Nafath

Issue 14
October 2020

Code Jumper

Paving the way for blind students in STEM fields

Detecting Attention of Children with Autism Spectrum through Face-Tracking Technology

Mada Fablab
Social Transformation through Accessible Digital Fabrication

Nafath 14

Content

9. Social Media Accessible for All – Instagram

Oumer Seid

10. Mada Fablab – Social Transformation through accessible Digital Fabrication

Achraf Ben Jamaa

An approach to accessible digital map experiences

David Sloan

Introduction

As a former cartographer, and now an accessibility and user experience consultant, I've always been interested in the topic of accessible maps. This topic is also a challenge to many of our clients, who worry about the accessibility of the maps on their web sites and applications.

In a recent conversation, a client was considering removing the maps from their web site, which had been provided by a third-party. They were worried about legal action relating to inaccessibility, as they didn't know what sort of accessibility problems were present and were concerned, they wouldn't be able to fix any problems that did exist.

Indeed, maps can seem to be a significant accessibility challenge, given that they are a complex visual presentation of information. But as a map lover who recognizes the value that maps can bring people with disabilities, I don't want organizations to remove maps from their web site because of concerns over accessibility.

Instead, let's consider how can we apply a sensible strategy to deal with map inaccessibility in a way that benefits everyone. The way to do that is to focus on the experience provided by the map.

The purpose of maps

The power of a map is that it uses spatial relationships to present data, often giving it new meaning. Interactive digital maps have brought some capabilities that paper maps can't provide, including the ability to turn on and off different layers of a map, show different levels of detail when zooming in or out, and show changes over time. Additionally, with GPS-enabled mobile devices, there are new opportunities to provide location-based interactions with digital maps. Digital maps are easier to update than paper, so can more quickly reflect important changes, such as new highways or renamed buildings. Even mountains change—in my first summer as a cartographer, I had to change the height of Aoraki/Mount Cook in New Zealand, after its height dropped by ten metres due to a landslide!

Let's think about some common uses of maps that you might find online:

- A street map that identifies the location of a company's head office, along with key local landmarks
- A map that shows the legal boundaries of a property

- A map that presents data of an important health phenomenon, like numbers of cases of COVID-19 by country
-

In each case, a map is adding geographical meaning to some underlying data, helping people use that data to complete real-world tasks.

The essential components of an accessible map experience

A digital map experience can be accessible to people with disabilities when it meets these core requirements:

1. The map's controls are meaningfully labelled, and they can be operated without needing to use a mouse.
2. The map's information is presented without relying on color perception.
3. The map's information is available in a nongraphical form.

(There are a number of additional, subtler requirements depending on the specific nature of the map. But if a map can satisfy these core requirements, it's likely to be accessible.)
Making digital maps keyboard-operable should be straightforward when developers use standard controls to interact with the map and when they provide supplementary keyboard commands where necessary.

Providing a map that does not rely on color to communicate information might initially seem to be more challenging. But there are many cartographic techniques available to convey information in ways other than color, such as variations in shading patterns, line thicknesses, and typefaces.

For both requirements, a review against accessibility standards such as the W3C Web Content Accessibility Guidelines will help you understand how well a digital map meets these requirements. If you have the capacity to remediate any issues you find, the review will indicate what changes may be needed to optimize the map's accessibility.

The third requirement, "the map's information is available in a nongraphical form," is the one that may seem most difficult, especially for visually complex and dynamic maps. For all but the simplest of static maps, there is no short text description that can convey the same information.

This is when thinking about comparable experiences is essential.

Comparable map experiences

The Inclusive Design Principle of Comparable Experience [https://inclusivedesignprinciples.org/#provide-comparable-experience] says: "Ensure (y)our interface provides a comparable experience for all so people can accomplish tasks in a way that suits their needs without undermining the quality of the content."

This principle recognizes that alternative equivalent experiences may be justifiable when a single experience can't be made universally accessible. Removing a visually complex map is not the answer to our accessibility problem.

So instead, let's go back to considering the map's purpose. Who is it provided for, and what tasks is it intended to support? What other ways could someone access the map's underlying data in a nonvisual but meaningful way? Answer those questions as accurately and as carefully as possible. These answers will help you identify a strategy to ensure that as many people as possible can use the map through an additional means that's comparable and equivalent.

Let's return to the map examples from earlier. What tasks might they be supporting, and what additional ways can we support those tasks?

- The street map is there to help visitors find their way to the office. A comparable nonvisual experience might be a list of directions from key landmarks on the map, such as the nearest parking area or bus stop.
- The map showing the property boundaries may be there to complement a legal definition of the boundaries that's already described in text. Providing a link to this definition could be a comparable nonvisual means of access.
- The map showing the incidences of COVID-19 infections is using data that could be presented in many different ways. A comparable nonvisual experience might be a table of the same data along with a search form that lets users filter the data to find data by region or country.

An effective strategy for map accessibility starts with understanding the digital map's purpose and the tasks that it's intended to support.

It recognizes that a single universally accessible map might be impossible to create, that in some situations there may be accessibility issues present that you are unable to address immediately, and that an equivalent means of access is an acceptable way to provide an accessible map.

It involves examining the map's purpose and identifying comparable ways to provide access to the map's information.

And when you can identify and provide those comparable ways, you'll have made the map experience accessible.

References

This article is adapted from an original post at: https://developer.paciellogroup.com/blog/2020/04/accessible-digital-map-experiences/

The map is taken from "© OpenStreetMap contributors" — see https://www.openstreetmap.org/copyright for further details. To help with providing a text alternative for the article, the map shows the city of Doha, showing main highways, streets, city districts, the coastline, and the airport.

David Sloan
David Sloan is User Experience Research Lead with The Paciello Group (TPG), a specialist digital accessibility consultancy that works globally. Prior to joining TPG in 2013, David spent nearly 14 years as a researcher, consultant and teacher in digital accessibility and inclusive design at the University of Dundee in Scotland. And before that, he worked for four years as a digital cartographer with Collins Bartholomew.

