A study on evaluating a prototype of a symbols-based voice output AAC app for the Irish language, Geabaire

Geabaire

1.

This is a guide to a study to evaluate a prototype of the first symbols-based voice output AAC app for the Irish language, Geabaire.

Contents

2. What will be covered in this presentation?

It will: introduce the study; describe the features of Geabaire; give guidance on how you may use it as AAC user or communication partner and will run through what will happen during the study.

We are enormously grateful to you for taking part in this study and for agreeing to give feedback on this prototype of Geabaire. Your input will be very valuable to us and will influence the design of the app going forward.

3. What are the aims of the study?

Over recent months research and development has been undertaken at the Phonetics and Speech Laboratory at Trinity College, Dublin with a view to putting in place an initial prototype for an Irish-language Augmentative and Alternative Communication (AAC) app, called Geabaire.

This is being carried out within the ABAIR research group with additional support from An Chomhairle um Oideachas Gaeltachta agus Gaelscolaíochta (COGG).

The ABAIR initiative develops linguistic resources, speech technology and applications for the dialects of Irish.

This study aims to investigate the specific features that are especially important to guide the design and to evaluate the effectiveness and functionality of the current version of the system. Developing the system beyond the prototype stage requires parallel research with AAC users, communication partners and other stakeholders who will form part of an advisory group. We intend to carry out cyclical testing.

Gaeilge agus Uathachas

4. Why is Geabaire needed?

Lack of availability of a robust symbol-based speech generating AAC app for Irish is a particular barrier for AAC users in Irish speaking families both in the Gaeltacht and outside the Gaeltacht and can be a major roadblock in AAC using children's' education particularly for those attending gaelscoileanna and Gaeltacht schools. The focus of this research is autistic children in gaelscoileanna and Gaeltacht schools but it is hoped that Geabaire will be of benefit to a large variety of users.
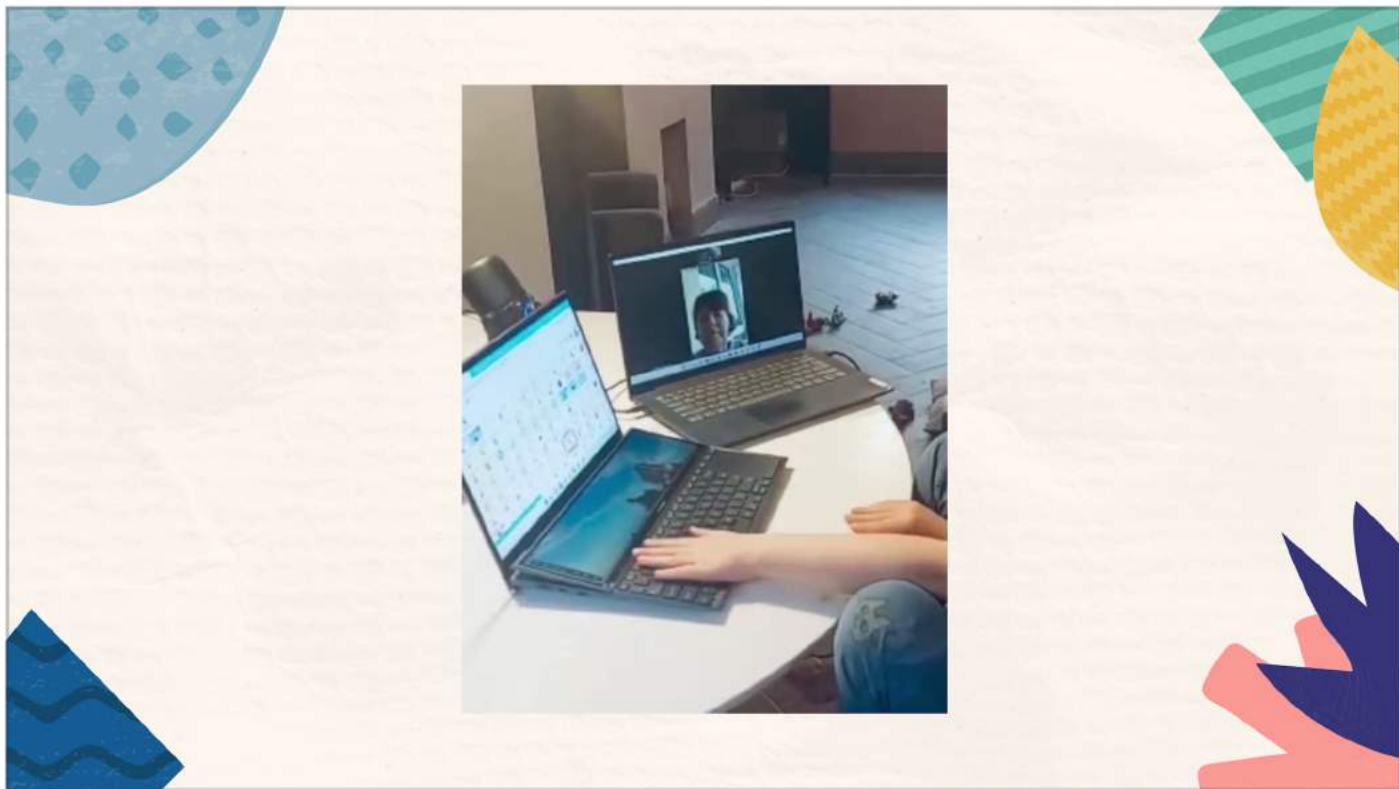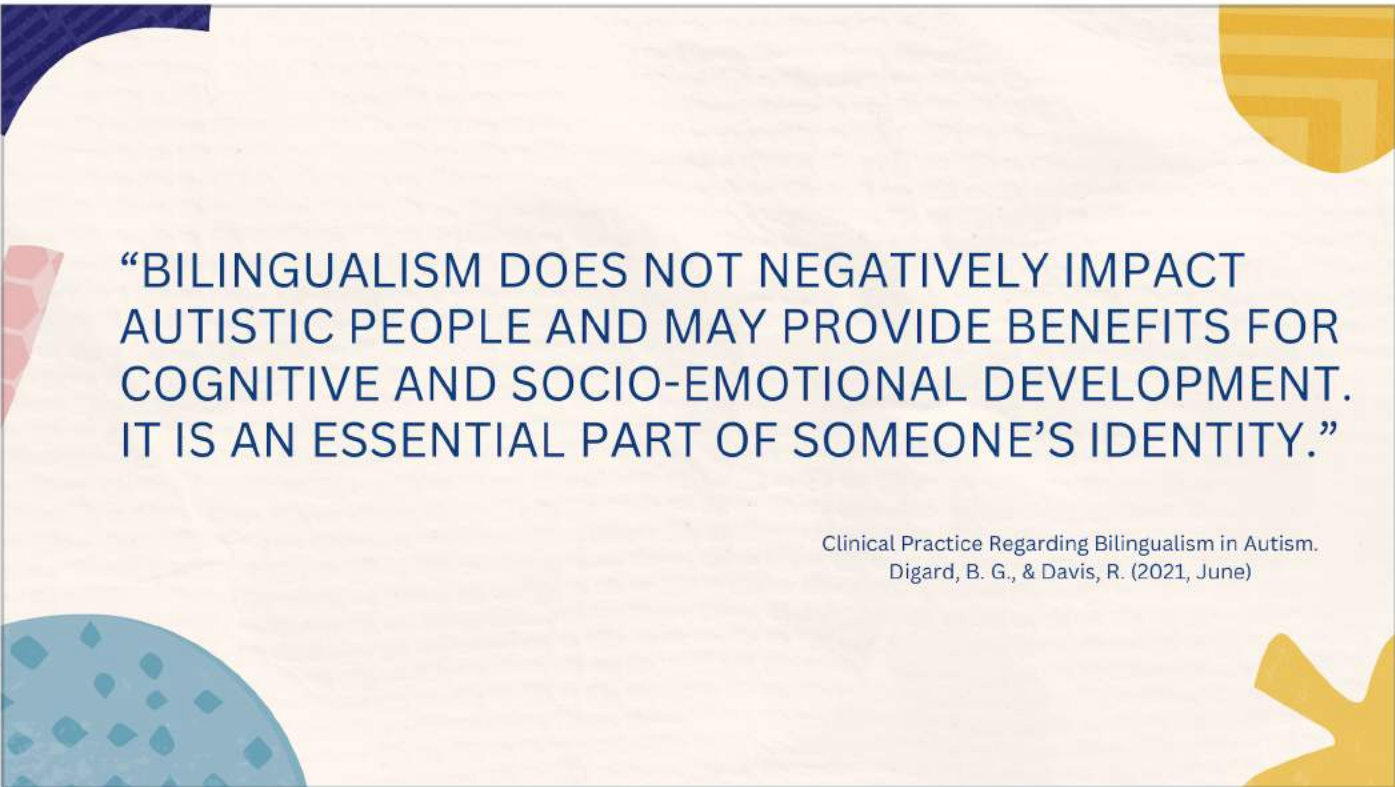
5. Físeán: Dia dhuit a Mhamó
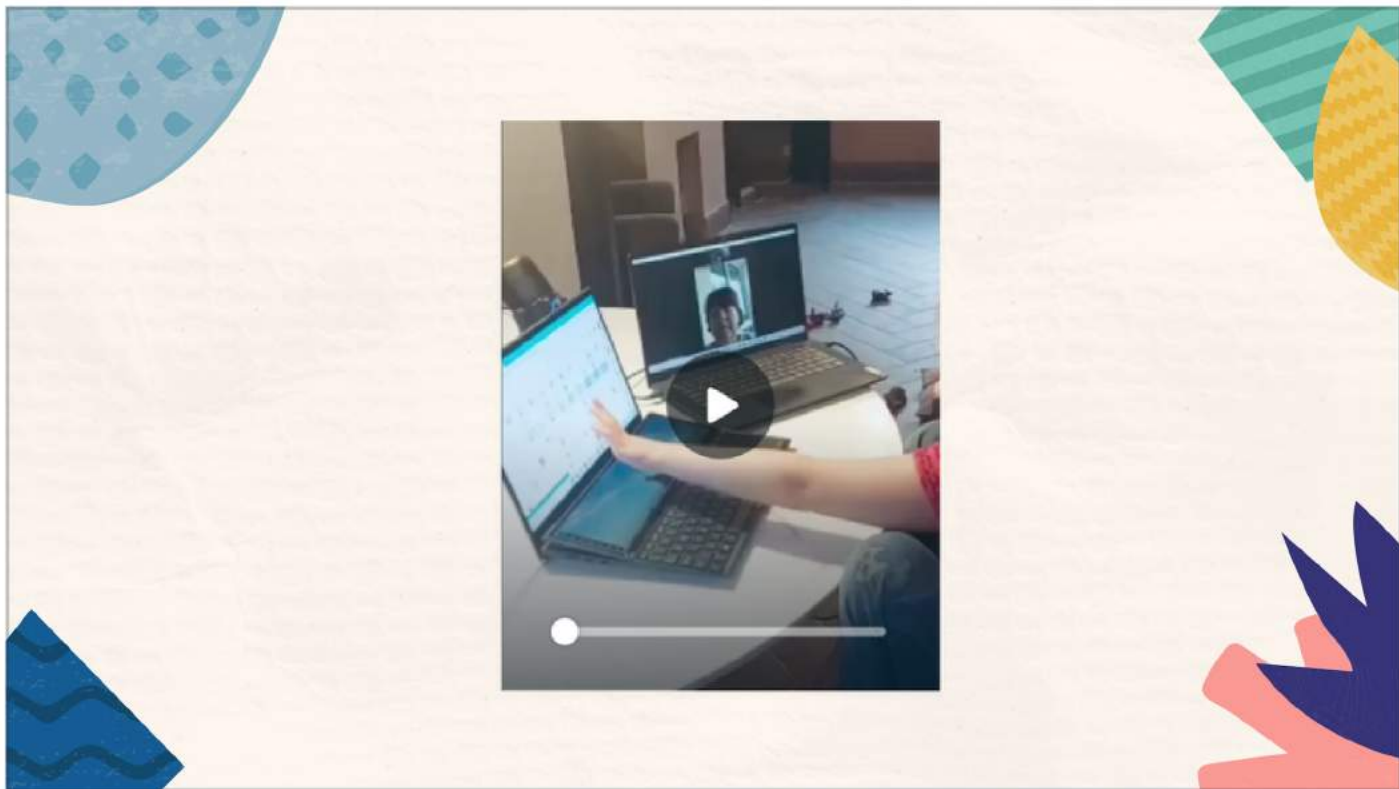
6. Everyone should have access to Irish

Having access to Irish allows people to connect with their identity, family and communities. It is a core element of the majority of students' learning experience in the Irish education system. It is one of the national languages of Ireland and an expression of Irish identity. Everyone, regardless of their ability, should be provided with equal access to language learning and should be appropriately supported in doing so.

> "BILINGUALISM DOES NOT NEGATIVELY IMPACT AUTISTIC PEOPLE AND MAY PROVIDE BENEFITS FOR COGNITIVE AND SOCIO-EMOTIONAL DEVELOPMENT. IT IS AN ESSENTIAL PART OF SOMEONE'S IDENTITY."

Clinical Practice Regarding Bilingualism in Autism.
Digard, B. G., & Davis, R. (2021, June)

7. Autism and Bilingualism

Research indicates that "bilingualism does not negatively impact autistic people and may provide benefits for cognitive and socio-emotional development. It is an essential part of someone's identity." Non speaking people may understand multiple languages.

8. How will using Geabaire benefit the user?

Geabaire will encourage the generation of spontaneous utterances of novel words so that the user can communicate what they want, wherever they want to whomever they want. Using Geabaire will encourage the expansion of vocabulary and the development of literacy and it is intended that the breadth of vocabulary available and access to a keyboard will ensure that it will grow with the user.

The system architecture and guiding principles take into consideration the particular characteristics of Irish and are underpinned by an in-depth understanding of Irish semantics, syntax and morphology. The layout is designed to be logical, intuitive and to utilise the fewest number of keystrokes in order to reduce the cognitive and motor load on the user. Parts of speech are laid out in a consistent pattern across the grid in order to encourage motor planning with only one location per word for the most part so users only need to learn one location per word.

