

Farmer Noah*

A New Concept for Orientation
and Mobility Training for the
Blind, Visually Impaired and
the Deaf-Blind

Presentation for: AER BVI VA 2024.

Presented by:

Christopher Hekimian, Dr. Sc. SE, MSEE

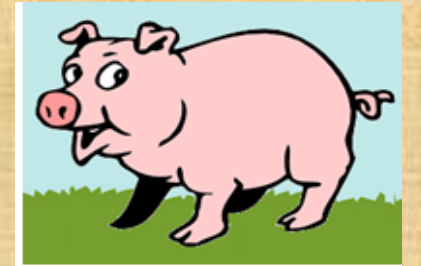
dxdt Engineering and Research, LLC

* and Bandmaster Stevie



Agenda

- How the Farmer Noah Concept Started
- What is Farmer Noah?
- Farmer Noah Screen Shots
- What Skills are we Working to Develop?
- Who Can Benefit from Farmer Noah?
- Farmer Noah Concept of Use
- What are the Potential Benefits of the Farmer Noah Approach?
- Where Does the Farmer Noah Concept fit in with Traditional Methods?
- Potential for Research Involving the Farmer Noah Concept
- Where are we now?
- Q&A
- Further Information on Farmer Noah.

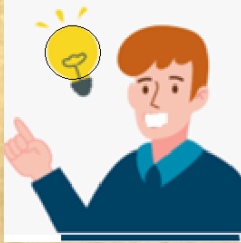


How the Farmer Noah Concept Started

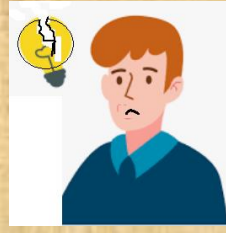
2011- Chris gets diagnosed with retina disease



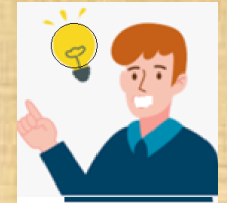
Chris gets ideas



2018- Chris takes ideas to Lighthouse for Blind. Learns that ideas are not good.



2018- CLB does indicate that technology to help children master cane use would be useful



=



+

!



+



+

2019-2022 With encouragement from CLFB and time, Chris developed a demonstration system

2019- Chris arrives at the basic concept for Farmer Noah. FN is like 3D game of concentration.

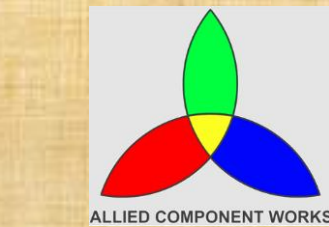
2018- Inspired by his work involving bomb detection for the U.S. Military and a previous product that tests cognitive acuity. - -

NFB Liked it!



N
F
B
2
3

Very popular at NFB 23!



2024: Enter production with Allied Component Works



N
F
B
2
4

Much excitement at NFB 24!



Factory built FN system

AER BVI Virginia 2024

Spreading news at AER BVI VA 2024!

What is Farmer Noah? (page 1 of 3)

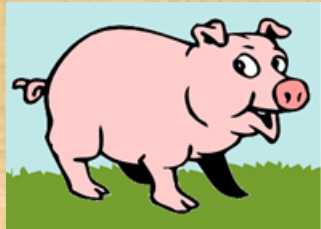
- Farmer Noah is a new system that implements principles of cognitive neuroscience to develop and enhance 3 skills that are critical to O&M skills. These skills are:
 1. Detecting non-visual cues in one's environment;
 2. Using the non-visual cues to make detailed and accurate mental maps of one's environment, and;
 3. Developing the skills and discipline of tracking one's position and orientation within their environment with accuracy.
- The Farmer Noah system is based on pairs of objects we call "animals".



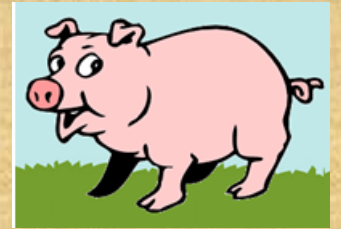
2 each, Cows, pigs, sheep. Turkeys.