Detecting Attention of Children with Autism Spectrum through Face-Tracking Technology

Bilikis Banire

Autism spectrum disorders (ASD) is a neurodevelopmental disorder with deficits in social communication and repetitive patterns of behavior. This developmental disorder affects one in 160 children worldwide. In particular, a cross-sectional survey on the prevalence of ASD in Qatar shows that 1,575 children under age 5 and 5,025 individuals between the age of 5–19 are affected [1]. These figures point to the need for evidence-based research that can relatively support individuals with ASD. Children with (ASD) have difficulties with attention as they are easily distracted away from learning tasks. Consequently, teachers find it challenging to monitor their attention and learning material at the same time. Assistive Technology can provide a solution; by using Face-Tracking Technology. This technology relies on webcam and artificial intelligence.

Attention requires behavioral and cognitive processing of discrete information while ignoring other distracting information [2]. It serves as a fundamental component of any productive learning which supports the assimilation of required skills for daily activities [3]. A review study on attention assessment of children with ASD shows that one of the most common strategies used for assessing attention is a direct observation or video data analysis [4]. In video data analysis, attentional behaviors of the participants are coded or rated from a recorded learning session by experts, parents or caregivers. This approach requires experience on how children with ASD pay attention. Also, the process of coding the attentional behaviors is time-consuming and tedious.

The dynamics of attention assessment has shifted from subjective evaluation to objective techniques. Some of the critical benefits of objective techniques such as face-tracking include easy attention assessment, personalized pedagogical support, and adaptive learning [5], Face-tracking simply refers to face detection and description of facial actions within a video stream in real-time. The tracking technique relies on a camera and artificial intelligence (AI) to capture video images and analyze facial actions respectively. Facial actions provide a specific definition of facial expressions describing the feelings and emotions of individuals. Overall, face-tracking is a promising approach because it is ubiquitous, non-obtrusive and cost-effective.

Research has shown that children with ASD exhibit attentional behavior via emotions such as happy and sad [6]. To further understand how emotions, facial expressions, and facial landmarks describe attentional behaviors in children with ASD and typically developing (TD) children, we conducted an experimental study on face-tracking during attention tasks. The study simulated a continuous performance task

(CPT) in a virtual classroom. CPT displays random alphabets on a blackboard where participants click the keyboard when a specified letter appears. This test is conventionally used to assess selective and sustained attention of children with attention-deficit [7]. Auditory and visual distractors are introduced in the test to simulate possible classroom distractions (Fig. 1). During the attention task experiment, iMotions software detects and generates facial features using a webcam device [8]. iMotions is commercial biometric software that uses computer vision and artificial intelligence for emotions, facial expressions detection, and facial landmarks.

The investigation of emotions on attentional behaviors in children with ASD and TD revealed that positive emotions were prominent when they pay attention. For example, children with ASD expressed joy emotion, while the TD group expressed more joy and surprise emotions. This finding is similar to a study by [28], which states that children with ASD show positive emotions in increased learning engagement. However, there was no significant correlation between positive or negative emotions with the performance scores. This finding indicates that while emotions explain the interest of students towards learning it is not sufficient for attention assessment. This implies that emotion will not define attention at all times. In the next phase of the investigation, we explore the low level of emotions i.e. facial expression describes attention. Facial expressions are facial action units that describe emotions. For example, surprise emotion comprises of three facial action units: mouth open, eye-widen, and brow raise. We explored 10 basic facial action units that are related to attentional behaviors in children with ASD and TD. These facial expressions include brow furrow, brow raise, lip corner depressor, smile, nose wrinkle, lip suck, mouth open, chin raise and lip pucker [9]. Four facial action units were common in children with ASD during the attention task. These facial action units include mouth open, brow raise, lip suck, and lip press. Similar facial expressions were identified in the TD children, except for lip press [10]. Further analysis of how these facial action units differentiate attention from inattention led to an attention detection model using facial landmarks.

Facial landmarks are facial points that describe the facial action units. The example of facial landmarks is depicted as red dots in Fig 2. We annotated the facial landmarks generated during the attention task as attention and inattention based on the response of the participants. Then we fed the annotated facial landmarks into a machine learning algorithm via specific and generalized models. A specific model is developed with facial landmarks from a specific participant while a generalized model is based on facial landmarks across different participants. The results from the experimental study show that the performance of the specific model was higher than the performance of the generalized model. This finding indicates that each child has a unique facial movement for attentional behavior. Conversely, the performance of the generalized model for TD children was higher than that of the ASD participants. This shows that the face-based attentional behaviors are common among TD children.

For effective attention assessment in children with ASD using the face-tracking tool, the development of the attention detection tool should be personalized. This indicates that the face-based attentional behaviors should be built on the facial

actions of each child. The findings can also be linked to attributes of ASD which states that each child with ASD is entirely different from another. It is worth noting that facial features have the potential for attention assessment but there is no universal facial feature that describes attentional behavior in children with ASD.

References

Alshaban, F., et al., Prevalence and correlates of autism spectrum disorder in Qatar: a national study. Journal of Child Psychology and Psychiatry, 2019. 60(12): p. 1254-1268.

James, W., The principles of psychology New York. Holt and company, 1890.

Moore, M. and S. Calvert, Brief report: Vocabulary acquisition for children with autism: Teacher or computer instruction. Journal of autism and developmental disorders, 2000. 30(4): p. 359-362.

Banire, B., et al. A systematic review: Attention assessment of virtual reality based intervention for learning in children with autism spectrum disorder. in 2017 7th IEEE International Conference on Control System, Computing and Engineering (ICCSCE). 2017.

Dewan, M.A.A., M. Murshed, and F. Lin, Engagement detection in online learning: a review. Smart Learning Environments, 2019. 6(1): p. 1.

Escobedo, L., et al., Using Augmented Reality to Help Children with Autism Stay Focused. IEEE Pervasive Computing, 2014. 13(1): p. 38-46.

