Earli
SIG15
Special Educational Needs

Guidance for the inclusion of students with Special Educational Needs for online learning

Introduction

- The global pandemic caused by COVID-19 has interrupted many routines and practices, including the education of young people. Many students are currently receiving some or all of their education online. Ensuring that online learning can be accessed by students with Special Educational Needs (SEN) can be a challenge. This guidance was written for teachers and educational professionals of mainly primary and secondary school students by offering insights from relevant research to ensure that students with SEN can reach their full learning potentials during online education provision.
- We recognize that students with SEN are a diverse group in terms of identified groups, abilities and skills but generally include students who need additional support in order to access the mainstream curriculum and meet their full potential.
- As such the guidance provided here is not prescriptive for all students with SEN but aims to help teachers and parents to consider barriers and facilitating factors that might impact on students with SEN to fully access online teaching materials and lessons.

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Online Learning

"Online learning, e- learning, digital learning, virtual learning, distance learning…" all describe learning where the learning space is extended from the classroom to the web and as such the learning tools also include digital technology, in addition to pen and paper, books and worksheets or educational games and manipulatives. In this guidance we use the term online learning to include a wide variety of digital tools, such as computers and mobile devices (smartphones and tablet devices), software-based applications, Internet sites, social networking spaces and virtual learning environments (e.g. Abbott, 2007; Cumming & Draper Rodríquez, 2017; Sormunen, 2020).

The online learning experience can be either fully or blended. A fully online experience is independent of face-to-face teaching in the classroom. On the other hand, the blended or hybrid model is where only a portion of the instruction is provided in online learning along with face-to-face experience (Smith & Basham, 2014).

Similar to SEN supportive physical classroom, SEN supportive online environments help students to structure their learning and navigate through different online learning activities (Mitchell, 2018; Sormunen, 2020) and the following points need to be considered:

General top tips:

- Provide a clear and simple overview of the front page and the activities to be completed.
- Make it clear how students navigate within and between pages and activities.
- Use clear and simple language.
- Follow students' progress and tailor the online learning environment to the students' needs regularly.
- Use elements that support digital literacies and multimodal ways to learn (e.g. image, animation, recording and video, but also corresponding texts).
- Direct students to supplemental resources and additional guidance for when they are stuck or have questions.
- Make it clear how students will receive feedback about their learning.

Overview of different online learning activities

There are a number of different types of activities that can be set for students with SEN, including those lead by the teacher, the student themselves or collaborative learning activities. Appropriate adaptions will need to be made for each of these.

Different types of online activities:

1) Learning content provided by the teacher through online platforms (podcasts, videoblogs, other videos or live instruction).
2) Personalised (or Individual) learning tasks for students to complete:
    - Personal blog, Infographic, PowerPoint presentation, photo collage.
    - Playing educational games and applications.
    - Problem solving tasks: solved online or as part of daily activities.
3) Different online activities for collaborative learning:
    - Online discussion debates (synchronous).
    - Online discussion forum (asynchronous).
    - Problem solving tasks: solved online or as part of daily activities.
    - Online creation (e.g. collaborative digital whiteboard).

Peer-support

It can be beneficial to involve students' peers as support in online learning, there can be several ways of doing this:

- Study buddies (assign students in dyads or threes to check on with each other at regular time intervals).
- Collaborative learning activities, with well-structured groupwork:
    - e.g. jigsaw (four students divide a book chapter to read into smaller parts and report to each other).
    - use of roles when reading- leader, clunk expert, gist expert, question expert (Vaughn et al., 2011).
    - when solving a problem, instruct the group to make sure they take turns when reporting their solutions, so that everybody's solution is listened to.

Benefits of online learning

Based on Hattie's (2009) meta-analysis, the use of technology and online learning is beneficial to all students' learning when:

- there is a diversity of teaching strategies.
- there are multiple opportunities for learning (e.g. tutorials, programming, word processing, drill & practice, simulations, problem solving).
- the student is in control of their learning speed.
- the collaboration and peer learning are spurred.
- the feedback is consistent and continuous.