Overall, the design is intended to facilitate ease of communication and to be simple to use and to learn.
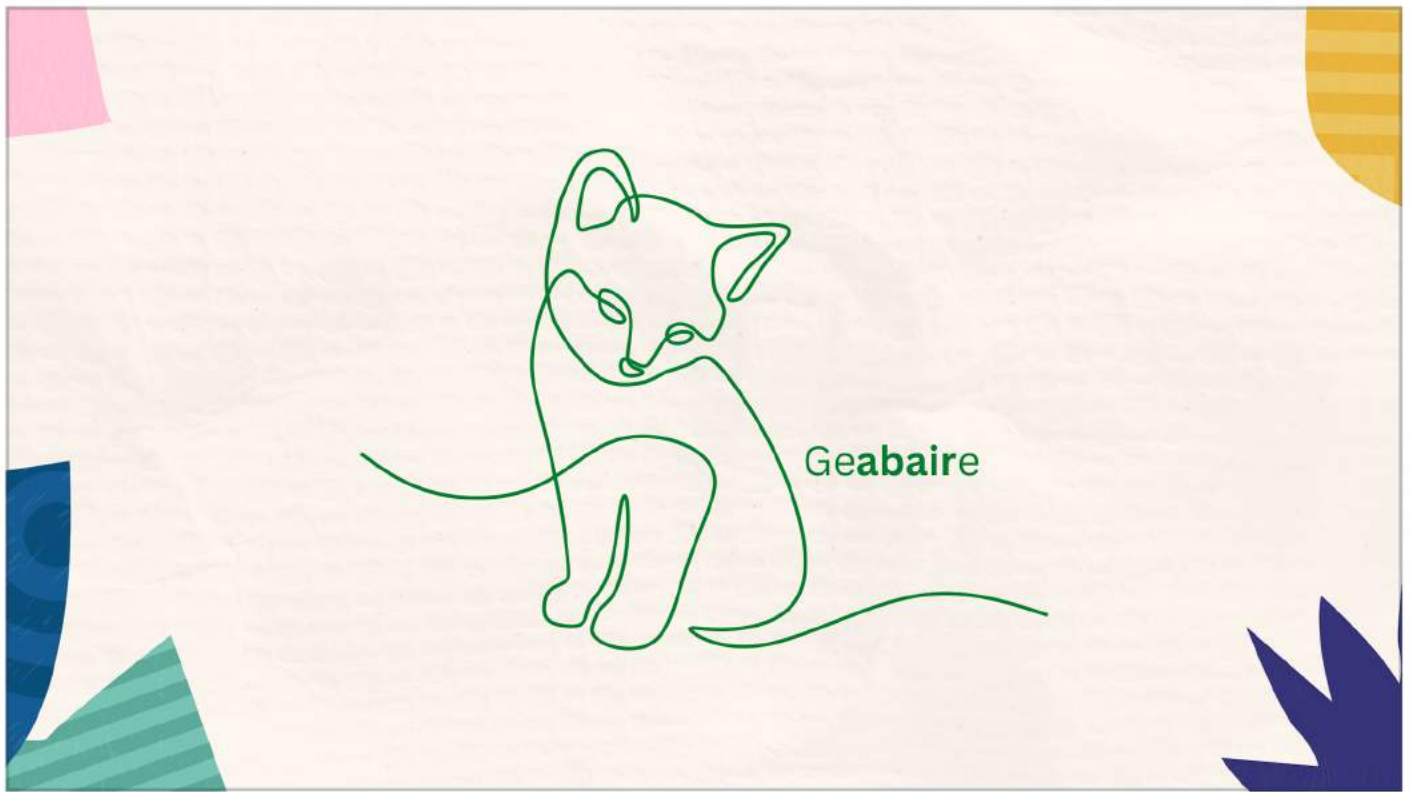
9. Why is the app called Geabaire?

The name Geabaire, chatterbox in English, reflects the intended use of the app i.e., as a tool to help a user communicate in Irish when they cannot rely on speech alone. The cat in the Geabaire logo is inspired by the 9th century Irish language poem Pangur Bán which concerns a medieval scribe who compares his task of hunting for words with the cat's hunting for mice.
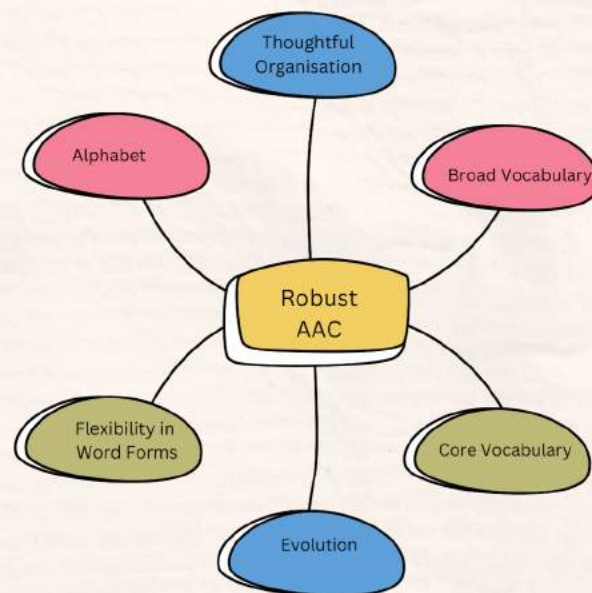
Zangari, 2021

10. What elements make up a robust AAC app?

Geabaire was designed with robustness in mind. A robust AAC comprises the following elements; thoughtful organization, access to a broad vocabulary, access to core vocabulary, possibility of evolution of the app, flexibility in word forms and access to the alphabet. (Zangari, 2021). A synthetic voice that can adequately pronounce words in the language of the AAC app is also key.

11. Example
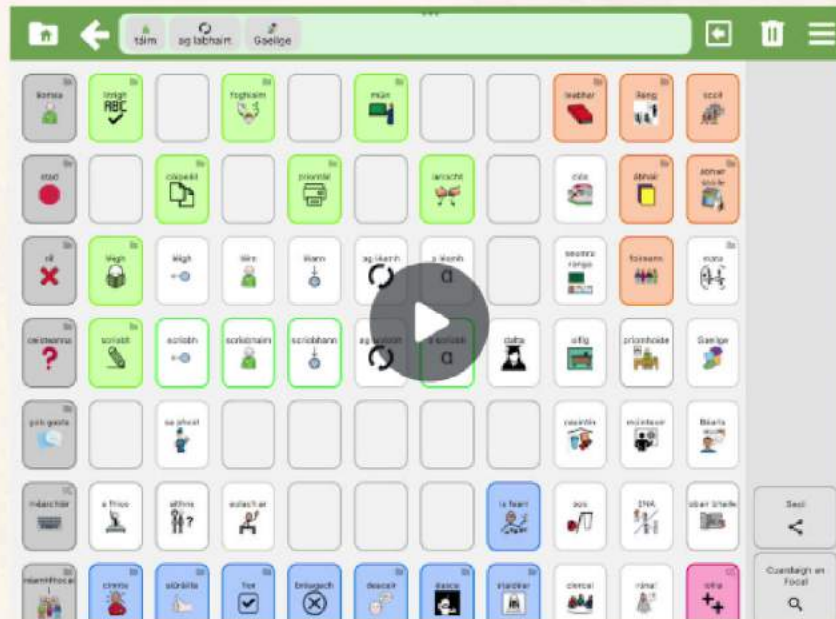
12. Robust AAC - Thoughtful Organisation

Thoughtful organisation is required to create an architecture that supports the linguistic features of Irish. The layout is arranged in a grid 7 x 11. When pressed the 77 buttons on the home board either speak a word or phrase using an Abair voice or navigate to a subsequent board.

There are approximately 700 boards in total. Buttons have symbols and a word. Symbols are chosen for easy identification.

13. Robust AAC - Thoughtful Organisation

Words are arranged by grammatical type and colour coding is used to indicate word type. The colour coding is based on the 'Fitzgerald Key', i.e., yellow buttons are pronouns, green are verbs, blue are adjectives, questions are purple and nouns are orange. Quick links to buttons that lead to a keyboard or prepositional pronouns, for example are in black on the home board and in grey on subsequent boards.

14. Robust AAC - Thoughtful Organisation

The layout is consistent across the boards to support motor planning and is designed to create the most efficient language generation that reduces the number of key strokes as well as the cognitive and motor load on the user.

15. Robust AAC - Thoughtful Organisation

Words are arranged across the boards in verb, subject, object order to reflect the syntax of Irish.

16. Robust AAC - Thoughtful Organisation

Words and phrases that are consistently used together are placed near one another. For example, the button 'siopa' on the home board leads to a series of interconnected boards which contain verbs such as 'ceannaigh' and fringe vocabulary relating to shopping and adjectives describing the concepts of poor and rich, for example.

Robust AAC Access to a Broad Vocabulary

Geabaire contains over 3000 words that will enable the user to access all of the functions of speech, i.e., have the ability to request, direct, ask questions, give opinions, comment etc. There are also words that are particular to Ireland, Irish culture and the school curriculum. For example, there are words for traditional instruments, words relating to religious festivals and the GAA.

18. Robust AAC - Access to a Broad Vocabulary

On the home board words are arranged across categories that reflect the themes frequently explored in the primary school curriculum to facilitate use in the classroom although these themes are applicable across contexts. Themes include 'scoil', 'abhaile' and 'nádúr', for example.
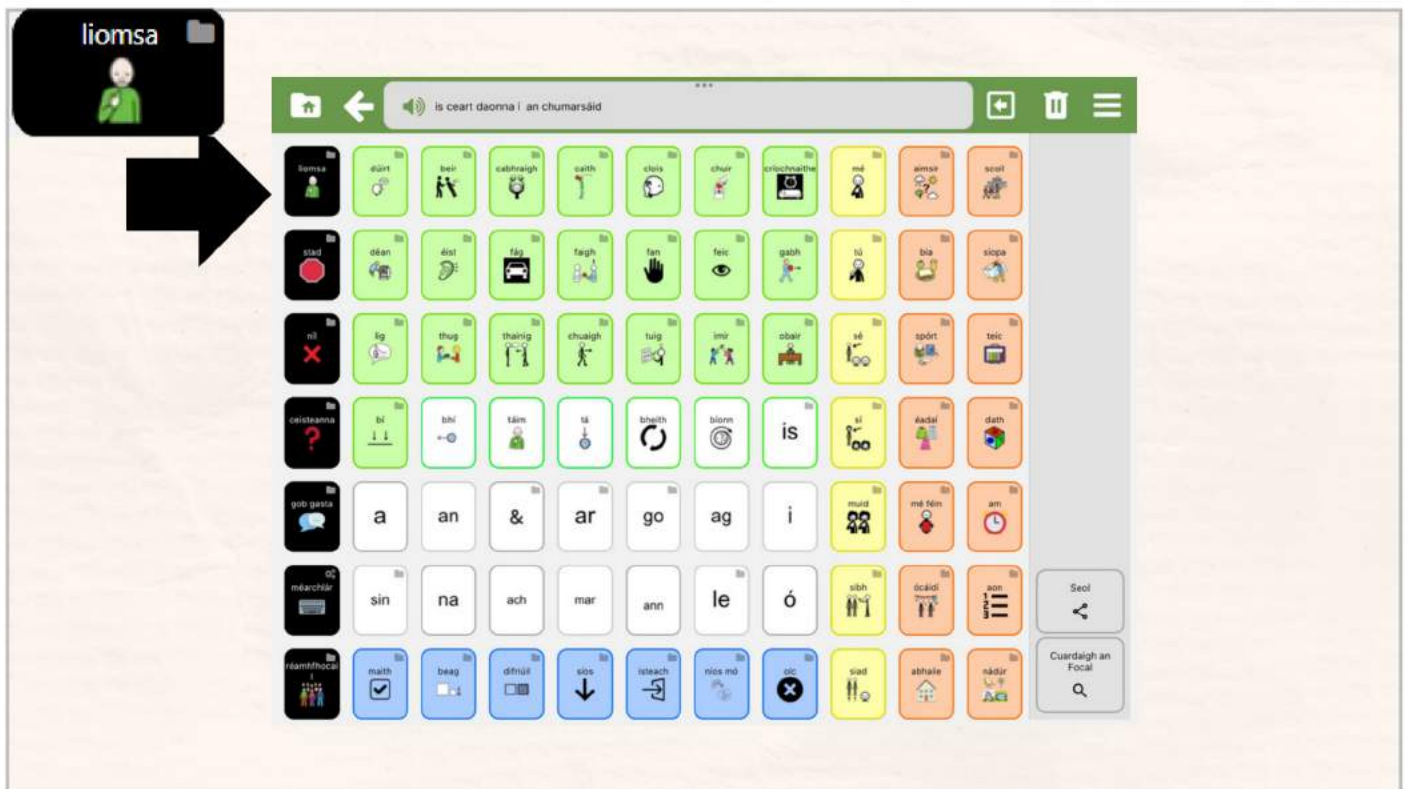
19. Robust AAC - Opportunity for Evolution

In future versions of Geabaire the 'liomsa' category will be customisable.
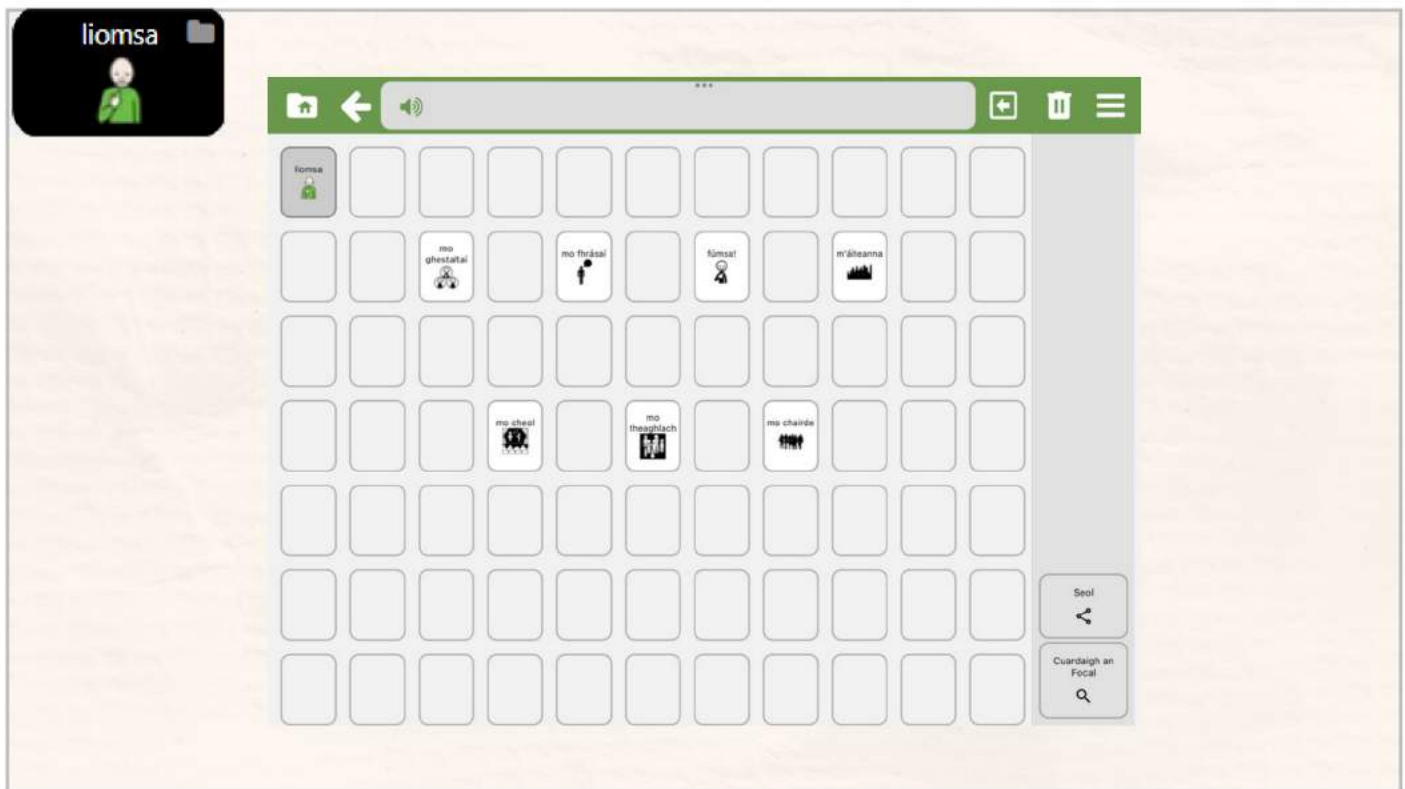
20. Robust AAC - Opportunity for Evolution

Users can include buttons to represent family members, favourite places, music and importantly gestalts that are meaningful to them. We do not intend to make the rest of the boards customisable in order to prevent communication partners from reducing grid sizes which makes motor plans more difficult to learn or reducing access to vocabulary to ensure that users are afforded access to the largest number of words as possible. Exceptions may be made in the case of those with vision or fine motor disabilities.