Rosvold, H.E., et al., A continuous performance test of brain damage. Journal of consulting psychology, 1956. 20(5): p. 343.

iMotions, iMotion Biometric Tool, 2017.

Magdin, M. and F. Prikler, Real time facial expression recognition using webcam and SDK affectiva. IJIMAI, 2018. 5(1): p. 7-15.

Banire, B., et al. Attention Assessment: Evaluation of Facial Expressions of Children with Autism Spectrum Disorder. in International Conference on Human-Computer Interaction. 2019. Springer.

Bilikis Banire is currently a Ph.D student working under the supervision of Dr. Dena Al Thani and Dr. Marwa Qaraqe at the faculty of Computer science and Engineering in Hamad Bin Khalifa University. She received her Master of Science degree in Software Engineering with distinction (3.91/4) from University of Malaya, Kuala Lumpur, Malaysia in June 2014. Her thesis was centered on Human Computer Interaction (HCI) and Requirement Engineering with the title “Visual Hybrid Development Learning System Framework for Children with Autism Spectrum Disorder”. This thesis investigated the software development framework for designing a computer-based learning application for children with autism spectrum disorder. During this period, she worked with Faqeh Autism Center in Malaysia and Abu Dhabi Autism Center as a volunteer and a researcher. She completed her bachelor’s degree in Electronics and Computer Engineering from Lagos State

University, Lagos, Nigeria in 2008. She worked as an intern and a web developer at Lagos State University ICT center between 2006 and 2009.

Code Jumper – Paving the Way for Blind Students in STEM Fields

Lisa Ferris , Nik Petersson

Two years ago, we listened as our 8-year-old son and his classmates demonstrated how they could program a lighted, clear plastic ball called Sphero to whiz across the school gymnasium floor; turning, flashing and interacting with other Spheros. Every once in a while, we would hear a little crash as two would collide, and the kids would groan and go back to their iPads to redo some code into a more exacting path so that the two plastic balls could avoid each other. On the next try, several of the balls would get close enough to do an impressive synchronized dance that garnered applause from the parents and teachers who were watching.

Coding clubs and educational programs have become a popular activity in schools. Codable toy robots and apps like Sphero, Dot and Dash and Scratch apps are very popular in the clubs, classrooms and in homes. They are not only fun, but they teach logic, sequencing, and coding at an early age. Two of our sons had been involved in coding clubs over the years, so we had attended many demonstrations like this one. Although our sons are sighted and have no problem participating in these clubs, we are both blind parents, so we were not fully able to follow what the Sphero balls were doing. The apps used to control the toys were not always completely accessible to us as screen reader users, and so we wondered how many blind kids might have benefitted from coding clubs and activities but couldn't participate due to the mostly inaccessible toys and apps. Not only would the exclusion be unfortunate, but so would the possible loss of educational opportunities in STEM (Science, Technology, Engineering and Math) experiences for blind kids. How would a blind college computer engineering student who never had a chance to code much fare compared to sighted students who had grown up with this technology?

Even though now we own our own assistive technology company and consult with educational programs on how to utilize adaptive tech in different settings, when we were children there was not as much of an emphasis on STEM fields for blind students. Blind and low vision kids were often left out of many science and math-based classroom and enrichment activities. Opportunities for these children have increased in recent years. In the United States, the National Federation of the Blind now runs STEM summer camps for blind children that pairs them with blind adult STEM professionals. Research in how to teach visual and spatial concepts to blind kids has increased as well. Technology like 3D printers have become more ubiquitous, and improvements in tactile graphics have also increased the tools available for blind kids in STEM.

While we were struggling to follow our son's Sphero demonstration and wondering how to increase opportunities for blind kids to be included in coding activities, a product was in the works to do just that. Microsoft, in partnership with American Printing House for the Blind, developed an educational STEM toy called Code

Jumper. It was championed by Microsoft researcher Cecily Morrison, who was frustrated that there were not existing accessible coding toys and programs available for her blind son.

Code Jumper is completely accessible to those with blindness or low vision. It uses an app on a tablet computer that is accessible to screen readers, and a series of connecting pods that have large, colorful tactile buttons on them. The pods then are programmed to perform audible songs, tricks and behaviors. Children use both block coding on the app and physical manipulation of the pods by connecting them with cords and using the tactile switch buttons to create lines of bullion, if/then/else, and loop types of logic statements. These activities provide blind and low vision students the access to early coding and logic experiences that they have been previously left out of in coding clubs and technology curriculums.

Niklas was given the opportunity, through Qatar adaptive technology company Superwire, to demonstrate Code Jumper last October at the Mada exhibit in the QitCom conference. It was a lot of fun as several classrooms of children, both sighted and blind, were able to come visit and play with Code Jumper. Even though the product was made for kids aged 7-11 in mind, Nik found that many younger kids did just fine with it as well. One 6-year-old blind student, Ali, was able to program a version of the song “Twinkle Little Star” with sheep sounds and was singing along with it. Many students spent over 20 minutes engaged in coding activities and some of the sighted students said they found it more fun than their usual SCRATCH activities they had done on tablets at school.

Innovations like Code Jumper promise equal educational opportunities and increase opportunities for future employment in lucrative STEM fields. When large companies like Microsoft get involved in researching solutions to accessibility problems, it paves the way for better mainstream technology as well. When we received our demo version of Code Jumper to take to Qitcom with us, our son’s eyes were big with excitement and he was anxious to try it. Solutions that work for students with disabilities are good for everyone. Disabled students are often excellent at resourceful problem solving, and their inclusion benefits everyone. Perhaps the next version of a coding toy like Sphero will soon incorporate these accessible features developed in Code Jumper. Then blind and sighted kids (and their blind and sighted parents) can learn, create and have fun together with STEM activities.

To find out more about code jumper, go to codejumper.com
Contributed by:

Lisa Ferris Nik Petersson Assistive Technology Specialists Miles Access Skills Training,

LLC Lisa Ferris, Chief Administrator
Lisa’s background is in Special Education. She has a Master’s Degree in Special Education, concentrating on students with multiple disabilities and deafblindness from the University of Kansas. Her Bachelor of Science in Education from the

University of Nebraska-Lincoln concentrated on both elementary and special education.