Similar notions are found to benefit students with SEN, but research suggests that SEN students benefit specifically from the multimodal learning that digital materials provide. Online learning, in contrast to books, can represent materials not only in written words but also with images, animations, graphs, recordings and videos. This helps SEN students to understand and use discipline specific terms (Fasting & Halaas Lyster, 2005; Geer & Sweeney, 2011; Looi et al., 2011). Multimodal presentation has also been shown to benefit the understanding of instruction, learning materials, notetaking and for processing learned material (Brigham et al. 2011; McGinnis & Kahn 2014; Tomlinson 2000).

In addition, students are usually motivated to use technology in their learning. However, in order for students with SEN to benefit from online learning each student's individual needs, the combination of learning difficulties and features of the used technology that may affect the learning, need to be considered. The repeated use of consistent methods and respecting students' personal experiences promotes learning online. Noteworthy is that students with SEN often require a long-term engagement before the benefits and disadvantages become visual (Sormunen, Lavonen & Juuti, 2019).

Benefits of online learning

- Easier to implement multimodal approaches: The combination of audio, video, text, and other means to convey meaning has the potential to provide students greater access to curricula and learning opportunities and additional ways to demonstrate their understanding (Hashey & Stahl, 2014).
- Easier to implement differentiation (at individual level or sub-group level): Teachers can customize the focus of instruction to best meet students' unique learning needs (Hashey & Stahl, 2014).
- Individual pace of learning: Students can work at their own pace and work at a time of day that suits the student.
- Lack of distractions: During online learning students with SEN may benefit from fewer distractions by peers or by noise in the classrooms and it may be easier to control and manipulate distractions in the home.
- Better meaningful social contact: some students (including those with Autism Spectrum Disorders) have been shown to benefit from online social interactions which are often perceived as being less threatening.
- Students with disabilities themselves are motivated and perceive that they can learn online (Harvey et al., 2014).

Challenges of online learning

Although there are benefits to online learning activities for students with SEN, there are also a number of challenges to be addressed. The following sections will discuss some of the challenges, including:

- Ensuring online access.
- Danger of diminished opportunities for social interaction, if not managed.
- Online learning requires new kinds of support for students with SEN. This also includes the need for teachers to understand what barriers to online learning might

be for a particular student and how online learning can be supported and facilitated (Rice & Dikman, 2018).

- Continued support: The parent (or adult member) in the student's household takes on added responsibilities for the student with SEN to participate in schooling (Smith et al., 2016).
- Feedback and assessment: How to measure online learning and academic progress?

General Accessibility Difficulties and Solutions

In order to effectively provide online instruction, it is important to make sure that students are able to access the lessons and the materials efficiently. To do so, several actions will need to be taken:

Access to laptops, specialist software and use of assistive technology.

Students with SEN may require Assistive Technology (AT) to enable them participating in the online learning. Therefore, it is recommended to prepare a checklist for each student with SEN in order to ensure that they have the necessary tools available or installed at their home (either APPs or specific items). Moreover, as Adebisi, Liman and Longpoe (2015) pointed out that in order to obtain the maximum benefit of this technology, students should be instructed in its use. That way students can focus on the lesson content instead of simultaneously learning how to work with the AT.

Accessibility Top Tips:

- Prepare a checklist with all AT tools that need to be installed or available to each student.
- Instruct students in how to use the technology.

According to Courtad and Bakken (2020), the most used technologies are those that modify the nature of reading and writing, and include:

(a) Speech-to-text tools: Convert voice into text (e.g, Dragon [https://www.nuance.com/dragon.html]).

(b) Text-to-speech tools: Translate written text into speech (e.g., Immersive Reader [https://www.microsoft.com/en-us/education/products/learning-tools]).

(c) Note-taking software: e.g., Sonocent (https://sonocent.com/).

The use of some of these tools may aid students who struggle with reading comprehension (Wood, Moxley, Tighe & Wagner, 2018), students with sensory difficulties (e.g., visual impairment) or other students with SEN that have difficulties at some stage of the learning process (e.g., students with attentional deficit disorder, Courtad & Bakken, 2020). However, it should be noted that even when receiving the appropriate support and instruction on the use of this technology, not all students benefit from this kind of AT (see Nordström, Nilsson, Gustafson & Svensson, 2019), teachers should analyse each case individually and consider the suitability of these type of AT.