21. Example: Iolraí

22. Robust AAC - Flexibility in Word Forms

The 'iolra' button automatically pluralises the last word when pressed. A significant challenge is how to account for inflections in Irish. Whereas, English relies heavily on word order to convey meaning Irish uses morphological inflections to do so. Irish is a highly inflected language with a number of cases for nouns and adjectives as well as inflected prepositions and verbs. This results in many more word forms than you would find in standard AAC systems in languages such as English or Spanish. A technical solution is being developed to automatically add inflections in order to reduce motor and cognitive load on the user and to avoid cluttering the boards. It will work in a similar way to the 'iolra' feature.

# Core Words

23. Robust AAC - Access to Core Vocabulary

Geabaire is designed with the core vocabulary of Irish in mind. Research tells us that, across languages, approximately 80% of what we say is made up of 500 words which are used in various contexts for the majority of the messages used. Using 'Liostaí Bhreacadh: Focail Choitianta sa Ghaeilge' among other sources we have made the most frequent words readily available to the user with minimum number of keystrokes for the most frequent words.
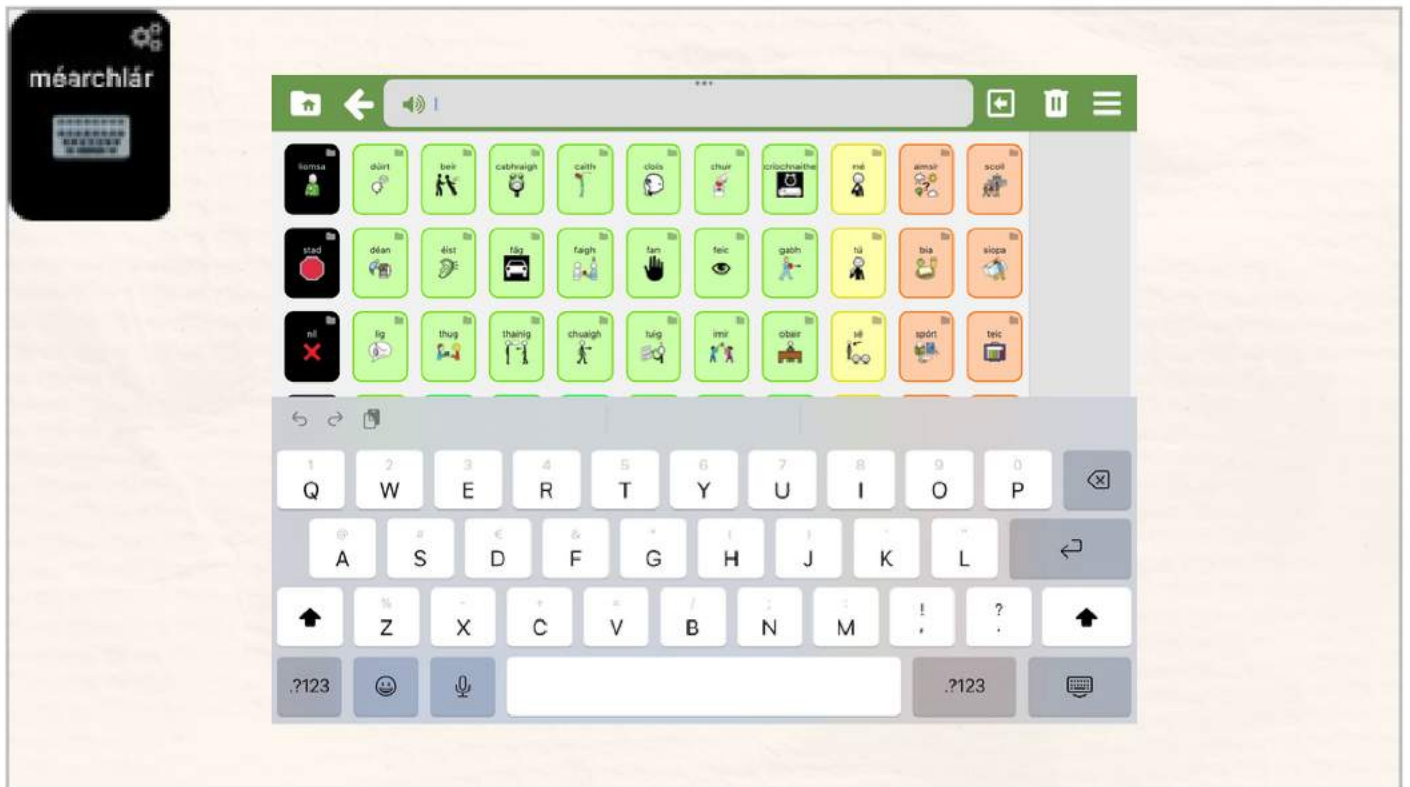
24. Robust AAC - Access to the Alphabet

Access to the keyboard is available on every board and the text to speech facility allows the user to say anything they want in Irish and to insert proper nouns into sentences.
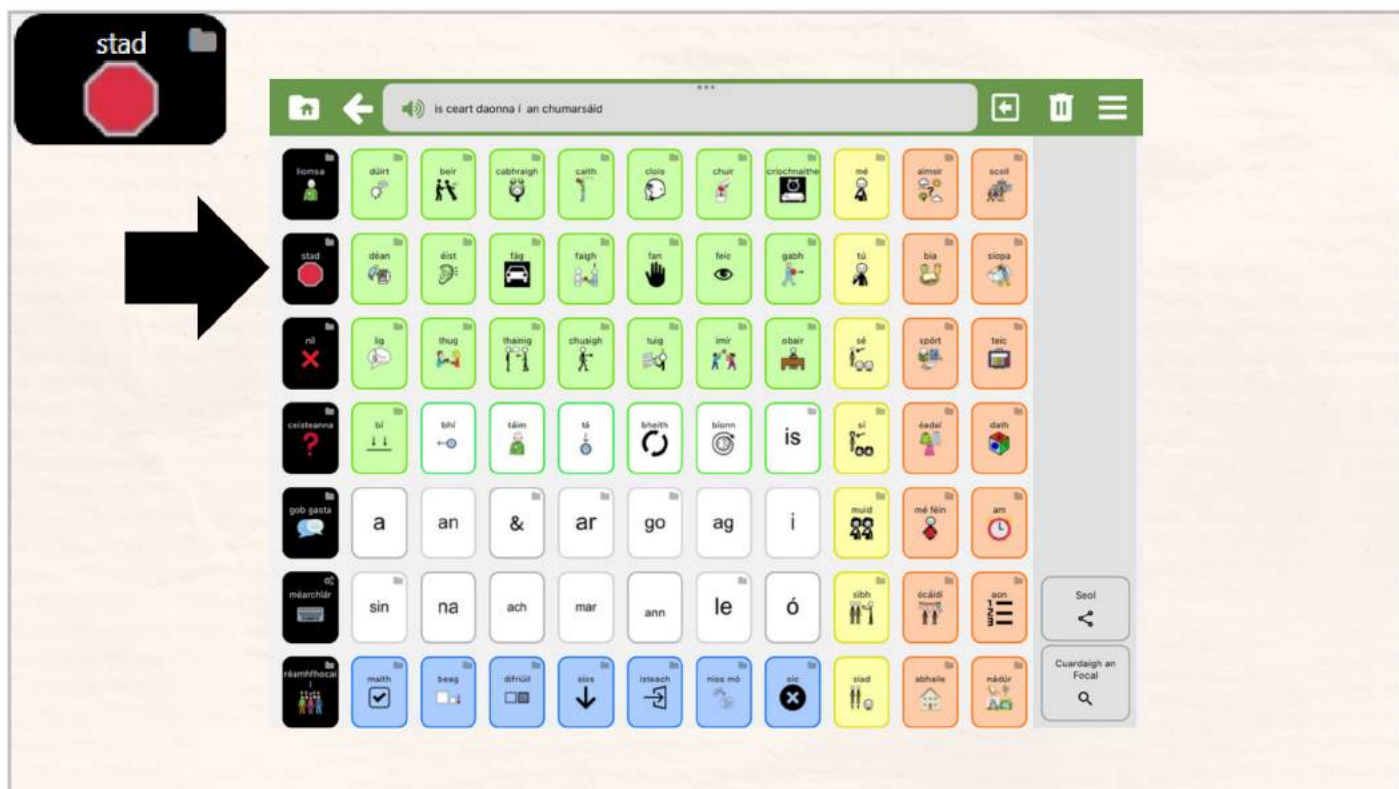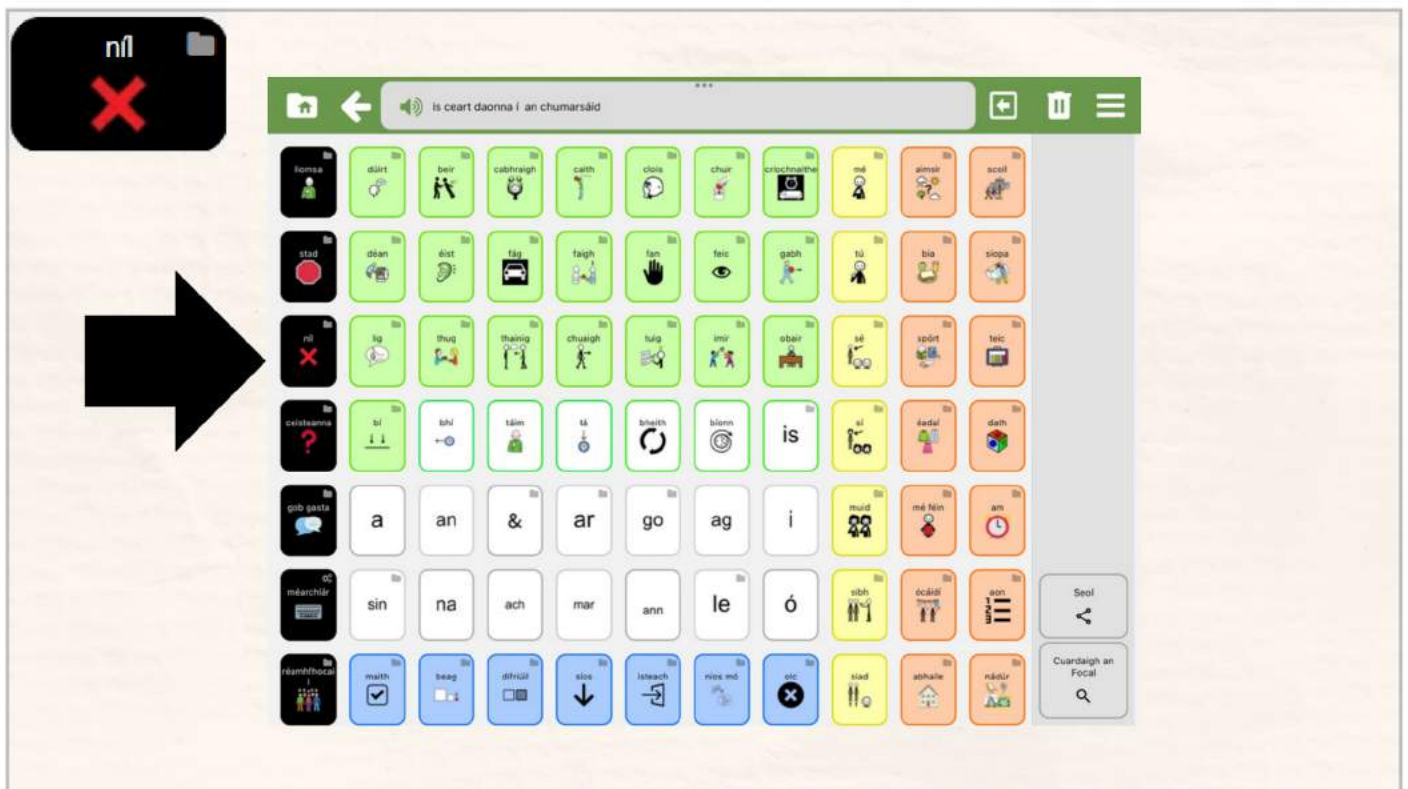
25. Quick Links