Niklas Petersson Senior Accessibility Consultant Niklas's main area of expertise is with Assistive Technology. As a blind person, he has first-hand knowledge of how to integrate accommodative technology into the work environment as well as at home. He studied Mathmatics and Sciences at Paul Säveskolan in his native Sweden. He received additional IT training at York University in Toronto, Ontario.

SpeakLiz & VisionCommunication Apps for People with Hearing and Visual Impairment.

Hugo Jácome

The Challenge

In general, and often not considered by societies and governments as a high priority, the whole world has a pending challenge: making it more accessible for people with disabilities. According to the World Health Organization (WHO), 25% of the world population has some kind of disability (hearing, visual, intellectual, physical), approximately 2 Billion people. Specifically, about hearing & visual impairment, 760 million people (470M deaf & 290M blind), face big challenges, like poor access to education and decent work. All these issues affect directly their independence.

Another big trouble it's in terms of the economic impact of that lack of access to those fields, according to UN, less than 5% goes to school, some hearing or visual aids can cost up to USD 100.000 and the combined global annual cost of unaddressed deafness & blindness is USD 1.400 Billion, this huge cost includes the impact of not having all those people
in a decent job.

The overall sector of assistive technology has been growing in the last years due to important aspects like the rising of smartphones and mobile technology plenty of User Experience improvements. In that sense, developers of all the world have made important steps to create new tools that can embrace the new mobile technology and accessibility features for people with disabilities.

Backgrounds and motivations

Talov was co-founded by Hugo Jacome and Carlos Obando, it's a company born in Ecuador, then opened in the US and from that last place, it's currently seeking of digital ways to expand to the world, whose purpose is to build technology for assist people with disabilities in their challenges. Although Talov is a recent company, the origins of that desire of working in this field are older.

All started when co-founders were high school classmates and a teacher at that time showed them the C++ programming language, that meant the beginning of a software development hobby. Many years later, when co-founders were finishing their engineering careers (Hugo studied Acoustical Engineering and an MBA, Carlos studied Mechatronics Engineering and ICT teaching postgrad), they started a research process without knowing each's other work.

Specifically, in 2008 Hugo started to work on a software (initially designed for macOS and Windows) that can follow him playing the guitar in real-time to create images, but almost immediately he realized that in addition to the entertainment field, this tool had a strong potential for a social purpose: assist people with hearing impairment to know through images, what's happening around them in terms of sound. Carlos was also working in coding mobile apps. In parallel to that co-founder's research process, they were also working as teachers in two different Ecuadorian Universities (University of the Americas in the case of Hugo and Northern Technical University in the case of Carlos), but then in early 2016 (8 years after being researching) they met casually and started to update each other about what they have been doing all those years. A couple of weeks later, Hugo and Carlos decide to quit their University jobs and start a new company from the scratch, and in January of 2017, the first app was launched: SpeakLiz (designed for people with hearing impairment). And, in early
2019 the second app was launched: Vision (designed for people with visual impairment).

The solutions

Now, these two apps have evolved after several updates that are continuously uploaded to mobile app stores; they combine the power of Artificial Intelligence with the daily use of the smartphone to give people with hearing and visual impairment more independence for their daily life activities. Both apps work in real-time, without Internet and have 35 languages compatibility:

SpeakLiz for deaf people

This app uses AI to understand the surrounding sounds and identify hundreds of them, this is important for deaf people to identify any sound, from emergency alerts to a baby crying, and many more. SpeakLiz also identifies human voices in many languages and transcribes them in real-time with no need for Internet. The most important feature is to understand sign language through a tiny hand gesture sensor (like a watch) and convert it in real-time to voice and text compatible with many languages, this allows deaf users to use their sign language with everyone, even with people that don't know the sign language.

Vision for blind people

this app uses AI and Augmented Reality with the phone's live camera feed to identify thousands of objects and their distance, money bills of many world currencies, multi-language text reading on many surfaces, detect colors. Also, it can assist blind people for maps navigation when they want to go to any favorite place.

Hugo Jácome

(Ecuador, 1986)
Serial entrepreneur in the fields of music production and technology development, he was the co-founder of MidSide music & recording studio and ATBS, a technology company.

Hugo has an academic background in Music by George Gershwin Conservatory, Acoustical Engineering, and MBA (International Business specialized) by the University of the Americas.

He is one of Talov co-founders together with Carlos Obando and currently works as President, but also leads PR, Digital Signal Processing and Artificial Intelligence models development.

Tips for Effective Inclusive Remote Learning

Mada Center

During the current situation with COVID-19 pandemic, most schools in Qatar were closed and started teaching students remotely. There were a few legitimate questions and worries that instantly cropped up from day one concerning remote education such as, are we ready for it? Will it require more commitments or less than the instructor-led classes? What is the best way to approach studying remote learning classes? In this article, we will be sharing some of the important study tips and strategies for online remote learners, teachers and for schools.

Technology

Technology is an essential component of remote learning and supporting all students, particularly students with disability at home. It allows creation of accessible, virtual inclusive classrooms that ensure all students have the access to their academic curriculum. It's also imperative to bring some accessible fun into the remote learning process, as the power of play both as a source of entertainment, as well as social and emotional learning.

Modifying curricula and instructions

Learning in a remote setting may differ from mainstream, classroom-based environments. This includes expectations for students and teaching methodology. Curricula must often be adjusted, and teaching resources must all be accessible for abilities in the classrooms. Ideally, Universal Design for Learning allows students with disabilities to access courses without adaptation and allows the coursework to be available in a variety of formats for the nondisabled, making it easier for everyone to access.

Review IEP goals

Define an unmistakable realistic objective to assist with remaining inspired and beat lingering. These objectives ought to be explicit and simple to gauge. Review students' IEPs -individualized education program- and identify the goals that can be adapted most quickly to the remote learning program. If students with learning disabilities are in receive of supports such as speech or language therapy, or occupational therapy or assistive technology services, teachers must review each student's IEP to determine who they need to collaborate with.