AT Tools to be considered for specific groups (adapted from Rodriguez & Arroyo, 2017)

Students with motor disabilities:
In general, they may need AT that assists them to interact with the computer. This includes solutions such as virtual keyboards with natural language processing; ergonomic/alternative keyboards (e.g., Big Keys), mouse clicking software or alternatives (e.g., joystick), voice recognition systems or other more specialized tools, such as sip-and-puff systems.

Students with visual impairments:
Screen-readers (such as JAWS [http://www.freedomscientific.com/] or Virtual Vision [http://www.virtualvision.com.br/]) are essential in this case (Freire, Linhalis, Bianchini, Fortes, & Maria da Graça, 2010). A screen reader reproduces the content that appears on the screen. Speech recognition systems or software for facilitating notetaking (see above) would also be desirable. There are other tools that may facilitate students' interaction with the computer such as stickers for enhancing the visualization of the keyboard, screen magnifiers (e.g., Zoom Text, [https://www.zoomtext.com/]) and Braille keyboards. Speech recognition math software such as MathTalk (https://mathtalk.com/), may be useful for them as well.

Students with hearing loss:
The audio provided by electronic devices is not as clear as natural speech and may be perceived especially degraded to those with hearing loss. There are assistive listening accessories that stream audio directly to the student prosthesis (e.g., FM systems or other specific accessories such as "Roger technology"). These systems enhance the quality of the sound that the student receives with their prosthesis. Some students who communicate with sign language may need an interpreter during the lectures. If this is the case, teachers should make sure that the interpreter appears always visible in the students' /parents' screen.

Learning disabilities related to reading and writing:
Computers or smartphones inbuilt technical possibilities such as text size, screen brightness or colour filters might help some students screen reading. Text-to-speech APPs and proofreading software (e.g., Grammarly, Ginger) may appear useful for these students when studying or doing homework with an electronic device.

Online Manipulatives

Moving teaching to an online format implies that resources such as concrete manipulatives that were useful for supporting the explanations from the teacher are no longer available at home. Manipulatives are often used in topics where comprehension of learning materials benefit from visual support due to the abstract nature of the content (e.g. maths).
As a solution, professionals can make use of some online or app-based manipulatives (i.e., generic virtual manipulatives- see those provided by the National Library of Virtual Manipulatives or Bouck, Working, & Bone, 2018). Yet, it should be noted that in case of using resources from a website, it is recommendable to check for the accessibility of that Website beforehand (see next section "General recommendations").

General accessibility recommendations

- Check the student has access to manipulatives and specialist software.
- *Provide pre-recorded lessons* as some students may struggle to follow the lessons online or may be unable to take notes efficiently (e.g., students with motor disabilities).
- *Create accessible documents*: Some students may need AT that reads aloud the content for them. These ATs require the document to be made accessible. For guidelines on how to create accessible content: A guide in English (provided by the University College of London) can be found at: https://www.ucl.ac.uk/isd/services/websites-apps/creating-accessible-content. A guide in Spanish (created by members from the University of Valencia) can be found at: https://www.uv.es/upd/doc/guias/Guia_accesibilidad_val.pdf.
- *When using a Website, check if it meets accessibility requirements*: see https://www.w3.org/WAI/standards-guidelines/ for further development on the topic.
- *When giving relevant information* (e.g., examination dates, homework) provide this information using multiple forms (e.g., short e-mails, calendar remainders, etc.).
- *Always provide subtitles*: either during pre-recorded or live lessons.
- *Consistency:* Avoid using a wide range of different platforms to avoid students have to learn different platforms and remember different passwords. Other students may be confused by changes on the routine.
- *Provide clear guidelines* for how to use the platform and ensure the student can navigate the AT before the start of the course.
- Share your lesson plan with the parents, by making them aware of what you plan to do and what are the expected outcomes, may help to avoid confusion at home.