Quick link buttons appear on the first column across every board. They are in black on the home board and grey on subsequent boards. This facilitates easy access to important or frequently used words and phrases.
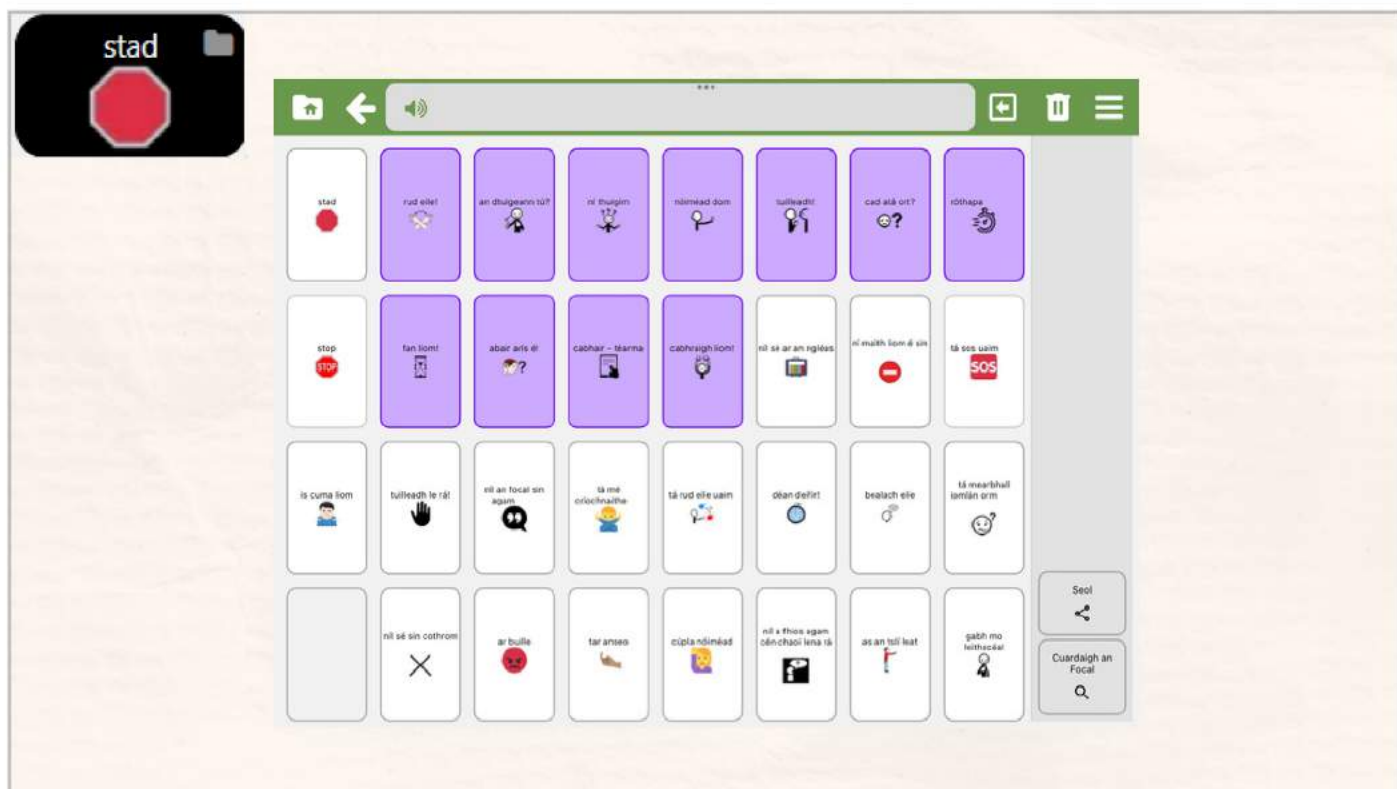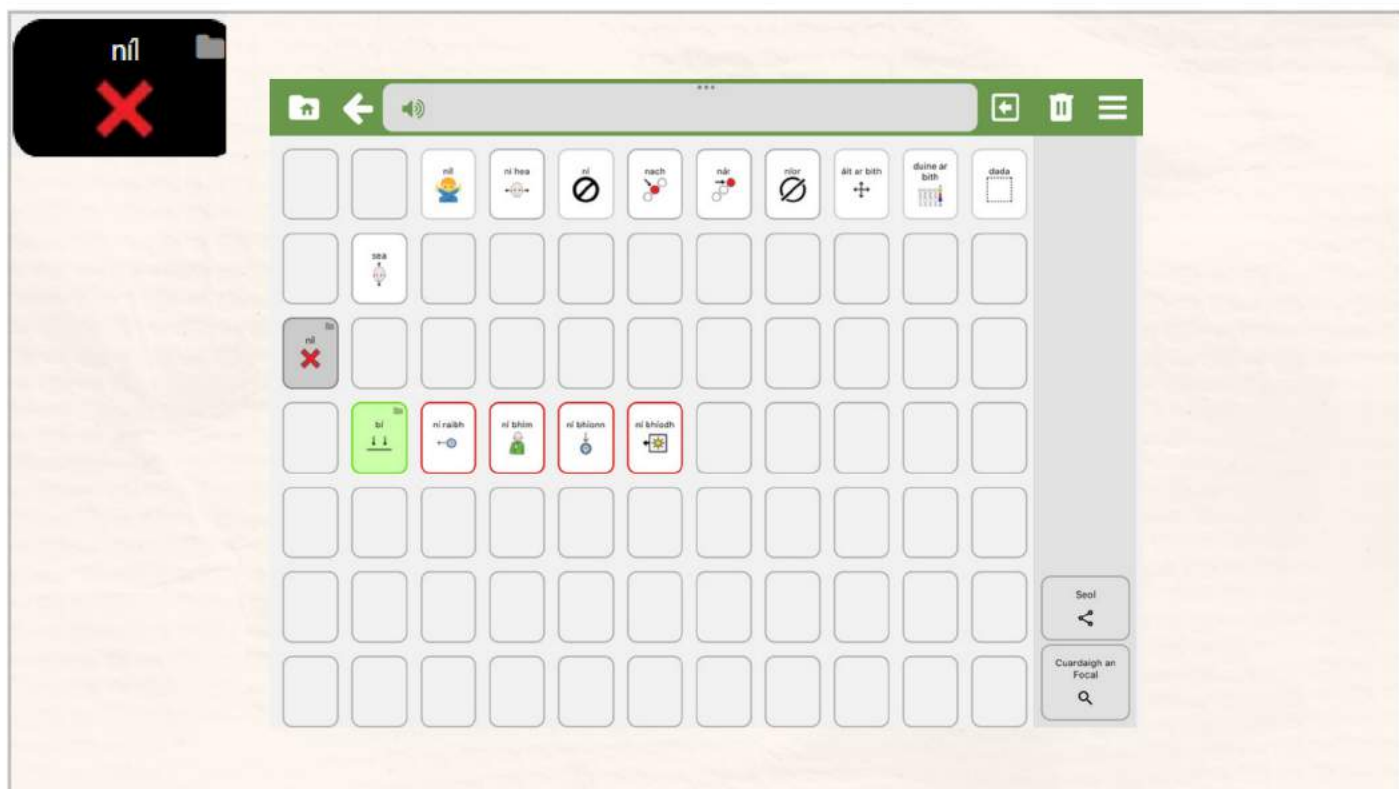
26. Quick Links - 'stad'

For example, the 'stad' button includes useful phrases that allow the user to quickly and efficiently self-advocate e.g., to say that they need help or extra time.
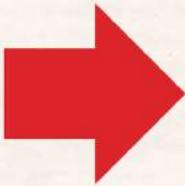
27. Quick Links - 'níl'

To access the negative form of a verb press the 'níl' button which appears in black on the home board and grey on subsequent boards.
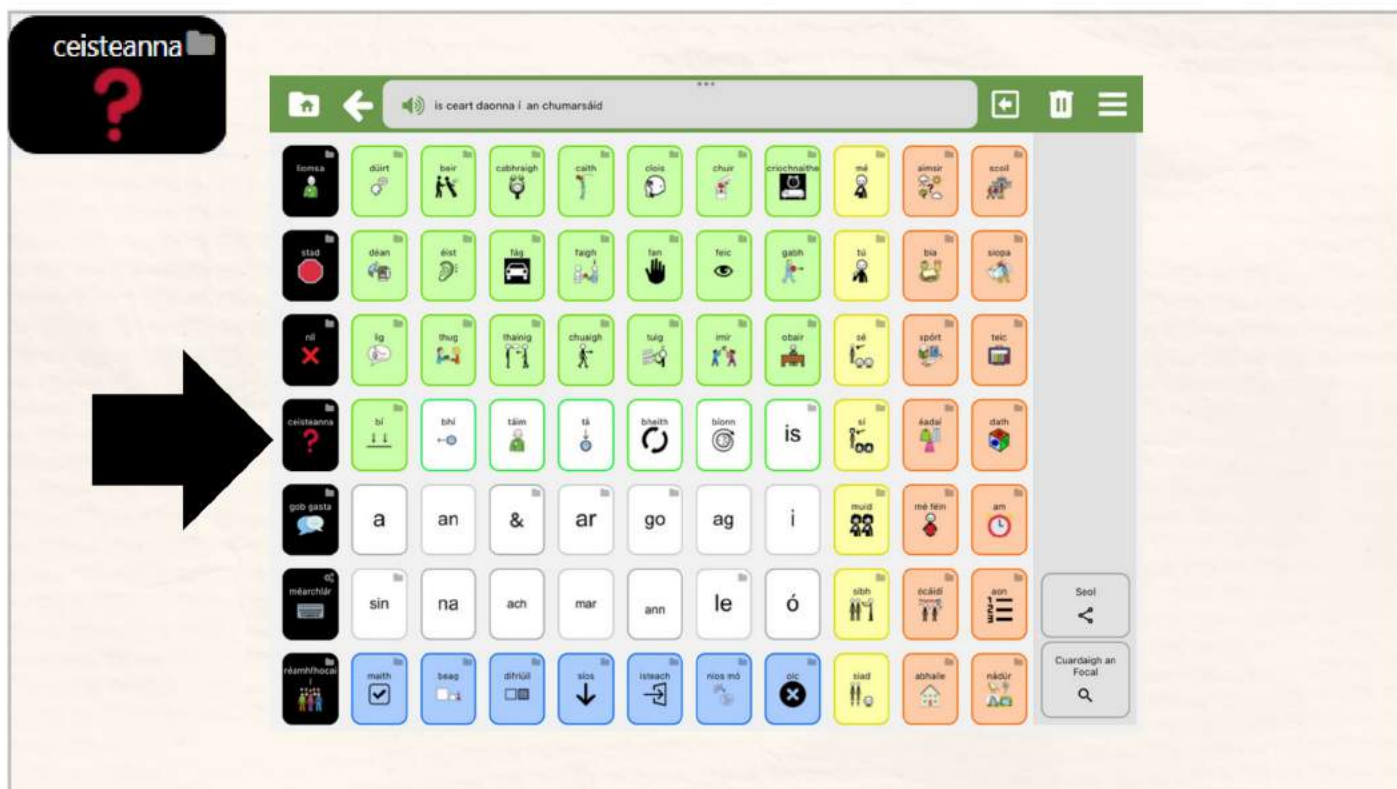
28. Quick Links - 'níl'

Colour is used to visually separate words and concepts.
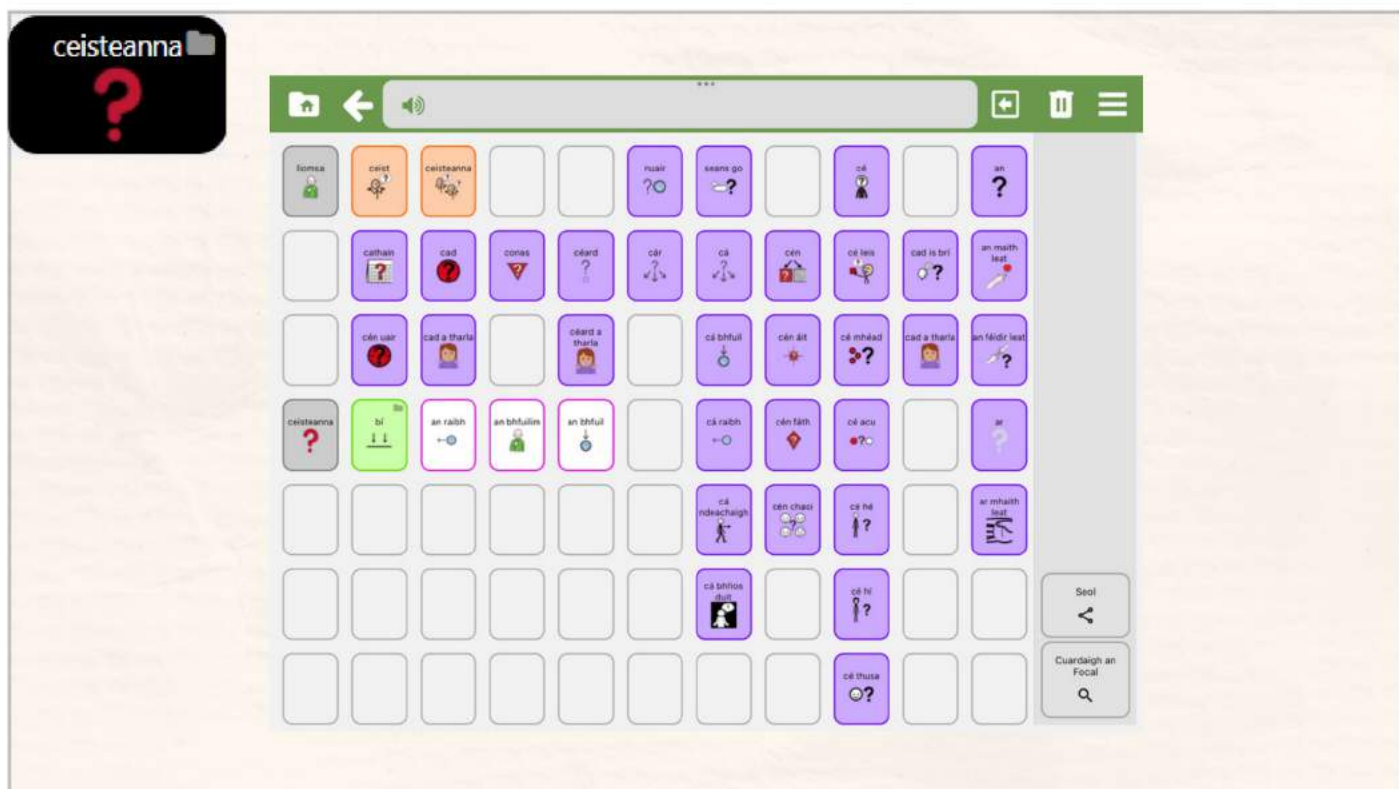
29. Quick Links - 'níl'

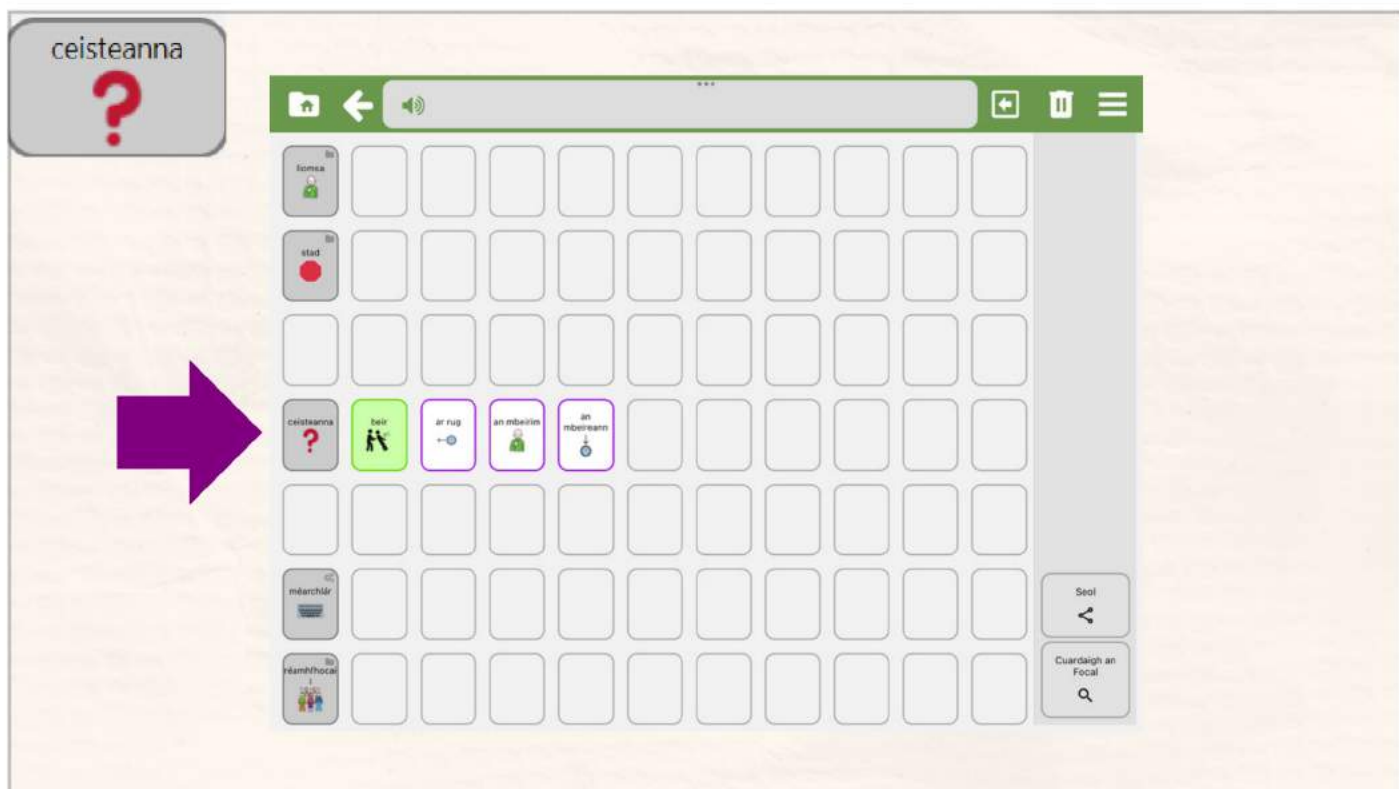For example, the negative forms of verbs have a red outline.