Understand remote learning practices

Remote learning is not as easy, but rather a more convenient one. It requires dedication, commitment and time. Teachers and students should also consider or prepared to be tech-savvy and work with others effectively. They also need to know where to find support teaching resources such as open educational platforms, bespoke and free online learning platforms.

Accessibility Considerations

The online learning environment and technologies in use are al subject to the same standard and laws governing regular classes in so much that educational establishments have the responsibility to ensure that learning opportunities and experiences should be accessible. In the online environment Web Content Accessibility Guidelines (WCAG) 2.1 standards should all be considered. WCAG outlines the features necessary to meet minimum accessibility requirements in the online/ remote participation environment and are comprehensive.

Reliable internet access

Internet speed and reliability are very crucial to take eLearning course, as technology problems or system crashing can happen any time while working online or in the middle of saving information. A reliable internet access will also give the opportunity to check in, stay current with remote lessons, and the opportunity to interact with other students and lessons' instructors. To avoid any misfortunes, ensure that students save their work repeatedly and backup regularly using cloud storage, for example Dropbox or Google Drive.

Dedicated study area

It's simpler to review and remember study ideas in case students are in a similar spot where they previously learned it, so having a committed space or desk at home to study can make learning progressively successful. Creating separate areas, one for study and one for breaks will help to focus more. Furthermore, ask friends, relatives, and colleagues to respect the virtual working environment and consider turning off mobile phone and logging off all social networks to stay focused.

Complete one task at a time

Doing many tasks at the same time is less productive than concentrate and focus on one task at a time. If students are regularly bombarded with multi streams of virtual information, they cannot pay attention, recall information, or switch from one task to another. They need to stay focused on one task at a time.

Use of calendars

Students can use calendars to open their schedules and pick an anticipated, dependable time that they can devote to study and finish required assignments. This will guarantee that homework won't become the last task on their agenda. Encourage students to set a day or two before the actual submission of the homework/ assignment's deadline using Outlook or Google or Apple schedules, or another schedule application.

Accountability and achievement

Encourage students to tell their friends and family about the remote learning they are taking and what grades/accreditation they are expected to achieve at the end. Having a community and support network of friends and family to cheer students can make a difference. Students can also post their achievements to the social media accounts, or social groups.

Groups discussion

Students shouldn't feel isolated, discussion forums and virtual online groups such as Microsoft Teams are one of the best places to ask questions about how to write assignments/homework, discuss topics, share resources and ideas, plan schedule and make friends.

Take notes

Taking notes can promote active thinking, boost comprehension, and extend students attention span. They can grab a notebook or find a digital app that works best and start jotting down key points.

Regular breaks

Students need to take regular breaks in order to rest their brains and eyes in order to stay focused and to complete tasks to high performance. If they have been challenged with tasks or assignments with no real progress for one hour, they should take a break.

Ask for help

While it may be productive for students to look for answers to their remote lessons' questions independently, they shouldn't hesitate to contact teachers online when they are stuck and in need of help. If they don't ask for help when required, they may end up falling behind, which may lower their self-esteem, as they may not be able to keep up with tasks and assignments. By asking online instructors/ teachers to clarify problems, this can help evaluate students' level of understanding of the online material, but also to get an idea of the overall effectiveness of the remote education.

Tawasol AAC Symbols and Inclusive Education

Mada Center

The use of an Augmentative and Alternative Communication (AAC) symbol-set is vital in fostering successful inclusion of students with learning and communication disabilities within an education environment. The integration of AAC into daily school activities can lead to improve student participation and performance in the education curriculum. Strategic and effective implementation of AAC resources in education can often have relevant students acquire new knowledge and skills to meet their diverse individual needs. The Tawasol AAC symbol set serves as a critical AAC resource to offer an inclusive education environment for students in Qatar and the Arabic language speaking region by supporting the provision of inclusive Arabic and English language-based curricula.

AAC can often serve as a universal design learning tool. It has been noted that the use of a symbol-based communication system can help improve the academic growth of all students. Conveying education ideas and concepts using symbols can offer a more visual perception of the content being discussed. The use of AAC symbols can facilitates such discussion amongst all students. Effective outcomes of AAC symbols usage occurs when communication partners (students and teachers in class) are well trained to initiate communication and responses using the AAC system. This allows complete integration of the student with disability within the classroom as he/she is able to inclusively communicate with peers and offer equal level of participation in classroom activities.

Mada has and continues to collaborate with strategic partners within the Education sector to build capacity for supporting relevant students with learning and communication disabilities. This is achieved by building capacity in relevant institutions by providing AAC solutions utilizing the Tawasol Symbol set and training educationalists on strategic implementation of the solution to gain effective outcomes. The enhancement of Tawasol Symbols set is a continues endeavor by focusing on the expansion of the vocabulary set and improving its availability in various platforms (e.g. Clicker 7 Arabic. Tawasol AAC App, etc.). Recently, a series of symbols have been created to educate children using AAC symbols about the COVID-19 pandemic and steps to safeguard from it. This is part of Mada’s continues effort to keep the Tawasol Symbols relevant and up to date for providing the latest inclusive educational content.