For more information see: Seeman, Montgomery, Lee & Ran (2020). Making Content Usable for People with Cognitive and Learning Disabilities, W3C Working Draft 17 July 2020, available at https://www.w3.org/TR/2020/WD-coga-usable-20200717/#anna-scenario-2-finding-accessible-content

Good practice for supporting students with hearing impairments and language difficulties:

Electronic devices do not often provide a clear sound, this fact causes auditory fatigue for the student, hindering their learning capabilities (Bess & Hornsby, 2014):

- *When giving a live lecture*: provide a script with the information and try to synchronize the explanations with the slides and the content.
- *Provide captions* whenever possible (either in live session or in pre-recorded videos), if that's not possible, provide a script.
- *Minimize background noise:* Background noise has a detrimental effect on students' learning, especially for students with hearing loss (Peelle, 2018). Also, ask other students to "mute" themselves when they're not participating.
- *Provide transcripts of your pre-recorded videos*.
- *Facilitate lip-reading*: When providing a live or pre-recorded lesson ensure that your camera is switched on and your mouth is visible to facilitate lip-reading. It is recommendable to check with your student that your camera synchronizes with the sound beforehand, otherwise it can be hard for them to read your lips.
- *Provide important information in written format (exam dates, assignment info)*. Ask all students to write down questions in the chat box so that all students can access the questions.

For more information see https://www.deafhhtech.org/rerc/covid-19-technology-resources/

Good practice for supporting online learning for students with visual impairment:

- Documents with images or tables cannot be read by most screen readers without making the documents accessible. Check for the compatibility of the software with the system and document beforehand.
- Information on interactive white boards during a synchronous videoconference may not be accessible for students with visual difficulties. Make sure you verbally describe the interaction on the whiteboard.
- Provide descriptive scripts for videos.

- Color alone should not be used to convey important content as some students might have difficulties to differentiate colors (e.g., daltonism): underline text instead.
- Further aspects concerning contrast, lighting and brightness of the materials and the screen should be considered. Since lighting requirements and other accommodations might depend upon the specific visual condition of the student, we recommend checking for them.

Improving social participation during online learning

Social participation is an important part of learning for pupils with SEN (Avramidis, 2011), and moving to teaching online may pose some challenges for these students. For example, students with SEN may rely on their peers during lessons for ideas, prompts, or group work (Prunty, DuPont, & McDaid, 2012), which may not be accessible online. If students have issues with inhibition (e.g. calling out, not knowing when it is their turn to speak) then this may be a challenge when conducting group work online.

Help-seeking is also a social interaction and students with SEN may struggle to adapt to seeking help in an online learning context (Adams et al., 2019). Furthermore, facial expression and gesture are important for memory and social communication (Church, Garber & Rogalski, 2007), both of which may be difficult to interpret via video or voice call. Students who already rely on these social cues, or even have difficulty interpreting them, may struggle to interact with a teacher online.

Top Tips to make social learning work:

- Provide clear ground rules and remind the students of these on a regular basis. If they also have any difficulties with memory or planning, then it may help them to have this printed on some paper to have beside them as a reminder during group teaching sessions.
- Make it clear how, where and when the student can ask for help. Again, this information should be reinforced with reminders and even printed visual information depending on the student's SEN profile.
- Alongside traditional teaching, try using smaller group discussions. Most online platforms allow break-out rooms to facilitate this. This will give students the opportunity to collaborate with their peers.
- Create a sense of belonging for the student with SEN: encourage social games such as scavenger hunts for younger students or ice breakers/quizzes for older students to get them interacting with one another and feeling positive about their learning environment.

Content difficulties

Online learning activities create a number of demands and challenges for students with SEN that may prevent them from accessing the content of the learning materials.

More demands on oral language

During online learning, learners with SEN experience a more exaggerated version of the difficulties they face in the classroom setting, especially related to processing oral language as students can no longer use their extra-linguistic knowledge and the situational communication to decipher oral language and have to deal with reduced social cues.

Limited modelling of higher-level social skills and communicative behaviours

During individual online tasks, student with SEN have fewer opportunities to interact with peers but also to observe positive higher-level social skills and communicative behaviours from their peers (Gupta, William, Henninger & Vinh, 2014). Actually, in online classes, learners with SEN often experience difficulties in expressing their ideas and may often omit words when using language (Lerner & Johns, 2012). Without the support from peers, students with SEN may lose interest and their learning may suffer from a lack of collective intelligence.