30. Quick Links - 'ceisteanna'

To access the question form of a verb press the 'ceisteanna' button which appears in black on the home board and grey on subsequent boards.
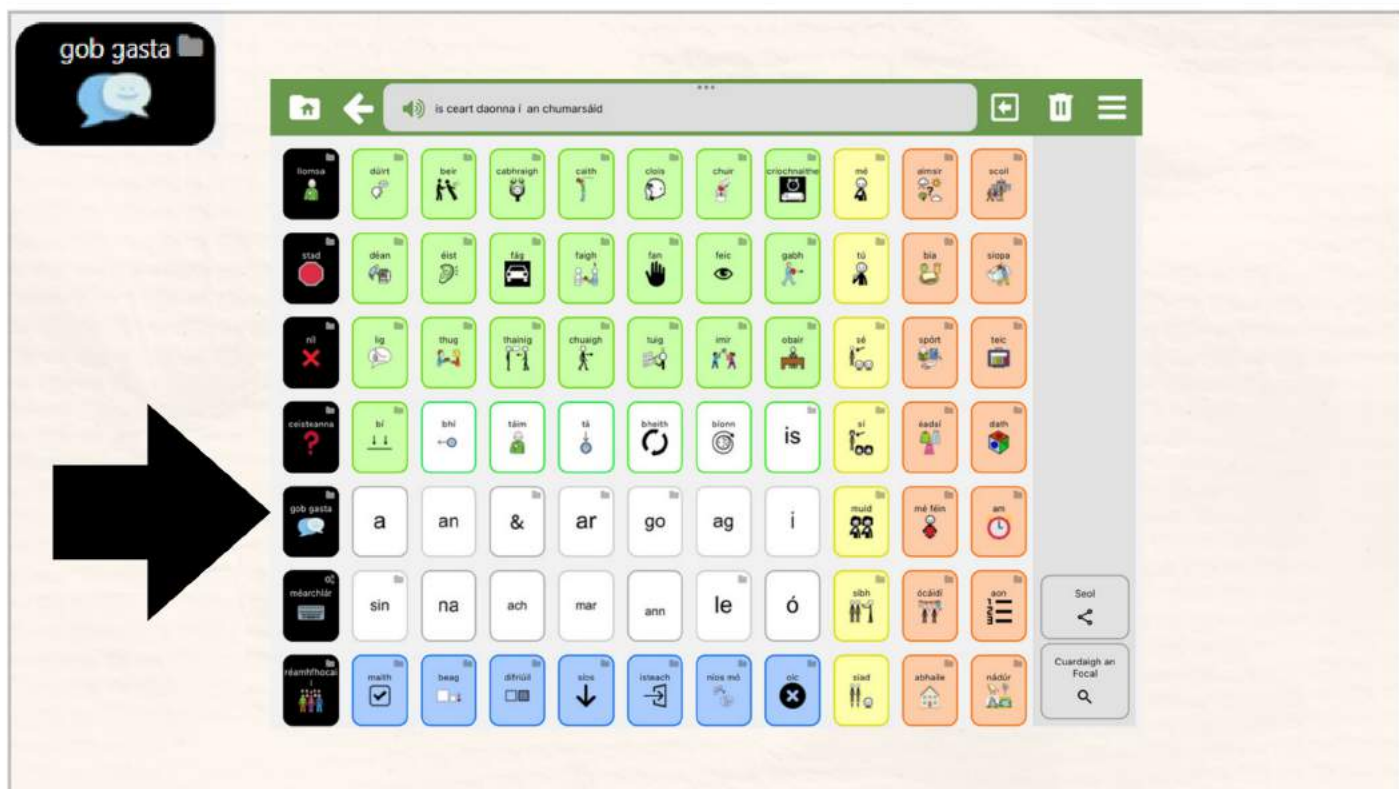
31. Quick Links - 'ceisteanna'

Frequently used questions can be found by pressing the 'ceisteanna' button on the home board.

32. Quick Links - 'ceisteanna'

The question form of each verb can be accessed by pressing the grey 'ceisteanna' button on subsequent board. Question forms of verbs are outlined in purple.

33. Quick Links - 'gob gasta'
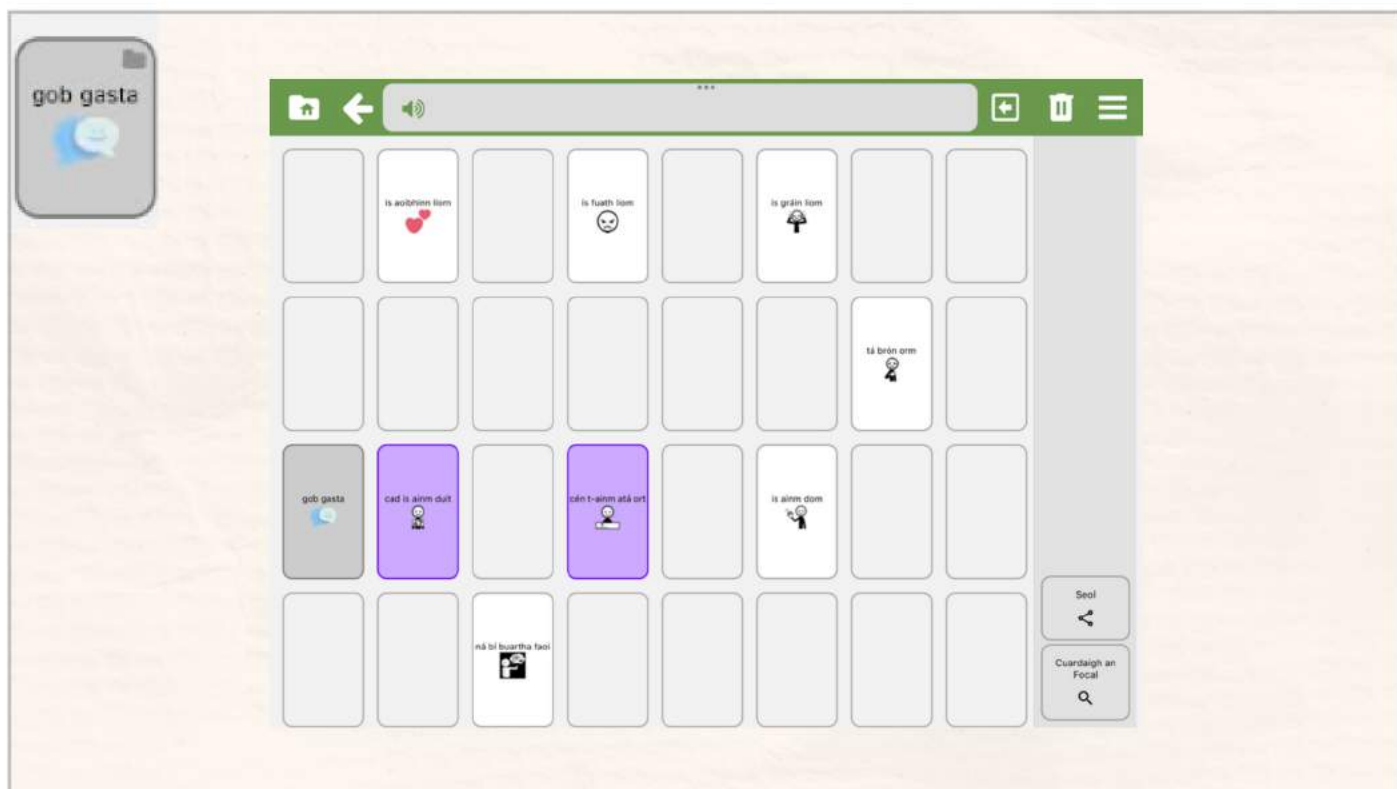
The 'gob gasta' button appears in black on the home board.

34. Quick Links - 'gob gasta'

This board contains greetings and common responses.

Board contents (icons/buttons):

- dia duit | dia daoibh | dia is muire duit | dia is muire daoibh | móra duit ar maidin | lá maith agat | tráthnóna maith agat | oíche mhaith
- conas atá tú | ar fheabhas | go hiontach | go maith | ceart go leor | cuíosach | go dona | go h-uafásach
- gob gasta | go raibh maith agat | agus tú féin | tá brón orm | comhghairdeas | ná habair é | gabh mo leithscéal | fáilte romhat
- i ndáiríre | aon scéal agat | diabhal scéal | slán go fóill | slán abhaile | feicfidh mé ar ball thú | feicfidh mé amárach thú | slán
- Seol | Cuardaigh an Focal

35. Quick Links - 'gob gasta'

The 'gob gasta' button also appears in grey on each subsequent board and leads to frequently used phrases relevant to the theme of the board.
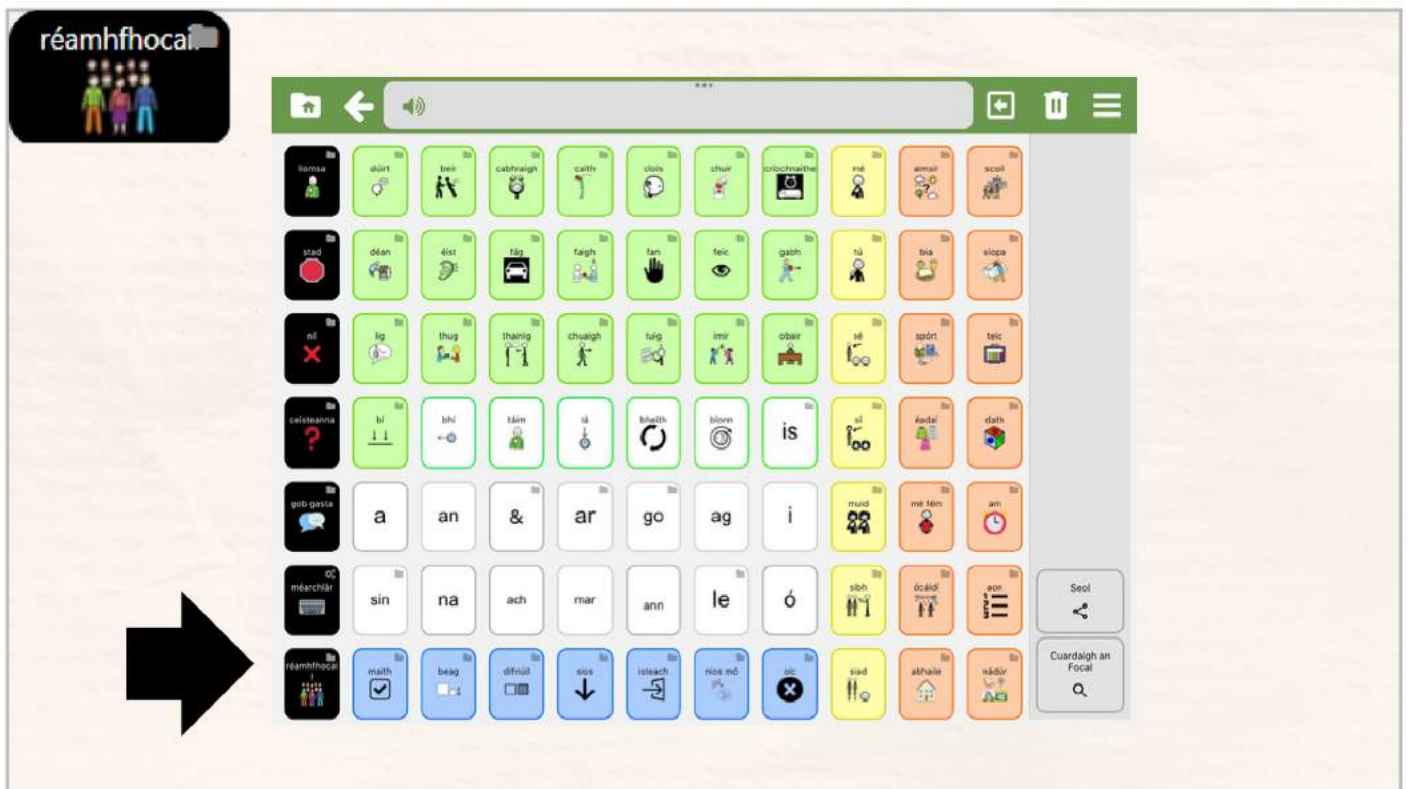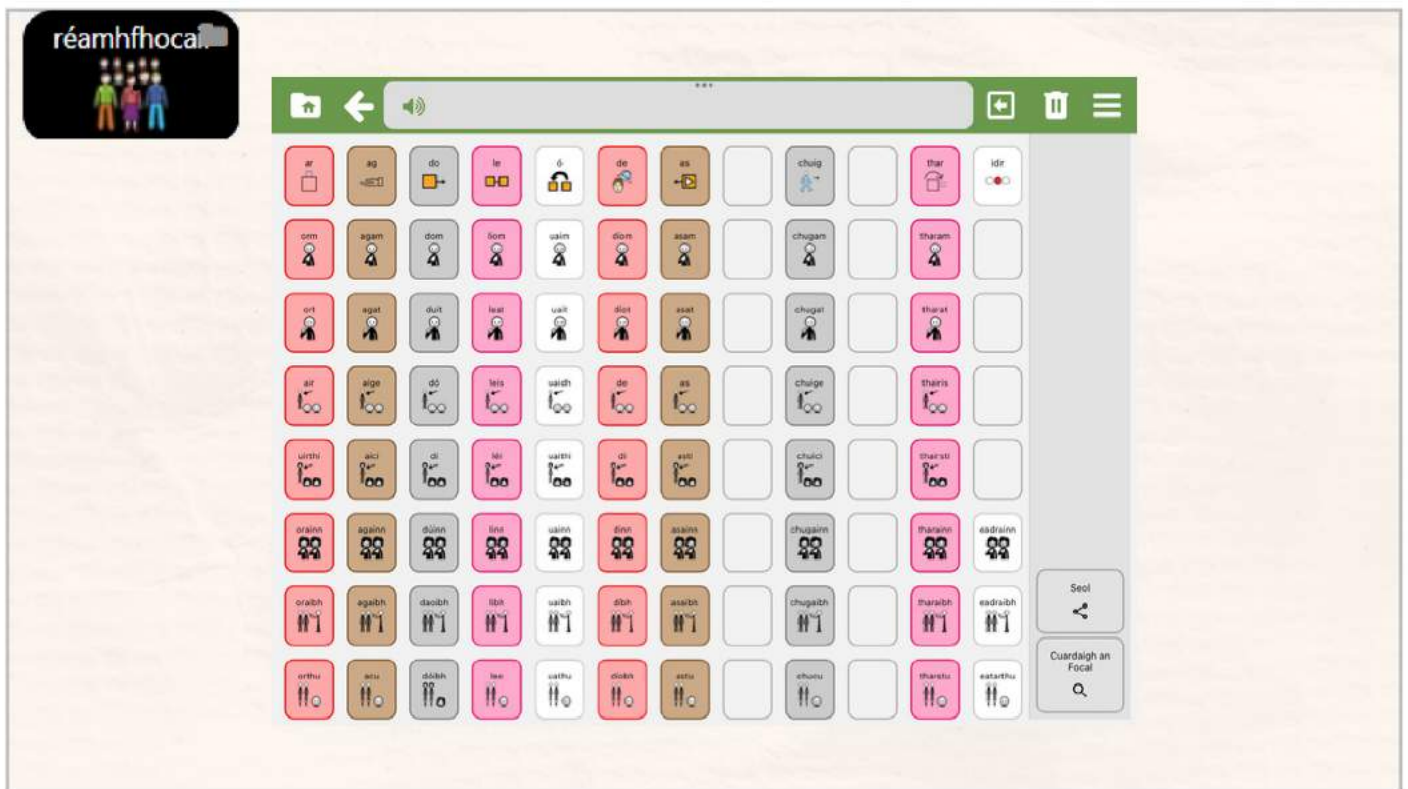
36. Quick Links - gob gasta