Key progression of Tawasol Symbols:

Key Milestone 1	**Tawasol Symbols Development Kick-Off**	In 2013 MADA had embarked on a project to develop an Augmentative and Alternative Communication (AAC) symbol-set called Tawasol that focused towards the Qatari Arabic language. The project was launched in collaboration with University of South Hampton and under support funding from Qatar National Research Fund (QNRF). The project aimed at the creation of a suitable set of symbols that is culturally and contextually appropriate towards the local society.
Key Milestone 2	**Online Platform**	A dedicated online platform was been developed in 2017 to make the Tawasol symbols available for teachers, therapists, parents, and developers. The platform allows users and relevant professionals to download the symbol set for use within their environment (e.g. home, school, etc.) along with the associated training resources to utilize it.
Key Milestone 3	**Application Programming Interface (API)**	The Tawasol Symbols online platform is further extended to offer an Application Programming Interface (API) in 2018 for developers to be able to integrate the symbol set into any applications being developed. The API can be used to develop new AAC Apps using Tawasol symbols for android and iOS.
Key Milestone 4	**Tawasol AAC App**	To maximize the impact on Arabic AAC users in Qatar and the region, Mada has introduced the first fully functional Arabic AAC app using the Tawasol Symbols. The Tawasol AAC App is one of the innovative solutions supported by Mada through the Mada Innovation Program. It has been developed in 2018 by following the international guidelines governing AAC methods, as well as transforming speech models into alternative and enhanced communication by following the principles of verbal behavior and the analysis of applied behavior.
Key Milestone 5	**COVID-19 Illustrations**	In 2020, considering the COVID-19 pandemic outbreak, a set of about 30 symbols have been designed to represent a COVID-19 guide interpreting the basic hygiene and safety measures to be followed – including depiction of the typical COVID-19 symptoms, proper hand washing procedures, respiratory hygiene, and calling for medical help were the main focus of the illustrations.

Developing an Application for the Diagnosis of Aphasia in Arabic

Tariq A. Khwaileh

Researchers at Qatar University in the field of English Language and Linguistics under the supervision of Dr. Tariq Khuwaila developed a diagnostic test for patients with aphasia that results from a stroke. This project was implemented to be the first initiative of its kind in Qatar and the Arab world to serve the health sector in Qatar and Arab patients, especially those speaking the Gulf dialect who suffer from aphasia (the inability to speak and understand speech as a result of an injury in the language processing centers in the brain). Discovering aphasia cases relies on studying diagnostic tests translated from the English language, which do not take into account the linguistic and cultural differences that exist in the Arabic language. These diagnoses can be inaccurate making it difficult for doctors to find suitable solutions for the treatment.

This project comes in response to the Qatar National Vision 2030 regarding the health sector, which is one of the most important aspects of human development strategies, given that the people of Qatar have the right to secure a high standard of living in the future. Progress in this sector contributes to the success of the Qatar National Vision as it has an impact on the quality of life of the population in Qatar and their productivity in society. The health component and the availability of an integrated health system would participate in the development and progress of the State of Qatar in all areas. Qatar cares about this field as the country contributes to invest in projects that guarantee its share in the success of the health sector within the framework of the state's future vision.

The researchers aim to develop a database that focuses on the audio-visual linguistic influences in the Arabic language, specifically the Gulf dialect, to serve those with aphasia and are affected by the symptoms of a stroke. Furthermore, this diagnostic test is developed so it can be changed to study various Arabic dialects, taking into consideration the different linguistic and cultural characteristics in these dialects.

This diagnostic examination in Arabic for people with aphasia helps neurologists and speech and hearing specialists to identify problems affecting the patient after a stroke and to assess the patient's linguistic ability to pronounce and understand by identifying areas of weakness in the brain of people with aphasia. These tests include a check for sound outputs and other tests that focus on how simple words, their types, and how other complex words are pronounced, as well as examinations of linguistic structures and sentences of all kinds. These tests diagnose the patient's morphological, derivative, and grammatical ability. After investigating the patient's condition and conducting all checks, these results are converted into figures so that certain statistical tools can be used to facilitate the analysis of these results, called "numerical results". Then, these numbers will be converted back to specific

conclusions describing the patient's condition and injury. With the help of these conclusions, the specialist in charge can develop a treatment in line with the patient's condition and draw up an integrated treatment plan for the patient, as it varies from one patient to another according to the severity of the symptoms and the extent of his/ her influence as a result of the stroke, especially aphasia. Currently, there are no tests that provide sufficient diagnostic tools to serve the accurate diagnosis of Arabic speaking patients with aphasia. What specialists currently use is tests translated from the English and French languages, which is considered an obstacle in determining the case accurately and sufficiently, because it does not take into account the patient's linguistic and cultural background. Thus, these specialists and patients are in urgent need of such developed test to serve them to diagnose the problem in an ideal and required manner to avoid wrong diagnoses that may increase the severity of symptoms and cause the aphasia to continue without being accurately addressed.

This project aims to implement a diagnostic examination in the Arabic language for people with verbal aphasia in neurosurgery and speech clinics in the region's hospitals, starting from Hamad Medical Hospital to all GCC countries, as well as western hospitals outside the Arab world that receive Arab patients. This diagnostic analysis will be a software application that facilitates the use of doctors and specialists in hospitals and clinics. On the other hand, this project aspires to put the first imprint in the field of medical science supporting the development of such examinations and databases so that they can be used in the field of linguistic research, as it is limited in the Arab world. We hope that this project will contribute to the development of hearing and speech therapy for patients with verbal aphasia to develop the health sector of the State of Qatar and participate in achieving its national vision 2030. This would set a positive path and great hope for stroke patients with verbal aphasia in order to avoid misdiagnosis of the patient's condition. This project is under experiment, as it is applied to several patients with aphasia to prove the validity and accuracy of the current diagnostic analysis, and work is being done to complete it for publication this coming August.

Dr. Tariq A. Khwaileh is the Head of the Department of English Literature and Linguistics at Qatar University. Since 2016, he has been a Research Fellow of the Department of Human Communication Sciences at the University of Sheffield, United Kingdom. Specialized in clinical linguistics and psycho-neurolinguistics, his main research interest is developing clinical tests for patients with Aphasia, and language processing in the mind and brain, with special reference to Arabic. Dr. Khwaileh presented in international and specialized conferences, and published journal articles in scientific and indexed journals specialized in the fields of psycholinguistics, neurolinguistics and clinical linguistics.

Lazarillo App: Orientation and Autonomy for People with Visual Impairment

René Espinoza

Technology is changing the way we interact with the world and access to services and products. Companies are eager to use technology to reach as many clients as possible. Although many companies are missing digital accessibility, leaving a growing population out without them knowing. Lazarillo is helping both sides of the equation.