These objects make the sound of their assigned animal and communicate their serial number to a controlling tablet computer when they are tapped with a cane.

What is Farmer Noah? (page 2 of 3)



- The core Farmer Noah process is one of finding and matching pairs of objects, for example, farm animals.
- When arbitrarily distributed within an environment, the paths between the objects will be characterized by non-visual cues such as:
 - Transitions in flooring
 - Architecture elements like doorways
 - Furniture
 - Radiant heat/ cool from windows
 - Scents from food, cleansers, automobiles, etc
 - Sounds through windows or hallways,
 - Temperature gradients
 - The list goes on.



Video introducing
Non-Visual Cues



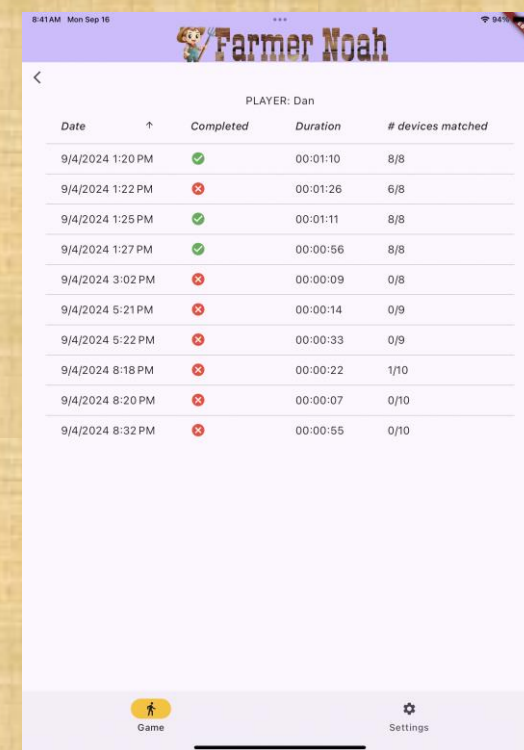
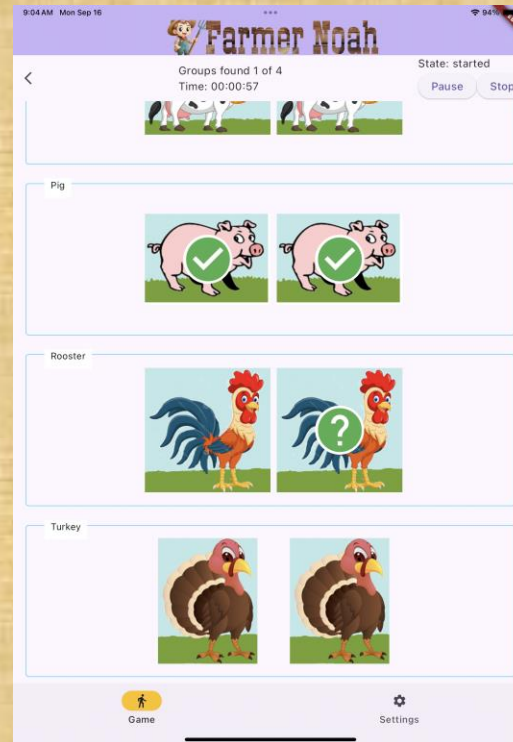
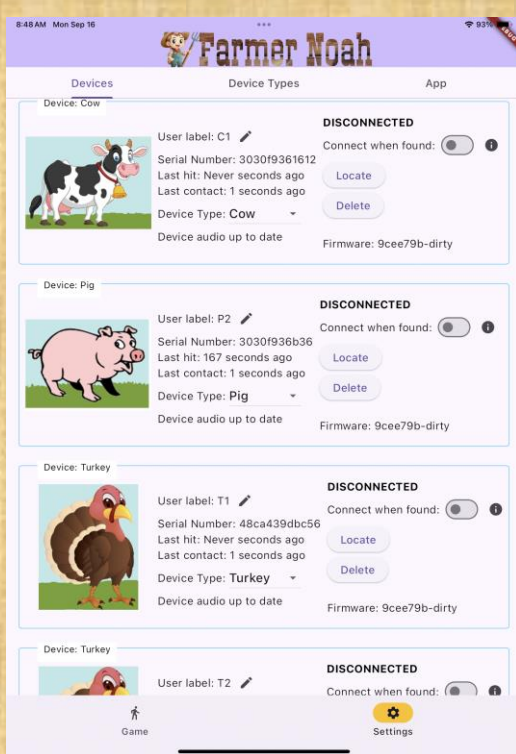
What is Farmer Noah? (page 3 of 3)