For example, on the 'mé féin' board, which contains words relating to the self and the body a 'gob gasta' for that page is 'cad is ainm duit?'.

37. Quick Links -'réamhfhocail'

A button that gives quick access to prepositional pronouns appears on each page.

38. Quick Links - 'réamhfhocail'
This reflects how semantically rich prepositional pronouns are in Irish.

39. Cuardaigh an Focal

The 'Cuardaigh an Focal' button appears on every page allowing the user to find the sequence of buttons and boards required to find a word.

Using Geabaire during the trial period with AAC learners for communication partners and school staff

The following ten slides were prepared by
Caitríona Ní Charragáin
Coru: SL017810
IASLT: IA205383

40. Using Geabaire During the Trial

The following slides give guidance on using Geabaire during the trial period with AAC learners for communication partners and school staff. These ten slides were prepared by speech therapist, Caitríona Ní Charragáin.
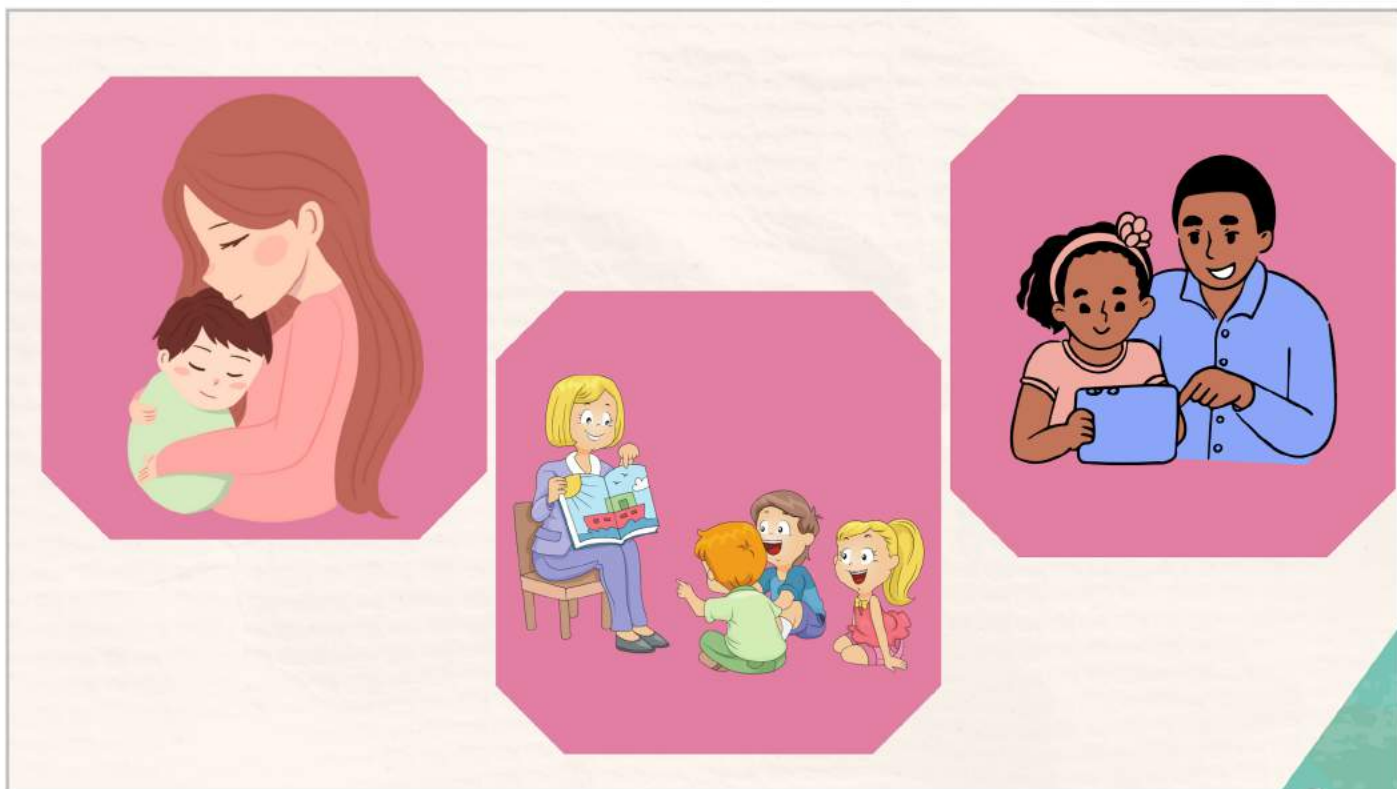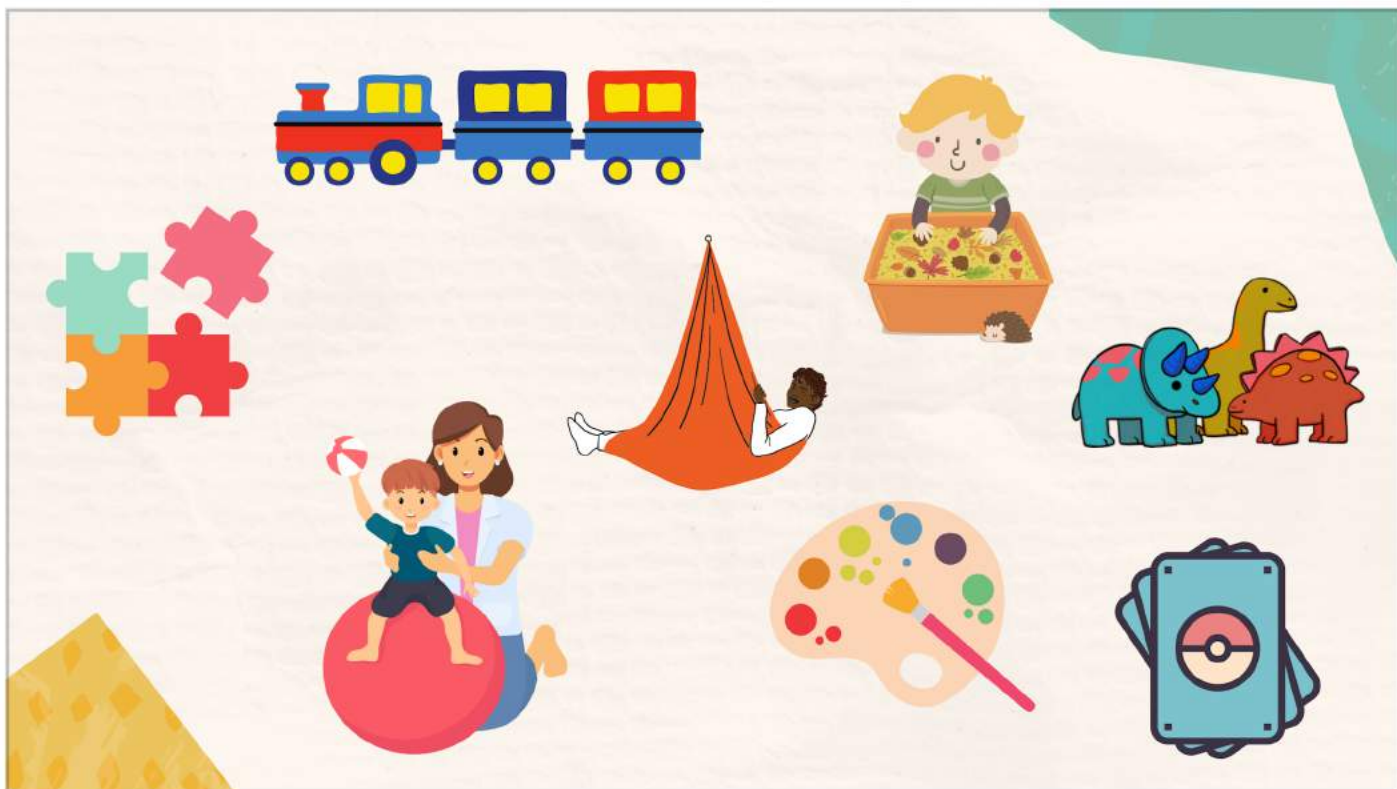
41. First Principles

So underlying everything I suppose is the acknowledgement that when anyone learns a new language first of all we are around people using the language and this is certainly true for typically developing communicators so as infants, parents speak to us for many months before they expect us to speak back to them. And of course, the baby doesn't speak until they are at least 12 months old because they're taking in all the information processing the different sounds around them gradually tuning in to what speech is and breaking down speech into different words in their heads and then also, they are developing motor skills that will allow them to ultimately speak in time. Although, when they start speaking it won't be perfect. And we're okay with that. And also, I suppose keeping Gaelscoileanna in mind staff members are probably used to have children join the Gaelscoil who come from a totally English-speaking background or another language and are new to Irish so they are used to supporting these new learners. They speak to them in Irish, and they use perfectly grammatically correct sentences. But they might adapt their communication slightly in that they might adopt a slower pace. They might use shorter sentences. Two short sentences rather than one long sentence running into each other. They might emphasise certain words to make them stand out to the learners. They might point to pictures or use gesture again to emphasise them and to make them stand out so that gradually the learner can identify okay this word means this thing and they gain confidence to use it themselves. Similarly, for an AAC learner they need to be exposed to somebody else using it to begin with and then in time they begin to learn how to use it, where the certain words are, how it can be useful. But the input at the start is the most important and this is where the school staff come in.
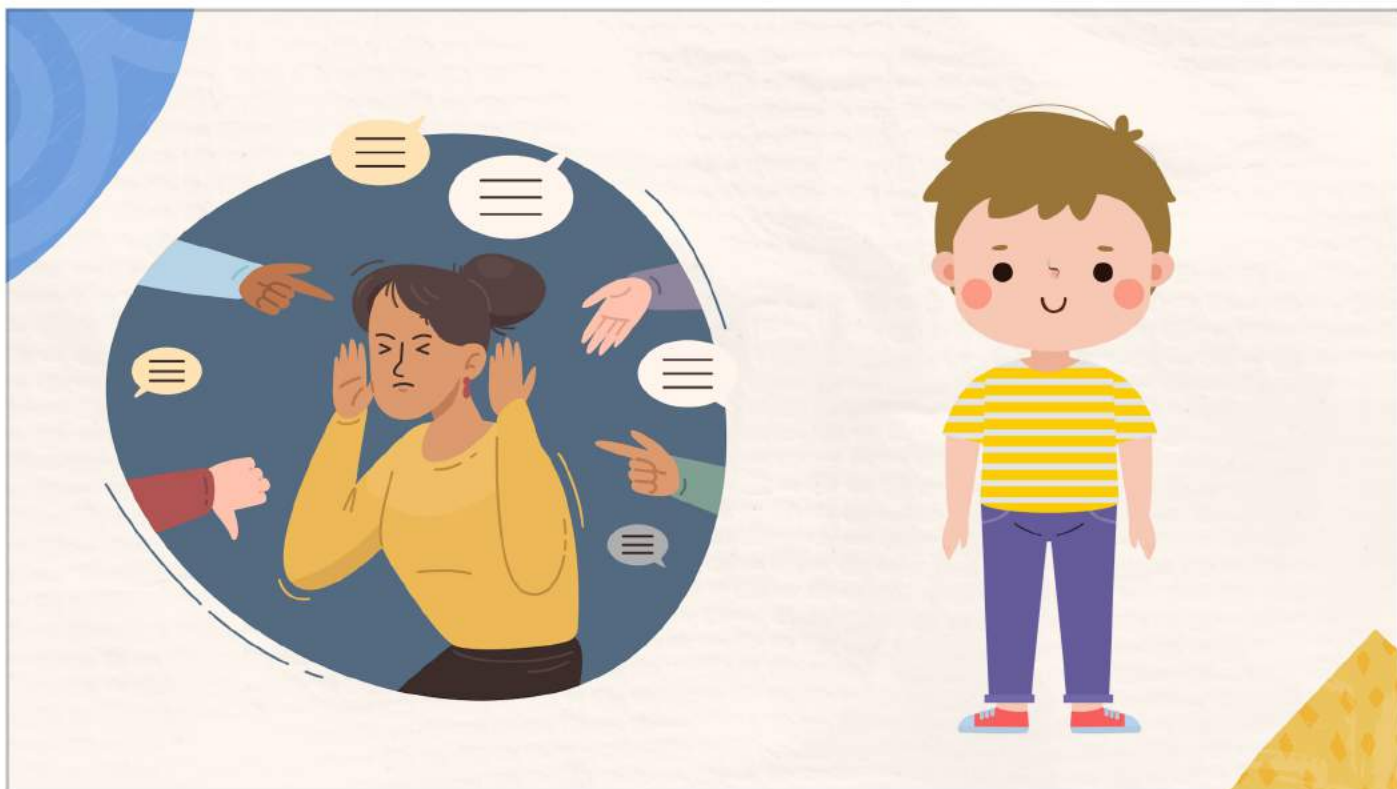
42. Regulation

So all of us are better able to take on new information, learn, process language when we are feeling well regulated so I'm sure you are all familiar with the three o'clock slump or that time during the day where you really need a coffee break or to do something because you can't really process of attend or concentrate anymore. So this is of course similar to students at school and this time where somebody is feeling bored or a little bit lethargic or tired is not the ideal time to begin to learn something new. Similarly, if we are feeling a negative emotion maybe we're a little bit upset about something again it is difficult for us to process new information, take things on board and similarly if we are feeling really hyper or really excited or our attention is drawn by something that is really thrilling to us again it is difficult for us to shift that attention and process language and take on new information so we need to keep this in mind and think about our learner. What would be the optimal time for them to actually be exposed to this new information? When are they most regulated?