More demands of reading skills

In online classes, teachers' explanations are more likely to be substituted by texts rather than just presented orally. Written language is more complex than oral language in general (use of passive voice or more infrequent words, Cain 2010), and is often more formal (Pittas & Nunes, 2017) which students with SEN might find difficult to comprehend. In addition, on screen reading might have a negative impact on reading comprehension as it has been found to foster a superficial reading style compared to paper reading (Annisette & Lafreniere, 2017; Delgado et al., 2018).

The use of videos for content learning might foster superficial study strategies

Although the use of videos for teaching subject content might help to overcome the lack of gestures and facial expressions in texts and the reading difficulties that some learners may present (e.g., those with dyslexia), it might hinder integration of information in comparison with on screen reading (Salmerón, Sampietro, & Delgado, 2020).

Top Tips for making content learning work:

Support verbal instructions (both oral and written) with visual cues: (e.g. use instruction videos, provide useful visual cues to highlight relevant information). Online teaching requires more focus on language use. Therefore, supporting verbal instructions with visual cues is of crucial importance.

There are a number of technological tools that can be used to nurture and stimulate the learning experience of students with SEN:

- Content enhancements can involve graphic organizers and visual displays, note-taking strategies, and mnemonics, e.g. teachers can proceed to visual spatial arrangements of information including words or concepts linked with diagrams; in this way, students are able to identify hierarchical, comparative, and sequential relationships (Dye, 2000).
- Visually representing the key elements of a narrative story with graphic organizers, called story mapping, can enhance the reading comprehension of students with learning disabilities (Stetter & Hughes, 2010).
- Abstract concepts, for students with disabilities, can be presented with the use of visual displays, i.e. visual maps (Heward, 2013).
- Provide handouts with keywords and definitions (Heward, 2013; Alber, Nelson, & Brennan, 2002).
- Talk slower: Speech rate is positively correlated with the perceived difficulty of a task (Iglesias, 2016). Also, as the speech rate increases, the recall of information decreases (Riding & Vincent, 1980).
- Use the recommendations for making “easy-to-read” documents: make linguistic adaptations that make the text easier to read and to understand than an average text (Arfé, Mason & Fajardo, 2018). For example, use active instead of passive voice and use shorter sentences.
- Encourage “on paper reading” versus “on screen reading”: “On paper reading” facilitates a deeper understanding of content and semantic knowledge (Delgado et al., 2018; Delgado & Salmerón, 2020).
- Use video-based instruction for teaching procedural knowledge: Video based instruction has proven to be effective to teach procedural knowledge involved in academic skills, daily living skills or social and communicative skills (Bellini, & Akullian, 2007; Park, Bouck & Duenas, 2019).
- Provide more explicit instruction (including order of activities, the learning outcomes and expected pace of learning).

- Ensure continuity of learning (for example, repeat examples and problem-solving strategies across different topics and modules) (Booth & Ainsow, 2002).
- Improve your strategies to check students' comprehension: Teach vocabulary explicitly to ensure all students have the right vocabulary to access the materials (Monfort & Sánchez, 2002). Break tasks/ lectures down into smaller chunks of information as this makes it easier for the student to process the information.
- Slower pace of learning: Provide more reminders of what content has been covered so far and what is going to be discussed next as this will help the student to embed the learned knowledge and skills (Kendeou, Rapp, & van den Broek, 2004).
- Regularly check for understanding of content: include questions concerning points of review process and points of learning process (Watkins, Carnell, Lodge, Wagner & Whalley, 2000).
- Provide Feedback for all responses, including correct ones, as this will confirm to the student what they have understood and what they have not yet understood to improve their learning (Pittas & Nunes, 2014).
- Provide more time to allow students to respond to questions, as extra-verbal cues are more difficult to perceive compared to face-to-face interaction. This can affect self-confidence and mutual understanding (O'Malley et al., 1996) and thus slow down conversation.
- Ask private questions through chat or give feedback, e.g. Do you need help with this? What are you doing? Please have in mind that 'Why' questions which can be interpreted as confrontational should be avoided. Feedback can also take the shape of reinforces in learning applications, (see, for example, those of the "Kahn academy" for maths learning).
- Announce changes: a sudden change of speaker can disrupt students' attention (Lim et al., 2019).