- The task of finding and matching the object pairs within the environment is associated with the following subtasks- each of which trains to and reinforces skills that are vital to competent and confident mobility.
- Subtask 1: Searching for an object. This will train basic cane and mobility skills while maintaining attention to non-visual cues.
- Subtask 2: Searching for the object pair. This will reinforce the cognitive skill of building mental maps based on the non-visual cues that intervene between the object pair. Cognition of orientation will be reinforced.
- Subtask 3: Recalling the locations of previously encountered objects and navigating to them. This will reinforce the cognitive skills including memory that will lead to improved mental maps and navigation relative to them.
- Repetition of these tasks in the context of a Farmer Noah exercise in different environments can be expected to enhance these skills to the point that they become self-reinforcing and second nature. Farmer Noah measures and tracks the time required to complete the exercise and that metric can be used to measure progress.



Farmer Noah Screenshots



This is a screenshot of the system set-up screen. As devices are powered on they will show as being connected here on this screen. The system has a locator feature that will make the animals easy to collect after a session.

During play, animals that are found or are still at large are depicted here. In this case 2 pigs and one rooster have been found. If the next animal found is not the other rooster the question mark will vanish.

The system tracks a users performance over time. This data will indicate when the returns of using the system are starting to diminish- I.e., they are sufficiently trained in the key skill areas.

Farmer Noah Animal



The key component of the Farmer Noah animal is the “puck”. The puck is affixed to the animal bowl. It contains a microprocessor with a communication subsystem. It contains a tap detector, a speaker, status indicator and the on/off and charging subsystems.

The base of the Farmer Noah animal is a durable and lightweight, hollow bowl. The bowl shape allows multiple bowls to be nested for easy transportation and storage.

What Skills are we Working to Develop?

1. Detecting non-visual cues in one's environment;

All environments have non-visual attributes that can be used by the blind or deaf blind to understand and map the geometry of a physical space.

2. Using the non-visual cues to make detailed and accurate mental maps;

The blind and deaf-blind will benefit from improved skill and discipline through practice- of developing more detailed and accurate mental maps.

3. Developing the skills and discipline of tracking one's position and orientation within their environment with accuracy.

The repeated processes of navigation through an environment relative to mental maps through a stress-free but purpose- directed process of locating pairs of objects will contribute to the ability to faithfully track and manage one's position and orientation relative to mental maps and hence, the actual environment.



Improve key skills.

Improve Safety and Confidence in Mobility.

Enhance independence.

These cognitive skills are transferrable to any environment.



Who Can Benefit from Farmer Noah?

- **Blind Children:** Blind children can be expected to respond most positively to the Farmer Noah concept. In many cases, blind children are fearful of event stepping out into a room so they can be taught basic cane and O&M skills. Our experience is that blind children find joy in searching for “lost” farm animals. Children not completely blind would use blindfolds in order to realize the benefits of Farmer Noah.
- **Deaf-Blind Children and Adults:** The current Farmer Noah concept is based upon the task of matching pairs of objects distinguishable by the sound they make when they are tapped with a cane. We intend to make a haptic version available such that objects will be distinguished by the number of vibration pulses they produce in a handheld unit during operation.
- **Blind Adults:** Our ***Bandmaster Stevie*** concept is the adult version of Farmer Noah. With Bandmaster Stevie, the objects are musical instruments and as objects are paired in succession, a 1, 2, 3 and 4-track musical piece is constructed and heard.
- **Sighted Children:** Using blindfolds, sighted children are in effect on an even playing field with blind children. They can develop their cognitive skills but perhaps more importantly, they will learn to appreciate the challenges faced by their blind classmates.