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44. Communication styles

We must remember of course that out communication style can be dysregulating for people as well. So, if we adopt a very demand-based communication style where we're asking a lot of questions of a learner or we're asking them to perform somehow with the AAC by saying 'Oh, tell me this or show me this or where's the', then we actually aren't making it a real kind of natural communication style. We're making it more like a teaching, testing opportunity and this can be very dysregulating for a new learner because they're thinking 'what's this now, is this more work? Is this something that is just hassle to me?' It doesn't feel very naturalistic. So if we adopt a style that's low demand, low arousal where we don't ask the learner to perform we're going along in parallel using it ourselves without putting pressure on the person. If we ask a question, we can answer it. We can of course provide plenty of pauses and give them an opportunity to use the AAC system. But our communication isn't reliant on that. So we're never leaving a kind of a cliff-hanger whereby we're asking them something directly. And now there's a standoff. Are they going to say it or not? We are just very calm, very much low demand as I said and low arousal. Certainly if they want to explore the AAC we are delighted with that and we leave them off and we might interpret what the buttons that hit but it is all very much without expectation.
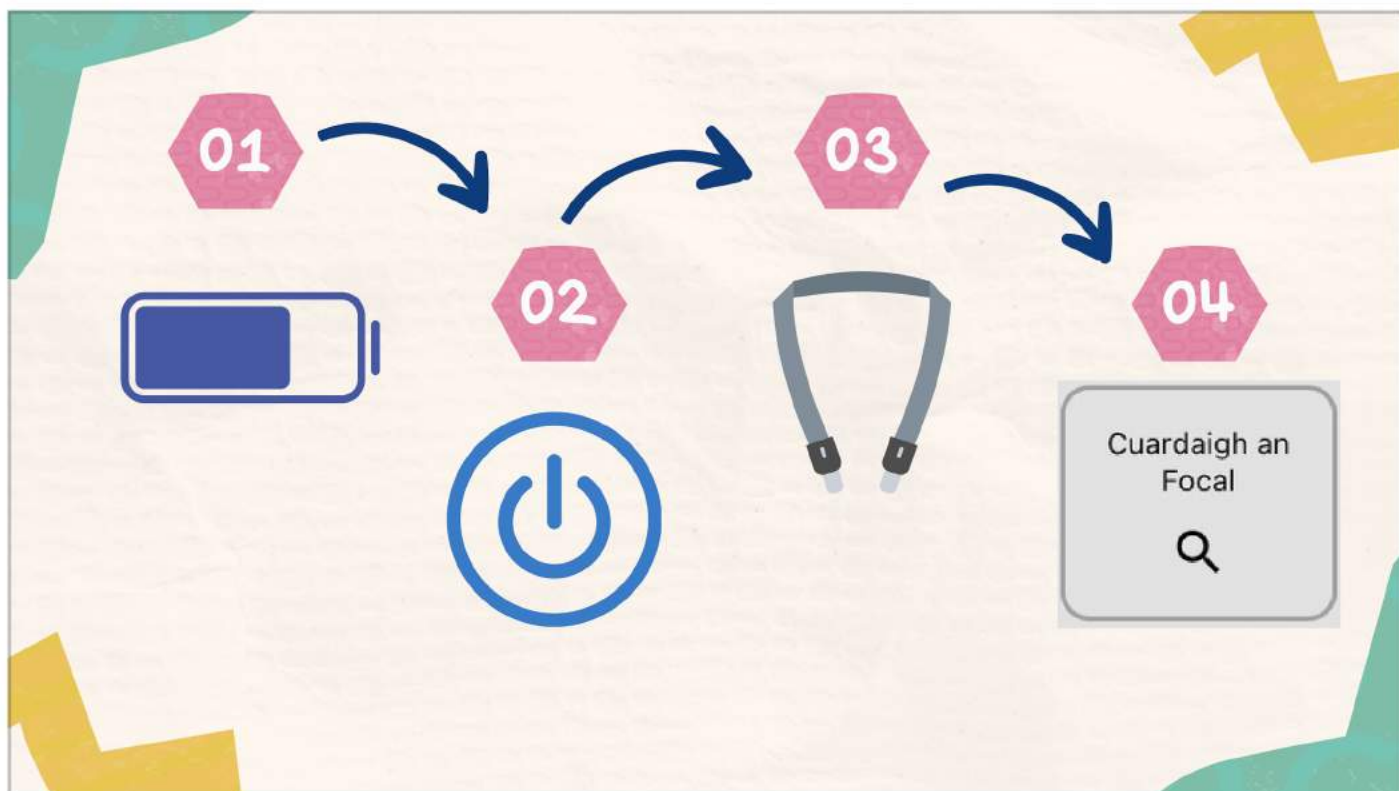
45. Practical Considerations

So, from a practical point, then we have to consider these things like

- who's going to charge the iPad?
- Do I know how to turn the iPad on?
- And then if I do I know how to access the app and keep it awake for the purposes of my session.
- Have I thought about how to transport the app or the iPad if we are moving between places or rooms.
- Is there a designated person who is going to take it with us?
- Is there a place that we are going to put it?
- And then of course from a practical point of view, am I going to have an opportunity to explore the app myself?
- Use the search button to find some words?

If not, maybe print out the home screen so that I can at least familiarize myself with the motor planning of the home screen. Which will ultimately support me when I need to begin to use it myself. Although, having said all that we don't need to be expert communicators with an AAC system. It's OK to be a little bit hesitant and to speak aloud about 'Oh I'm looking for this button', or 'I wonder where I will find this word', that's absolutely OK because it just tells the AAC user that you're learning too which again takes the pressure off.
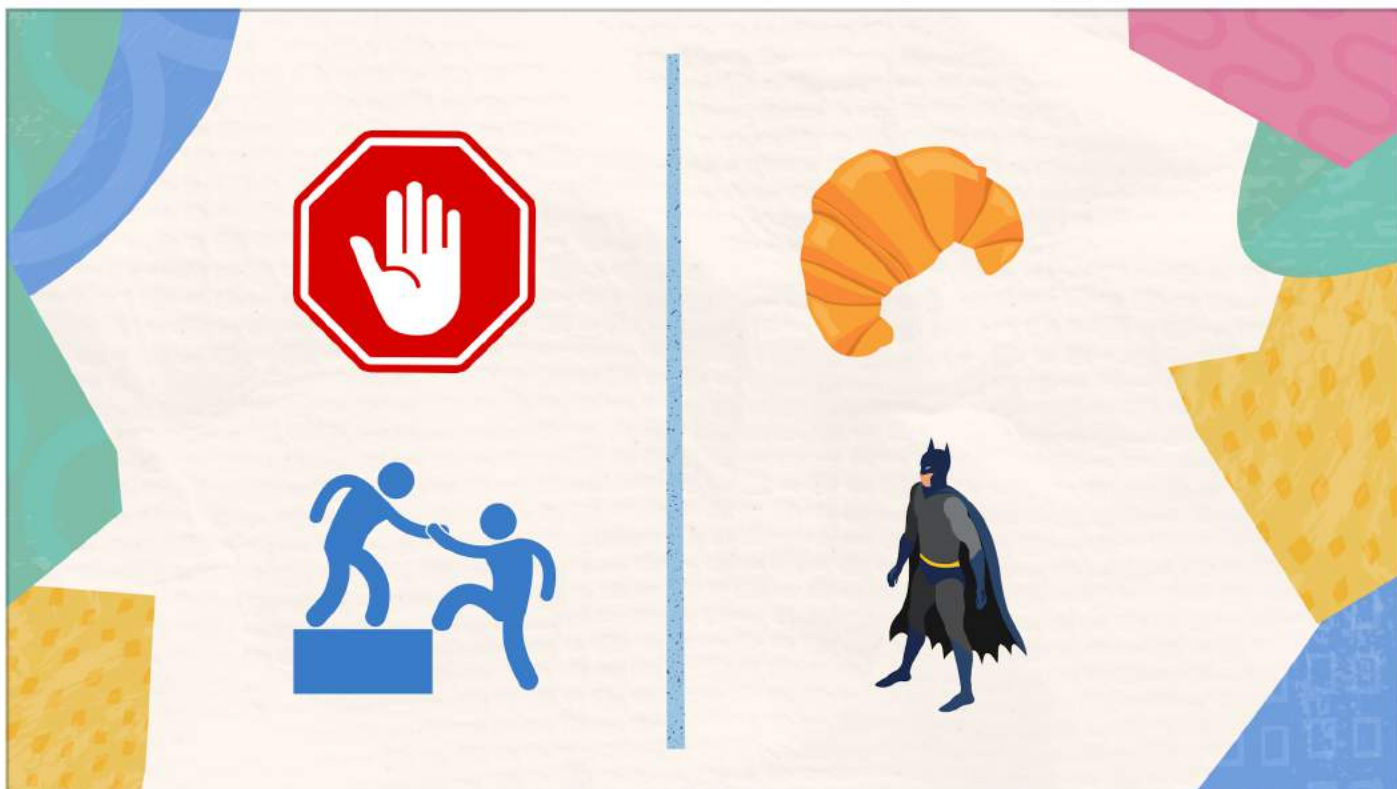
46. Core and Fringe Vocabulary

Just to keep in mind that the vocabulary of the system is split into what we would call core vocabulary, which is words like 'stop', or 'help', which could be used across the day in any number of activities. We could use them. The user could use them. They are very flexible words that are difficult to take a photo of that's why we have the symbols. Then there is also fringe vocabulary which is vocabulary that is more specific. It is also very important but you wouldn't necessarily use it throughout the day in different scenarios. Like a word like 'croissant', you're more likely to use it at a specific time during the day. You might even use it once a week or once a month depending on different people. Similarly, 'Batman' is a very important word for some people other people very rarely use it so try to have a balance of core and fringe words when we are communicating.
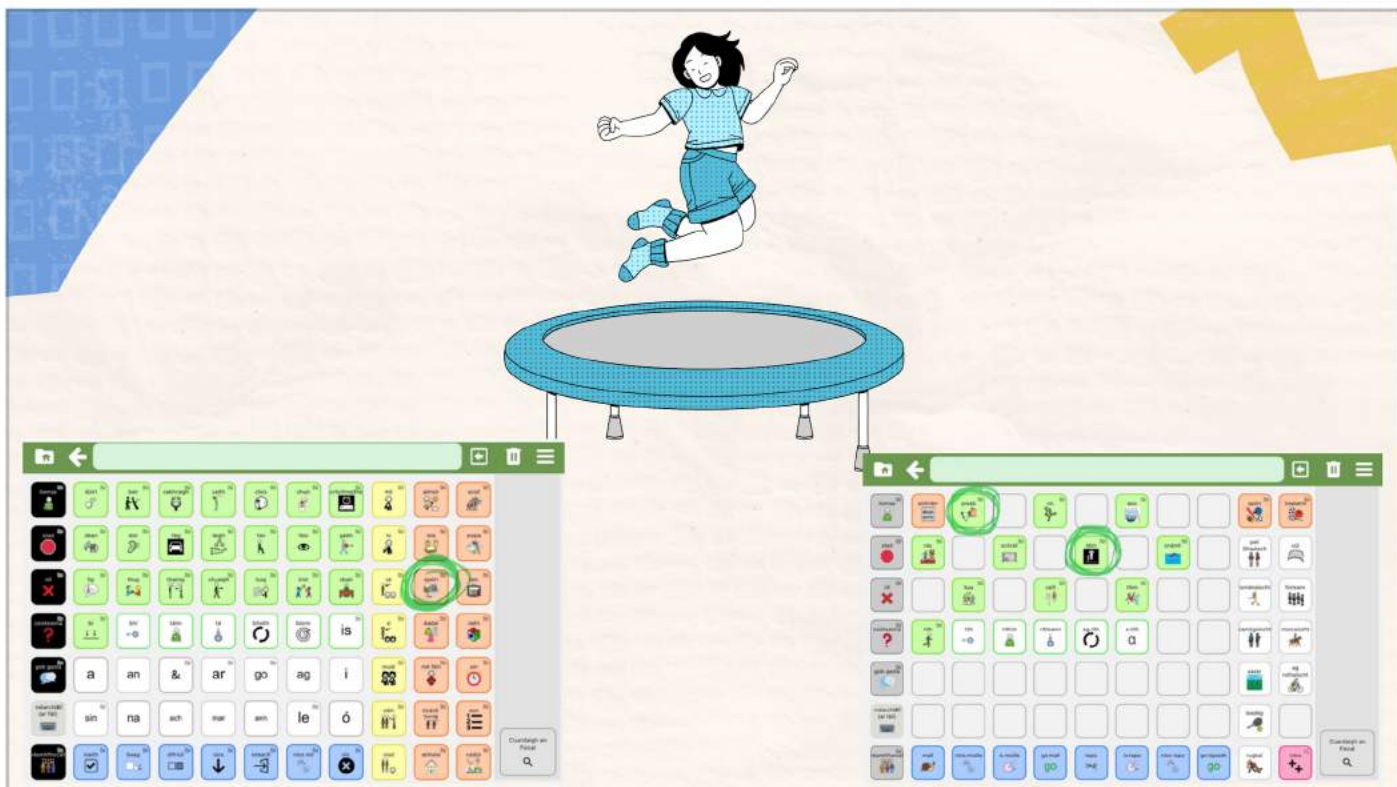
## 47. Introducing Geabaire During a Preferred Activity

