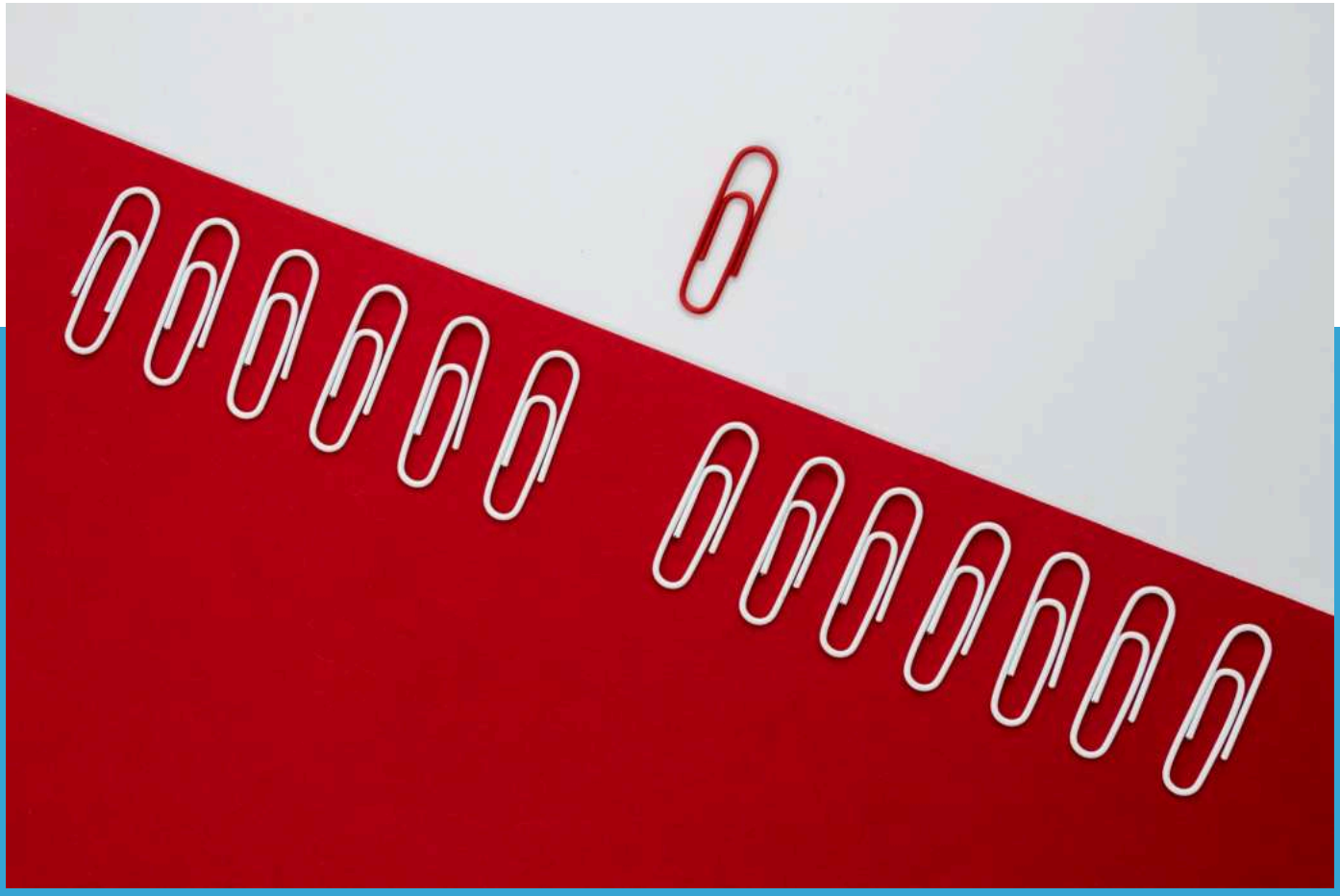
OBJECTIVES OF THE QUESTIONNAIRE:

1. **Evaluate the Educational Impact:** Collect objective data on students' satisfaction with the project and the learning obtained.

2. **Measuring Changes in Perceptions:** To assess how students' understanding of people with disabilities and the use of technology has evolved.

3. **Gathering Feedback on the Methodology:** Obtain direct feedback from students on the service-learning methodology used and its usefulness.

By analysing the responses to the questionnaires, the teaching team will be able to gain valuable insights into the effectiveness of the Brain Waves project, identifying areas of success and opportunities for improvement. This will enable future iterations of the project to be adjusted to maximise its educational and social impact, thus contributing to the holistic development of students and promoting greater inclusion and understanding of people with disabilities.



APPENDICES

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10. APPENDICES

- PRESENTATION OF THE PROJECT FOR STUDENTS
- PRESENTATION OF THE PROJECT FOR FAMILIES
- MODEL CONCEPT MAP
- PROJECT COMMUNICATION AND STYLE GUIDE
- INITIAL ASSESSMENT QUESTIONNAIRE
- FINAL EVALUATION QUESTIONNAIRE

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