Farmer Noah Concept of Use

- **Private O&M Instructors:** Farmer Noah or Bandmaster Stevie can enhance the private O&M instructors service selection and help prepare students for traditional O&M training methods.
- **Institutional O&M Instructors:** Farmer Noah and Bandmaster Stevie can be integrated into institutional O&M programs to enhance student skills and confidence as part of a comprehensive O&M program.
- **Schools for the Deaf Blind:** All of the benefits available to the blind by virtue of Farmer Noah are also available to the deaf blind through the use of haptic interface devices.
- **Camps for the Blind and Deaf Blind:** The Farmer Noah process is fun for children and would be an enjoyable and rewarding activity at camps for the blind and deaf blind.
- **Special Education programs for K-12 public and private schools:** Through the use of blindfolds, all children could engage in the Farmer Noah Activity. Thus raising awareness of the issues that face the blind and deaf blind while enhancing the skill sets and confidence of blind and deaf blind children..
- **Hospitals and clinics serving the blind:** Hospitals and clinics treating the newly blind can integrate Farmer Noah and Bandmaster Stevie into their rehabilitation programs to enhance skills and focus on a positive path towards life without sight.

What are the Potential Benefits of the Farmer Noah Approach?

- Gamifying training will reduce stress on behalf of trainees and encourage adherence to training regimen and appeal to children.
- Use in controlled spaces allows key skills to be enhanced while training in relative safety.
- The Farmer Noah system returns quantitative metrics in the form of the time required to complete the matching task.
- The Farmer Noah system can be engaged by the blind and partially and fully sighted (using blindfold). It can be engaged by the deaf-blind using a haptic transducer as opposed to a speaker (optional accessory).
- The Farmer Noah system trains three skills critical to O&M- detection of non- visual cues in the environment ; construction of mental maps based on the non-visual cues; tracking ones position and orientation relative to the mental maps and the surroundings.
- The Farmer Noah process is structured and systematic for the trainer. It is readily time-bound and the process can be scaled for between 1 and 4 pairs. Trainers and trainees will know what to expect in each of their O&M training sessions.
- Farmer Noah training is based on principles of cognitive neuroscience- that will stimulate the brain much like a puzzle- and building an enduring foundation for O&M, memory, reasoning and other skills.

Where Does the Farmer Noah Concept fit in with Traditional Methods?

- Farmer Noah is not a replacement for traditional O&M methods- it is supplementary to them and enables them to be more effectively be and safer.
- Traditional O&M training methods remain important and vital to a person's competence and confidence within their environments. Farmer Noah represents somewhat of a more nuanced approach where development of specific, cognitive skills is the focus.
- Traditional methods can be stressful and overtaxing if core skills are not already in place. Farmer Noah allows these skills to be developed ahead of time, prior to traditional measures.
- Farmer Noah allows key skills to be practiced and trained for indoors in relative safety.
- Farmer Noah is a fun endeavor that can be used as a recreational activity while it trains key O&M skills.
- Use of the Farmer Noah system can be expected to be associated with improved O&M program retention.
- The Farmer Noah concept is appealing to most children and serves as an early on-ramp to improved mobility and confidence within their environments

Potential for Research Involving the Farmer Noah Concept (1)

- The Farmer Noah team recognizes the value of research and is very interested in supporting research efforts to the extent it can. The Farmer Noah concept is new and is a fertile area for research. Some research questions are listed below:

1.) Is use of the Farmer Noah system associated with better performance in traditional O&M training performance?

2.) Do children find the Farmer Noah process enjoyable?

3.) What number of Farmer Noah exercises appear to optimal – after which the rate of improvement slows?