If you were preparing to introduce the AAC during a preferred activity where you think the child was going to be engaged. In advance, you might think about what core words could I use so if a child loves trampolining maybe I could use 'go', 'stop' 'let me help you', 'up', 'down' all of that core vocabulary would be very useful and then you might have more fringe vocabulary such as if you go into the spórt folder you will find words like 'preab', 'leim' words that are more specific to this activity. Think about where those words are before your session use them during the first few sessions and then extend and expand from there until you become more comfortable.
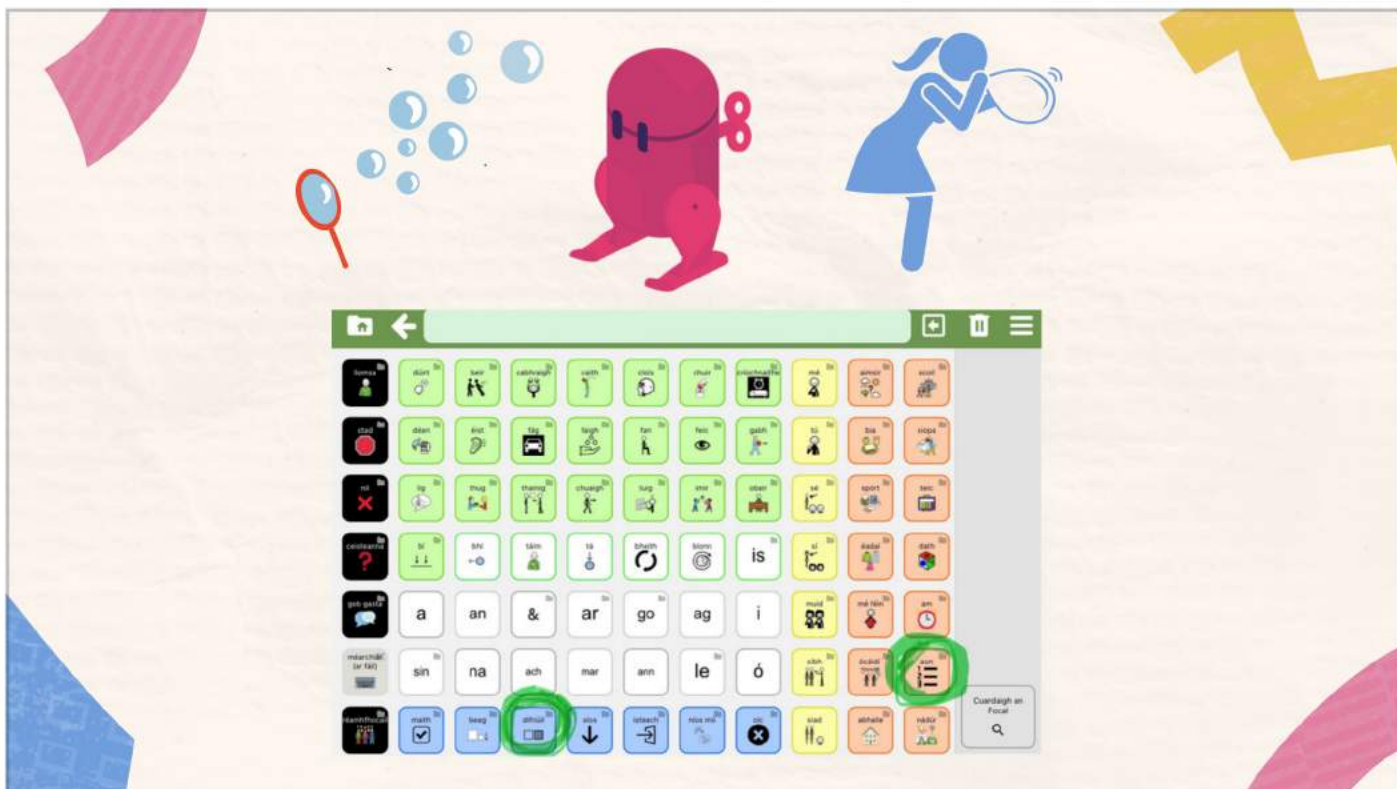
48. More Ideas for Engaging Activities

Some children really enjoy bubbles or when you blow up a balloon and let it go around the halla or they might enjoy wind up toys and again just thinking in advance about the kind of words you could use in this scenario so again you might want to use 'help', 'stop', 'go', 'more'. Maybe you want to go to numbers and say '1,2,3' to give that bit of anticipation for the routine. Maybe you want to use a word like 'different' to signify that you are going to move on from one thing like the bubbles or something like the balloon. So again, to just think about this in advance.
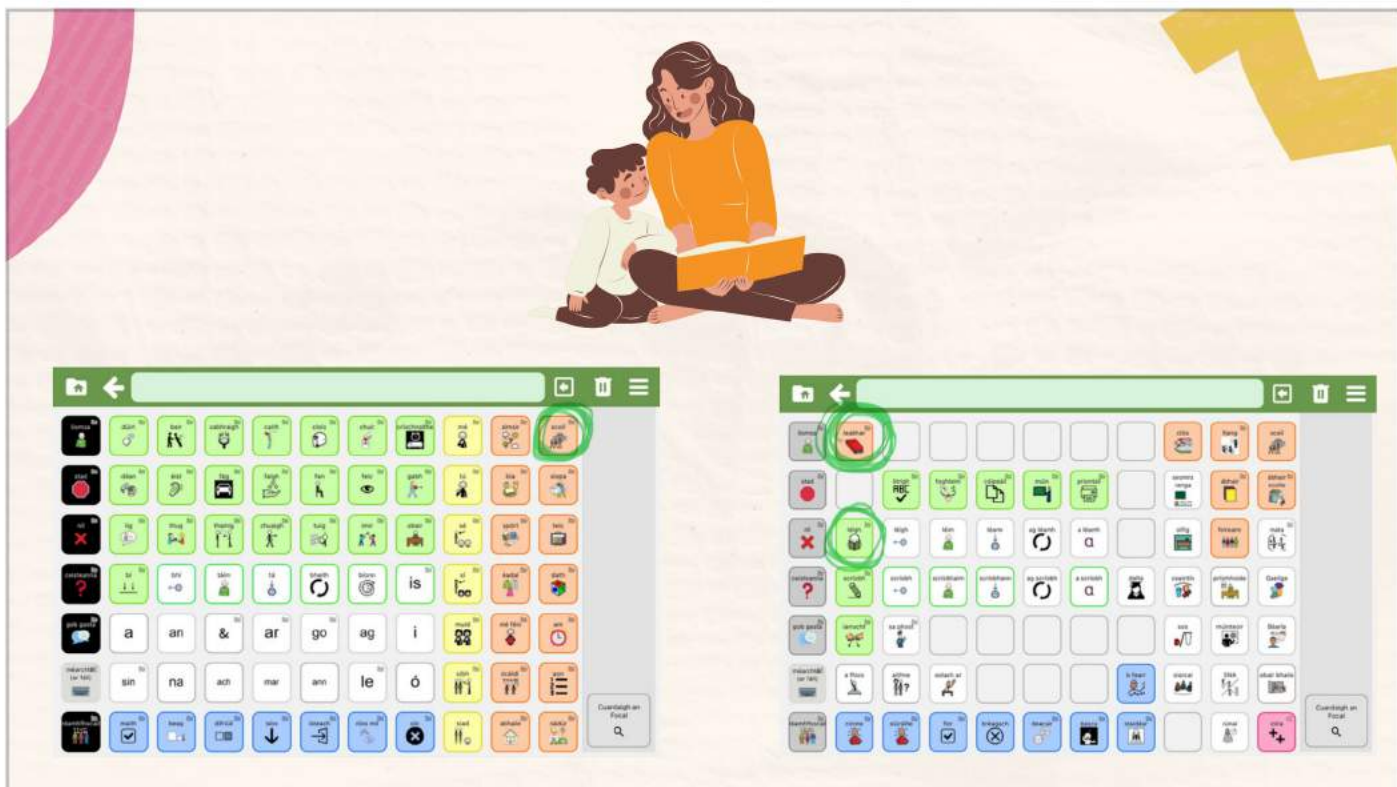
49. Shared Reading

Another activity that somebody might like is a shared reading activity, again all that core vocabulary would be relevant but you might want to have a little bit more specific vocabulary such as 'read', 'book' that kind of vocabulary. If you want to read a book about a particular TV character or special interest you might find the specific fringe vocabulary that would go with that such as 'pig' or 'dinosaur' again not trying to overwhelm you but have a think in advance about a range of vocabulary, try to find it and give yourself time to become more fluent and learn the motor plan so when you repeat the activity you will become more confident and then in time you can begin to demonstrate to the AAC user where that important vocabulary is and then pause to give them a chance to say something when you give a very enjoyable experience for you both.
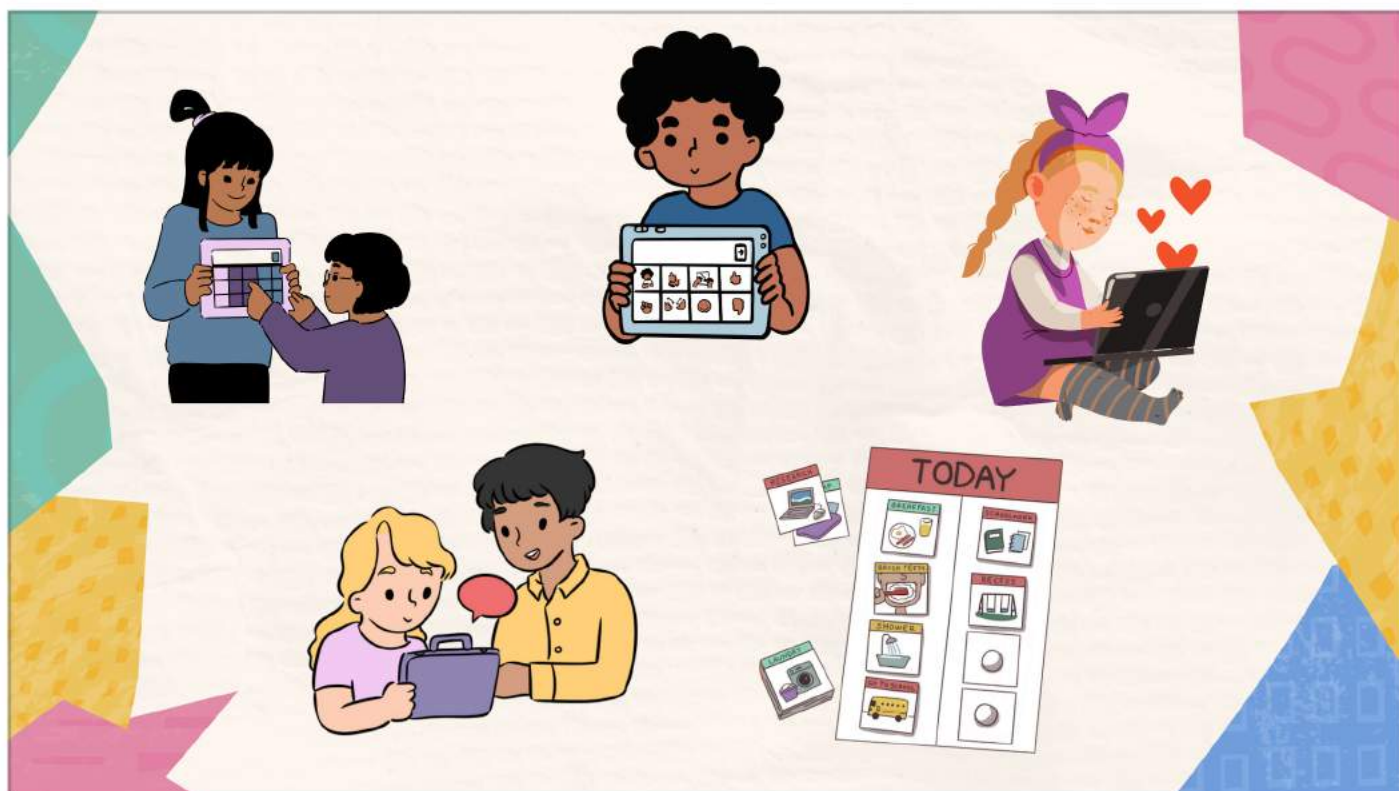
50. Assessing Progress

So what does progress look like? Over the course of the trial some little people will want to use the AAC or they might in time choose to use the AAC themselves you might see them having a little more ownership over the iPad they might bring it with you as you move to a different place you might see them exploring the iPad themselves which we call babbling they might decide to explore in their own time and see what it is all about or indeed you might see that they are paying more attention to your modelling gradually over time. They might transition between activities more easily when you use the iPad to tell them what's happening, what to expect. You might find that it is helping their comprehension and their transitioning. Thank you very much and have great fun.

How will the study work?

51. How will the study work?

1 You will be invited to download TestFlight from the Apple Appstore onto your iPad, you will then be given an invitation code as well as the TestFlight link which will lead to a beta version of Geabaire. A member of the team can visit your school to help with this and to get you started.

52. Installing the TestFlight
You will be invited to download TestFlight from the Apple Appstore onto your iPad, you will then be given an invitation code as well as the TestFlight link which will lead to a beta version of Geabaire. A member of the team will visit your school to help with this and to get you started.

2 You will be asked to use Geabaire either to communicate yourself or to model as a communication partner with an AAC user in a variety of settings and scenarios during daily routines for ten minutes over ten sessions. You will be given access to the app for four weeks. If you are neither an AAC user or a communication partner you are invited to assess the system using your clinical judgement.

53. Using Geabaire
You will be asked to use Geabaire either to communicate yourself or to model as a communication partner with an AAC user in a variety of settings and scenarios during daily routines for ten minutes over ten sessions. You will be given access to the app for four weeks. If you are neither an AAC user or a communication partner you are invited to assess the system using your clinical judgement.

3

When using the app please consider if Geabaire meets the criteria of a robust AAC app. A robust AAC app comprises the following elements; thoughtful organization, access to a broad vocabulary, access to high frequency core vocabulary, the possibility for evolution, flexibility in word forms and access to the alphabet (Zangari, 2021).

54. Assessment and Reflection

When using the app please consider if Geabaire meets the criteria of a robust AAC app. A robust AAC app comprises the following elements; thoughtful organization, access to a broad vocabulary, access to high frequency core vocabulary, the possibility for evolution, flexibility in word forms and access to the alphabet (Zangari, 2021).

4 You will be provided with a list of sample sentences which represent various functions of communication to act as a starting point but please feel free to explore Geabaire in its entirety however you wish. You will also be provided with sample core and fringe words that you may wish to focus on for the duration of the study along with a daily evaluation sheet to record your experiences during the course of the study.

55. Accompanying Materials

You will be provided with a list of sample sentences which represent various functions of communication to act as a starting point but please feel free to explore Geabaire in its entirety however you wish. You will also be provided with sample core and fringe words that you may wish to focus on for the duration of the study along with a daily evaluation sheet to record your experiences during the course of the study.

5 Finally, you will be invited to take part in an interview which will take up to 45 minutes to record your experiences of using Geabaire.

56. The Interview

Finally, you will be invited to take part in an interview, either in person or over Zoom, which will take up to 45 minutes to record your experiences of using Geabaire.

https://abair.ie/en/geabaire/support

57. Support Website

Further information and support can be found here : https://abair.ie/en/geabaire/support

Go raibh míle maith agaibh!

58. Thank You

Many thanks again for agreeing to take part in this study. Your input is hugely valuable to us.