Stepwise enquiry learning needed

Hands-on learning, inquiry-based and investigative methods have been found effective to SEN students especially when connecting learning to a student's environment, favouring concrete experiences and physical interaction with the studied phenomena, and constructing the meanings of concepts (Bell, 2002; McGinnis & Kahn, 2014). These student activating methods are beneficial during online learning periods, when students might spend hours sitting behind a device. Inquiry activities and short investigation tasks lighten SEN students' online schooldays, connect learning to everyday life at home and facilitate and engage students to learn (Scruggs, Mastropieri, Bakken & Brigham, 1993). However, SEN students require more practice and well-designed learning tasks than other students.

Top Tip to organise online inquiry learning:

1) Be creative with the themes. Inquiry learning can be used in all subjects when making short investigations, for example, finding
   - mathematical patterns, shapes, big numbers...
   - objects beginning with letter A, C...
   - materials that are made from plastic, metal... or that float, sink...
   - Use your imagination!
2) Use same inquiry method with students repetitively so that they have time practice and get to know the method.
3) Pay attention to clarity and structure of instructions. Make step-by-step instructions using visual demonstrations for example tutorial videos or digital picture-supported guides.
4) Be creative with materials and make sure that they can be found in all homes.
5) Use breakout rooms in online meeting (e.g. TEAMS, Google Hangout, Zoom) for peer collaboration. A small group of students can make the inquiry activity simultaneously in their own homes.

Inquiry learning can be also used in maker activities where students **make** something using different tools and materials, **tinker** with a playful mindset that aims to solve problems through experimentation and discovery, and engineer to invent solution to the set problem (Martinez & Stager, 2019). Short maker activities can be used also to spark online learning (see https://youtu.be/kLmzGWVNi3k).

Managing Sensory and Behavioural difficulties

Students with SEN often have a range of behavioural and sensory processing difficulties. For example, students with attention difficulties may find it hard to stay focused and sit still for long periods of time. They may also struggle with starting or finishing tasks.
Related to this, some students are particularly sensitive to their sensory environment – in other words, the things going on around them such as noises, things they can see, smell or touch. This can make them distracted and it can be difficult to concentrate (Ashburner, Ziviani & Rodger, 2008).

Top Tips for supporting attention and sensory differences:

- ***Avoid distractions***: Make sure physical environment at home is conducive of learning. Think about the environment that the student is working in. Try to keep this a quiet and calm space so that there are fewer distractions (e.g. lights and noises). Take care of the background (e.g., a plain wall with a single colour and without pictures is preferable as a background for your online lectures). Take care of your outfit too, (e.g., avoid wearing colourful scarfs that could distract the student).
- ***Allow regular breaks*** so that the student is not required to sit in front of a screen for long periods of time. Break up tasks into shorter activities and give them opportunities to get up and move their body (Wong et al., 2015).
- ***Allow use of sensory aids*** (e.g. stress ball, chair cushion for balance, dividing screen): Fidget toys can be beneficial for some students with sensory and attention difficulties (Rohrberger, 2011). Giving them something to do with their hands while they listen may help them to focus. This strategy may not work for everyone, as some students may actually find fidget toys distracting rather than helpful.

This could be due to the student choosing something that over engages them, so keep this in mind when selecting a suitable object for them to fidget with (Ledford et al., 2020).

- ***Use the student "sensory diet" plan***: this is a personalized activity plan that provides the sensory input a student needs to stay focused and organized throughout the day (Wilbarger & Wilbarger, 2002), including knowing when a student is most attentive in order to learn.

Some students with SEN find it really difficult to plan ahead, which can affect their ability to start and complete tasks. They can also find it hard to figure out how much time they will need to complete a task. If they don't know what is coming next, this may cause some anxiety (Wigham et al., 2015). Students with SEN may also have difficulty remembering lots of things at once (e.g. a list of instructions), or forget things really easily (Pickering & Gathercole, 2004).

Top Tips to help with memory or planning difficulties:

- Break down longer instructions or activities into smaller chunks (Langberg et al., 2018; Breaux et al., 2019). This can help students with planning difficulties by allowing them to clearly see the individual steps. It can also help students with poorer memory so that they only need to process one step at a time and hold less information in mind at one time. Moreover, the use of checklists / visual organizers can support students with poor memory skills. The students would benefit from having an overview of the school day and each lesson and a possibility follow the progress by, for instance, "ticking off" the completed activities in a checklist.
- Students may benefit from having instructions repeated to them more than once or repeating the most salient parts of the learning content. Both telling them and writing down the instruction may also help. Providing plenty of opportunities for repetition generally, not just for instructions, is also a good strategy for students with poor memory skills as this is something they may not inherently do for themselves (Kibby, Marks, Morgan & Long, 2004).