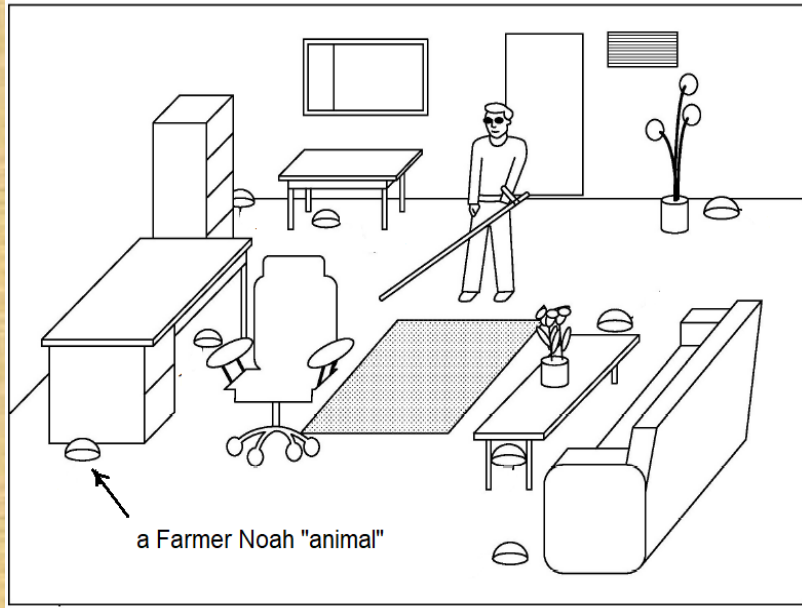
4.) Is use of the Farmer Noah system associated with improved O&M program retention by age group?

5.) Is the Farmer Noah activity suitable as a recreational activity for the blind and deaf-blind by age group?

Potential for Research Involving the Farmer Noah Concept (2)

- 6.) Does use of the Farmer Noah system improve a subject's ability to identify and localize non-visual cues in their environment?
- 7.) Does use of the Farmer Noah system improve a subject's ability to construct detailed and accurate mental maps of their environment?
- 8.) Does use of the Farmer Noah system improve a subject's ability to maintain an understanding of their own location and orientation within their environment?
- 9.) What are the descriptive statistics associated with the length of time needed to complete the Farmer Noah process (by subject demographic)?
- 10.) Are the 3 skills targeted through use of the Farmer Noah self-reinforcing? (i.e., do they endure after training with the system stops; and, do they continue to improve?)
- 11.) What are the core skills required to administer the Farmer Noah training method?
- 12.) How can the Farmer Noah system be applied to other novel games and approaches in order to benefit or engage blind/deaf-blind/sighted students and individuals?

Farmer Noah “Where are we now?”



Drawing from Farmer Noah patent application

- Farmer Noah is currently in development.
 - The “animals” have been developed and a manufacturing concept is in place.
 - The basic software has been developed but testing and accessibility enhancements are still pending.
 - Haptic and Bandmaster Stevie features are not yet integrated.
 - User manual and packaging concepts are still pending.
- Targeted release date is February 2025.
- dxdt Engineering and Research, LLC is looking for interested parties now. The benefit of engaging with us early is that you may be eligible to receive one of our early systems at or below our cost. We are motivated to get our systems out expeditiously to support the blind community and the researchers dedicated to helping them.

Q&A

- How much per system?
 - Systems include: iPad, multi-charger, charging cables, Farmer Noah animals, carrying concept and documentation.
 - 2 animal system: \$1050.00
 - 4 animal system: \$1830.00
 - 6 animal system: \$2590.00
 - 8 animal system: \$3300.00

Further Information Available Here:

Visit www.FarmerNoah.com for:

- System description
- [Farmer Noah Introductory video](#)
- Current product brochure
- [Quick video of Mr. Juan Avila's interview with Christopher Hekimian at NFB 23.](#)
- [Chris Hekimian being interviewed by Jonathan Mosen of the the "Living Blindfully" podcast.](#) Interview starts at time mark 1:08:03. Transcript of the entire podcast is [here](#).
- [Non-visual cues demo video](#)

Thank you!

Contact:

Dr. Christopher Hekimian, Proprietor of
dxdt Engineering and Research and
Inventor of the Farmer Noah System.

- HekimianCD@dxdtengineering.com,
- 301 520-1575