Lazarillo is a company founded in Chile by 2016 with the mission to improve the quality of life and autonomy of people with disabilities, creating tools that enhance the relationship between people and institutions, making the world a more accessible and connected place.

René Espinoza, CEO of LazarilloApp, realized that it was necessary to create an effective tool for institutions to easily improve the digital accessibility of their spaces and services connected to mobile assistance that uses this information to help the user navigate through the space or know about the institution's services.

Lazarillo first started as a thesis project, while René was studying Electrical Engineering and working part-time in a medical center helping doctors develop assistive technologies. During that time he was asked to develop a mobile app for blind people, after interviewing 30 people with different visual disabilities and researching on the standards for web and mobile accessibility he finished that project but discovered a bigger issue, most mobile apps are not accessible and most of the people he interviewed needed to rely on somebody else to do their daily routes or even on a stranger if they missed a stop. He decided to dedicate his thesis to solve this issue with the help of Miguel González. Miguel was born blind and by the time he met Rene he was a specialized teacher on assistive technologies, with his feedback and testing with multiple users, after a year a final prototype was born with great results and a year after more Lazarillo became a startup with government funding from CORFO Chile's entrepreneur organization. Running the business with Jonathan Taivo as COO and Alvaro Bravo as CMO who joined Lazarillo as a cofounder.

Today Lazarillo has grown to 160,000 users globally in 39 countries and it is available in 22 languages including Arabic. With its platform, it has digitized and made accessible 66 locations of companies that include Banks, hospitals, university campuses, museums, retail stores, parks, and public buildings. This tool that first started as an assistant for visually impaired users has been gradually growing becoming a universal tool that provides new capabilities in places they mapped such as accessible routing for wheelchair users and with the integration with key partners can provide on-demand sign language interpretation on the companies venues.

Miguel Gonzalez UX Leader of Lazarillo

Lazarillo is currently growing with the help of local partners distributors that use the Lazarillo platform to integrate with local companies and public institutions making countries more accessible. Currently, Lazarillo is working with partners in the US, Mexico, Costa Rica, and Uruguay.

Due to the current pandemic of the COVID-19 Lazarillo is taking action. After talking to its users one of the key problems they identified, is the accessibility of digital resources. Local entities are providing and posting resources on social media platforms even though most of the resources get lost in the feeds with a bunch of news and people with disabilities usually miss it and have a lot of difficulties to find it again, for example, forms for diagnostics or links for free telemedicine consults, list of phone numbers for medical consults by state or regions and all sort of actionable resources that a user are missing plus many of this information aren't in an accessible format as some institutions are responding as fast as possible and are not taking care of the accessibility of its information. Using Lazarillo's service institutions ensure the accessibility of their contents, as it reviews and makes the adaptations as needed and then notifies the users in specific geographic regions.

To learn more about our work visit our website at www.lazarillo.app

If you would like to learn more about the COVID-19 service contact us now!
covid19@lazarillo.app

René Espinoza, Founder and CEO of Lazarillo, a startup that developed a platform and mobile App for institutions to digitize their services and spaces to make them more accessible for clients with disabilities, selected as part of the Techdiversity program from Tampa Bay Wave 2019. Espinoza is a 29 years old Electrical Engineer from the Universidad de Chile, specialized in electronics, mobile and assistive technologies. He has worked in previous startups in the fields of mobile apps and health devices. Espinoza, selected as MIT (Massachusetts Institute of Technology) Innovator under 35 Latam 2019, is a fellow from the Collective Global Accelerator, Westerwelle Young Founders Program and the Young Leaders of America Initiative.

Social Media Accessible for All – Instagram

Oumer Seid
Mada Center

Accessible Social Media

This article will showcase some of the ways Instagram has been designed to be accessible to people with disabilities, thereby enabling everyone to easily share and access contents.
The article is part of a Nafath series that addresses different ways major social media platforms implement the fundamentals of accessibility and universal design to their websites and apps. At a time when the use of these platforms has become increasingly, taking the place of traditional media outlets, it is important to ensure that there are ample resources out there to enable the disabled community to access them and use them at par with the rest of the world.

About Instagram

Launched in 2010, Instagram is an American photo and video-sharing social networking service that allows users to upload photos and videos, which can be edited with filters and organized with tags and location information. Posts can be shared publicly or with pre-approved followers. Users can browse other users' content by tags and locations, and view trending content. Users can like photos and follow other users to add their content to a feed.
As of 2019, Instagram has more than one billion active users and is the 4th most downloaded app of the 2010s. Its global reach is undeniable. Therefore, ensuring that people with disabilities can access it is an important part of creating an inclusive digital ecosystem.

Instagram Accessibility

Seeing that Instagram is primarily a visual medium, most of the accessibility features that are built in address the needs of the blind, and persons with low vision. With over 285 million users with visual impairments around the globe, an accessible Instagram will undoubtedly have a profound impact on this community.

In addition to those features embedded in the app itself, Instagram has designed its platform in a way that makes it compatible with a variety of assistive (AT) and access technologies. This is primarily done through the implementation of WCAG standards, thereby organizing and labeling the features of the app in a manner that makes it easier for AT users to use.

Screen Reader Compatibility

Instagram is designed in a manner that enables screen reader users to easily access the app. This means that through activating the VoicOver feature on iOS or Apple computers, a blind person can navigate the entirety of the app through audible cues. This facility is also available for Windows (JAWS or NVDA) and Android (TalkBack) platforms.

Alternative Text

Also known as alt text, alt tags or alt descriptions, alternative text is the written copy that appears in place of an image on a webpage if the image fails to load on a user's screen, either for a technical reason or if the user cannot see the image due to their disability. This alternative text feature helps screen-reading tools describe images to visually impaired readers.