- Linked to repetition, consistency is also important. Students may benefit from the use of consistent language, approaches, tools, resources and structure so that they become familiar with the way things are done, supporting their memory. Moreover, the use of routines might help to create a comfortable and predictable environment (Ormond, 2003).
- Encourage students to write down notes for themselves to refer back to later on. The more meaningful the notes are to the student, the more useful they are likely to be (Eskritt & McLeod, 2008).

Some students can suffer from feeling anxious, frustrated or worried and that may reinforce the use of avoidance behaviours and / or hinder their learning processes. Their anxiety may stem from other difficulties, such as those mentioned above: a lack of confidence, fear of failure, specific triggers (e.g., noises, sounds, situations) or a specific subject (e.g., literacy for students with dyslexia, Carroll & Iles, 2006; mathematics, Dowker et al., 2016).

Top Tips to manage anxiety:

- Talk to the student about how they feel and what might be making them worry. This also encourages students to self-regulate, in other words, managing their own feelings, emotions and behaviours. Self-regulation is related to anxiety, therefore more self-regulating behaviour may help to reduce anxiety (Cisler et al., 2010).
- As with sensory difficulties, it is important to consider the environment the student is working in and the length and frequency of breaks between activities.
- Increase students' perception about their abilities by comparing learners' performances to their past performances rather than to peers' and teach learners to do the same (Ormond, 2003). Academic self-esteem is related to anxiety, therefore a focus on this dimension may help to reduce anxiety (Alesi et al., 2014).
- Support students' levels of confidence and ensure that they have successful learning experiences. For example, Ormond (2003) recommends providing learners with work on tasks whose success is likely and to give learners reasons to believe they will succeed.
- Communicate expectations clearly and provide feedback about specific behaviours (Ormond, 2003).

Additional Top Tips to support online learning for students with SEN:

1) Use a tick-off list for the day or for the lesson so that the student has a clear structure and routine.
2) Talk to students about what works and what does not work for them. This will help you better understand your students' needs and to differentiate instructions.
3) Foster home-school communication and collaboration. Communication and co-production with families supports positive outcomes (Turnbull et al., 2015).
4) Establish checkpoints for reflection (Smith & Basham, 2014). After instruction take time to consider the following:
    - Were learning outcomes achieved as planned? Did all learners meet desired high expectations? What data support your inference?
    - What instructional and learning strategies worked well? How could the use of instructional strategies be improved?
    - What learning tools worked well? How could the use of tools be improved?
    - Overall, how might you improve the design and implementation of this lesson/unit or a similar experience?

Final notes on facilitating inclusion during online learning

In ordinary times, students with SEN are facing multiple barriers when it comes to benefitting from an adapted curriculum within mainstream education (Pivik et al., 2002). In this section, we propose to review three of them and highlight how these could be even harder to overcome in online learning situations. At the same time, we try to provide guidance in order to help teachers to allow students with SEN to benefit from an inclusive education, even when provided online.

Teachers' Attitudes

- In order to foster inclusive education, it seems particularly important that teachers hold positive attitudes toward this policy (van Steen & Wilson, 2020). Indeed, it is assumed that the more positive teachers' attitudes are, the more they will endorse teaching behaviors that take into account students' needs (Elliot, 2008; Sharma & Sokal, 2016).
- However, due to the general difficulties caused by the COVID-19 on teaching (Daniel, 2020), the positivity of these attitudes is at risk which could further reduce the likelihood that students with SEN would benefit from an adapted online curriculum.
- In order to overcome this difficulty, it is particularly important that teachers strengthen their links with their school community and the students' family. Indeed, by sharing their difficulties and challenges with their colleagues (e.g. asking for help; sharing their good practices) or building a strong partnership with the parents (e.g. explaining explicitly their expectations for the given tasks), the support they received will increase and help them maintaining positive attitudes (Meijer et al., 1994).

Stereotypes

- Stereotypes are lay beliefs shared by a large number of people regarding a targeted group that could influence perception or behaviors (Hamilton et al., 1990). Research has shown that students with SEN suffer from a negative stereotype regarding competence (i.e., they are perceived as less competent than others, Krischler et al., 2018). Such a stereotype could notably lead to lower expectations regarding their possibility of success.
- Since this stereotype is partly coming from the fact that these students could be perceived as a homogeneous group (Er-Raifiy & Brauer, 2012), direct contact with them is particularly important to reduce the prejudice they could face (Pettigrew & Tropp, 2006). However, within an online learning situation, it could be difficult.
- To prevent such difficulties, we recommend that teachers engage, as much as possible, in online visual or, at least oral, (daily?) meetings with those students particularly. Indeed, it will help them to be protected from the potential negative influence of the above-mentioned stereotype within their teaching practices.

Assessment

- One of the most difficult tasks in teaching is assessment (Autin et al., 2015). Within an inclusive educational system, it is maybe more difficult since teachers should provide accommodations for assessments, sometimes questioning the equity between students (Bourke & Mentis, 2014). In addition, within an online assessment situation, teachers have to trust that students complete the assessment by themselves (i.e., without receiving extra-help from others).
- Thus, we strongly recommend that teachers should rely on formative assessments instead of normative ones. Indeed, formative assessments are conducted during the learning process and are specifically designed to be tools for improvement. These assessments can either be driven by the teachers or the students themselves and are formative to the extent that they provide specific and detailed feedback that can be used to adjust the teaching and learning activities to the students' progress and difficulties instead of grades.

- Finally, we share Table 1 based on advice by Bolt & Roach (2009) which presents accommodations that could be made *without* changing the construct intended to be measured.

Table 1
Type of accommodation for an online assessment (extracted and adapted from Bolt & Roach, 2009)

Domain	Accommodation	Definition
Presentation	Font type and size	The assessment should use an adapted font in terms of type (sans serif), size (larger) or space.
	Read-aloud	Commonly, an assistant/ a peer / the teacher may read aloud the test directions, items, and responses to a student. Rather difficult in online teaching, teachers should be sure to provide a document that can be read screen-reader programs (for an opensource one: https://www.nvaccess.org). Teachers can also record themselves while reading the instructions.
	Instructions	Since teachers are not present to specify the instructions to the students, they should be sure that their instructions are crystal clear without ambiguity. The use of pictograms within the instructions could be helpful (for an open-source software, see https://www.pictoselector.eu).
Response	Type of responses	Provide opportunities to answer without writing the answers.
	Scribe	If writing is needed, allow another person to write the answer provided for the student.
Scheduling	Extended time	As in a regular situation, allow extended time for students who need it (for example, by extending the deadline on the software, if any).
	Test break	In contrast to simply providing extended time, some students may benefit more from breaks during testing. As a result, assessments should be designed a priori in order to allow these breaks while not impacting the validity of the construct measurement.

Glossary

Assistive Technology (AT)	"Any item, piece of equipment or product system, whether acquired commercially, off-the-shelf, modified, or customized, that is used to increase, maintain, or improve functional capabilities of individuals with a disability" (IDEA, 2004, p.8)**.**
Conceptual/Semantic Knowledge	Also referred as declarative knowledge, refers to facts, events or information stored in the memory in the form of concepts, descriptions and relations between them (e.g. pros and cons of online classes or the distance between the sun and the earth).
Concrete Manipulatives	Concrete Objects that are used to teach or support learning.
Mnemonics	The study and development of systems for improving and assisting memory.
On Paper Reading	The act of reading a text from printed hardcopy.
On Screen Reading	The act of reading a text presented on a computer screen.
Online Learning	An umbrella term that includes any type of learning accomplished on a computer and usually over the Internet.
Procedural Knowledge	It refers to how to perform or accomplish a task and it is involved in a variety of academic skills (e.g. how to use a keyboard) and daily living skills (e.g. how to tie shoes).
Special Educational Needs (SEN)	Legal definition that refers to learning problems or disabilities that make it harder for some students to learn than most students the same age.
Story Mapping	A strategy that uses a story map (a graphic display of the structure of a story and its parts) to introduce the basic structure and essential elements of a story.

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