Captioning

Users can also leverage the alt text feature to caption video posts by using the post's description field. Captioning is useful to both users with visual and hearing disabilities. For both, it provides a description of what is going on in the video, content which is usually delivered through a combination of moving imagine and sound. Users can see if a video has sound by clicking on the video, and playing it, where in the lower right-hand corner, there will be an "X" if there is no sound in the video or a speaker icon if there is.

To view and edit the alternative text for an image before posting it on Instagram:

1. **Start** by taking a photo or uploading an existing photo to Instagram.
2. **Select** a filter and edit the image and tap Next.
3. **Tap Advanced settings** in the lower portion of the screen.
4. **Tap Write Alt Text.**
5. **Write** in the box your alt text and tap **Done.**

To alter a photo's alt text after you have posted it on Instagram:

1. **Go** to the photo and tap on **three dots** above the picture.
2. **From** the list tap **edit**
3. **Tap Edit Alt Text** in the bottom right.
4. **Write** the alt text in the box and tap **Done.**

Mada Fablab – Social Transformation through accessible Digital Fabrication

Achraf Ben Jamaa

Digital Technology Access and Inclusion

Today, more than **half of the world's population is using the interne**t, that means that the way its cooperated and communicated among citizens, and between citizens and the governments is changing dramatically. However, according to the International Telecommunications Union, in a global scenario where **digital access and its adoption are not distributed uniformly or inclusively for everyone**. Only 24.4% of Africa's population was online in 2018, while Europe had a 79.6% internet penetration rate. At the same time in the USA, it is registered at 69.6% (other statistics show that countries in Africa and Asia have driven growth during recent years in mobile cellular subscriptions and mobile broadband subscriptions).

In order to reduce the digital gap, it is essential to **create more inclusive and participatory digital communities and spaces, this reinforces affordability while also increasing digital awareness and skills.** By gaining access to increasing amounts of digital content, people can become better able to understand and navigate the digital systems which increasingly rely upon producing and delivering services or products related to their needs (health care, education, employment, and civic participation).

Greater digital access can improve the quality of life, especially for the most vulnerable. However, we should not think exclusively about access to the internet and its data, but how that data can be connected to our physical world. This process is known as the **Internet of Things**, or "IoT". IoT is designed in order to allow us to **develop new products and services which are surrounded and operate by networks of smart, web-connected devices and services capable of sensing, interconnecting, inferring, and acting.**

According to the *World Economic Forum* (WEF), we are living today the *Fourth Industrial Revolution* (4IR) that represents a fundamental change in the way we live, work and relate to one another. The 4IR is a **new chapter in human development, empowered by outstanding technology advances** along with those of the first, second and third industrial revolutions. These advances are **combining the physical, digital and biological environments**. The speed, breadth and depth of this revolution **are forcing us to rethink how countries develop, how organisations create value and even what it means to be human.**

Through this dramatic change, it is essential to understand that the **4IR** is not just a technology-driven change. Although its focus seems to be on technology and its advances, it is an enormous opportunity **to help and include everyone,** where we can join efforts and objectives between **leaders, policy-makers and people from**

all income groups and nations, to harness converging technologies in order to create an inclusive, human-centred future.

As part of this revolutionary change, a close and strategic relationship has been generated between the **information and communications technology and digital manufacturing, which has dramatically expanded access to industrial-grade digital fabrication technology, and is transforming the landscape of business models, value chains, and cross-border trade.** Fab Labs play a critical role in this innovation ecosystem by providing the facilities and support services that make it possible for entrepreneurs, researchers, and small businesses to access technologies allowing them to turn innovative ideas into working prototypes.

What is a Fab Lab? It is an educational outreach component that started at MIT's Center for Bits and Atoms (CBA), as an extension of its research into digital fabrication and computation. "A Fab Lab is a technical prototyping space for invention, typically equipped with an array of flexible computer-controlled tools that cover several different length scales and various materials, intending to make almost anything ", Gershenfeld, Neil A. (2005). A Fab Lab is also a platform for learning and innovation: **a place to play, to create, to learn, to mentor, to invent.**

One of the characteristics of Fab Labs is flexibility in the interaction with their users, from accompanying them on a specific section of their innovation journey or merely during the time of their stay at the lab, through the use of the equipment, and their experience of a well-run personal production process.

Overall, Fab Labs can change patterns of fabrication, promote science, technology, engineering and mathematics (STEM) skills, create businesses and jobs, and drive economic growth and productivity. They do this by providing the opportunity for practically **anyone in the broader public with creative ideas to participate in the design, production, and distribution of products and services.** A growing global network of Fab Labs has generated an entirely new realm of possibilities at the local level to stimulate innovations, inventions and applied research across industries.

However, as mentioned in the beginning, just as the internet has not been distributed uniformly or inclusively for everyone, some Fab Labs around the world have made this same mistake. Their approach has neglected an **inclusive design, focusing on collaboration resulting in "one size fits one person", which is very different from "universal" design and its "one size fits all" mandate.**

That is why, remarkably, the process that MADA has been developing to build and launch very soon the **first Fab Lab designed 100% for people with disabilities**, will become a world reference. Since not only its space and furniture will be proposed for the integration of people with special needs, but also their content will be developed with the same approach, **where assistive technologies and online courses will be mixed with digital fabrication**. This approach will help the process of changing social norms, values, and attitudes while addressing unconscious biases and stigma, and adopting policies and practices in training centres accordingly. **In a**

world where change is occurring ever more rapidly, driven by science and innovation, inclusive education and training must leverage technology to bolster the cause of universal access and increasingly personalised learning.

Robert Garcia

Costa Rican, Architect specialized in digital fabrication and social innovation. He holds a Master's degree from the Institute of Advanced Architecture Institute of Catalonia, a Diploma on Digital Fabrication from the Fab Foundation, and is a Certified Innovation Manager by Leipzig University. In 2011 he received the "Excellence in Business Management" prize by the Total Quality Association in Guayaquil, Ecuador. Selected by the Costa Rican newspaper "El Financiero" as one of the 40 most influential persons under 40 in Costa Rica for 2016. He currently serves as Operations Manager at IbTECHar Digital Solutions, Doha Qatar.