Tecnun
Universidad
de Navarra

Piano Finger Exerciser

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1. Description of the product

Product Overview

The *Hand Piano* is a low-cost, hand-training device designed to help older adults maintain finger strength and dexterity through simple musical exercises. It combines gentle physical activity with familiar songs and personalized audio messages from family members, turning routine hand exercises into an enjoyable and emotionally meaningful experience.

What the Product Is

The Hand Piano is a compact, hand-held tool with spring-loaded keys for each finger, plus two additional keys for the thumb and pinky to encourage a wider range of movement. Pressing the keys requires light resistance, helping users safely build hand strength and improve tendon mobility.

To guide the user through a melody, the device lights up and lightly vibrates the key that should be pressed next. The songs—simplified classics from the user's generation—fit within a single octave, making them easy to follow even for beginners. Each key has its own spring hardness, so the combination of keys used in a song determines its difficulty level. A small screen displays the chosen song and level, and users can select what they want to play at any moment.

When a song is completed, the device plays a short recorded message from a family member, offering encouragement and strengthening the sense of connection across generations. Together, the musical guidance, physical resistance, and personal audio feedback create a simple, comforting tool for daily hand exercise and emotional support.

Day in the life

1. The user picks up the device and places their hand through the wide, soft elastic band for secure grip.
2. They turn the device on.
3. A simple menu lets them choose a song and its difficulty level.
4. The backing melody starts.
5. The first key lights up and gently vibrates.
6. The user presses it; the note plays.

7. The next key lights and vibrates and stays lit until pressed.
8. This continues, key by key, until the song ends.
9. A personalized family voice message plays to congratulate them.
10. They can replay the song or move on to the next one.
11. If unused for 60 seconds, the device switches off automatically.

User

The Hand Piano is designed for:

- Older adults who want an intuitive, low-effort daily hand exercise routine
- People with reduced mobility or dexterity who need guided movement
- Anyone who enjoys music and prefers playful, stress-free training instead of formal physiotherapy tools

The device does **not** resemble a children's toy. Its forms are clean and simple, with a calm, timeless aesthetic that respects the user's age and taste.

Mechanism

Spring-loaded keys: Each key uses a built-in spring that provides light resistance, helping strengthen the fingers and improve tendon mobility.

Individual keys for all fingers + two extra keys: One key per finger, with additional keys for the thumb and pinky to support a wider range of motion.

LED + vibration guidance: The key that must be pressed lights up and gently vibrates, making the exercise easy to follow even for users with limited vision.

Difficulty levels through spring hardness: Keys have different spring resistances, so songs automatically correspond to difficulty levels (1–3) depending on which keys are required.

More Product details

Simple interface: A small display shows the selected song and difficulty level, and allows easy navigation.

Personalized audio feedback: When the user finishes a song, a short family-recorded message plays to encourage connection and reduce loneliness.

Ergonomic hand shape: The body of the device is sculpted to fit naturally in the user's palm, supporting comfortable long-term use.

Elastic band for secure grip: A wide, soft elastic band keeps the device stable in the user's hand, preventing accidental dropping and allowing relaxed use.

Flat supporting side: One side of the device is flat so it can be rested vertically on a table while still being used for hand-training movements.

Audio settings

Simplified Songs: The device includes well-known melodies from the user's generation, adapted into a single octave. Songs are arranged to be easy to follow, keeping users engaged and motivated while exercising their hands.

Personalized Feedback: After selecting the correct notes, users can receive short voice messages recorded by family members. This encourages them to continue and helps them feel supported and connected.

Difficulty Levels: Songs have three levels of difficulty (1–3), determined by which keys are used and the resistance of their springs. This allows users to gradually increase the challenge as their hand strength and dexterity improve.

Physical properties and price

Material: Lightweight plastic to ensure easy handling.

Components: The device consists of the main structure, the keys, a rope for wearing it around the neck, a play/pause button, a next and go back button, and a mini screen to display the song's name and level of difficulty, elastic band

Aesthetic: Its design has a clean, classic look, purposefully avoiding the appearance of a children's toy, so older users feel comfortable and respected while using it.

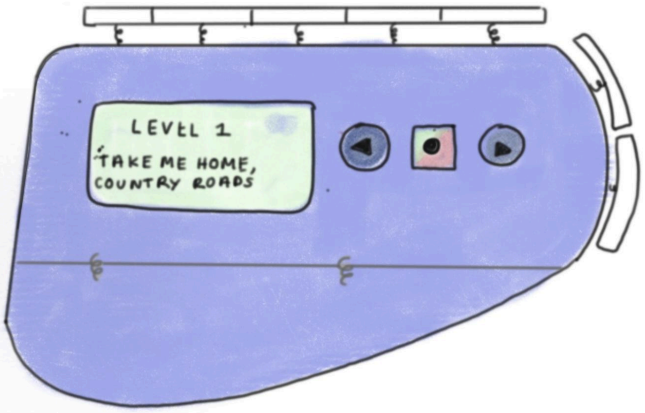
Price: The product is designed to remain affordable, with a target cost under €15, making it accessible to a wide range of users.

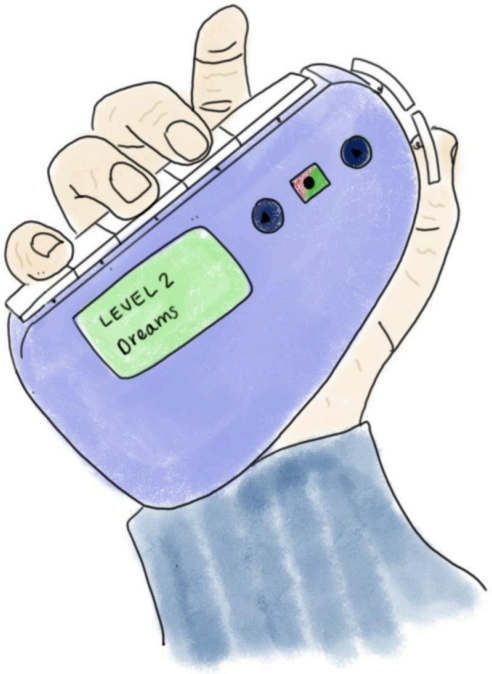
How it answers to user needs

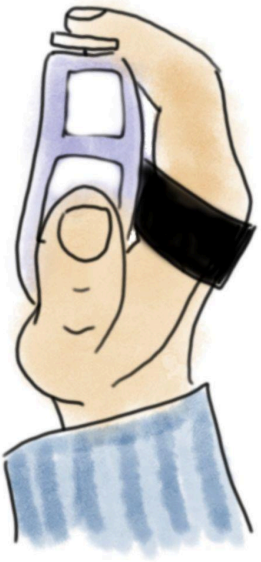
- Safe hand-strengthening through spring-loaded keys
- Full-hand mobility with keys for all fingers plus two extras
- Engaging, music-based exercise instead of repetitive training
- Clear LED and vibration cues for easy guidance
- Reduced loneliness through family-recorded messages
- Cognitive stimulation through musical patterns
- Comfortable ergonomic hand shape
- Secure and accessible grip with elastic band
- Simple interface and easy operation
- Affordable materials meeting the under-€15 requirement

2. Detailed sketches

The sketches include a front view of the Hand Piano as well as a view of a hand holding the device ready to play. They illustrate the device's ergonomic hand shape, showing how it fits naturally in the user's palm. The drawings also highlight the main components, including the spring-loaded keys, small display, navigation buttons, and elastic hand band, providing a clear visual overview of the product's design and functionality.

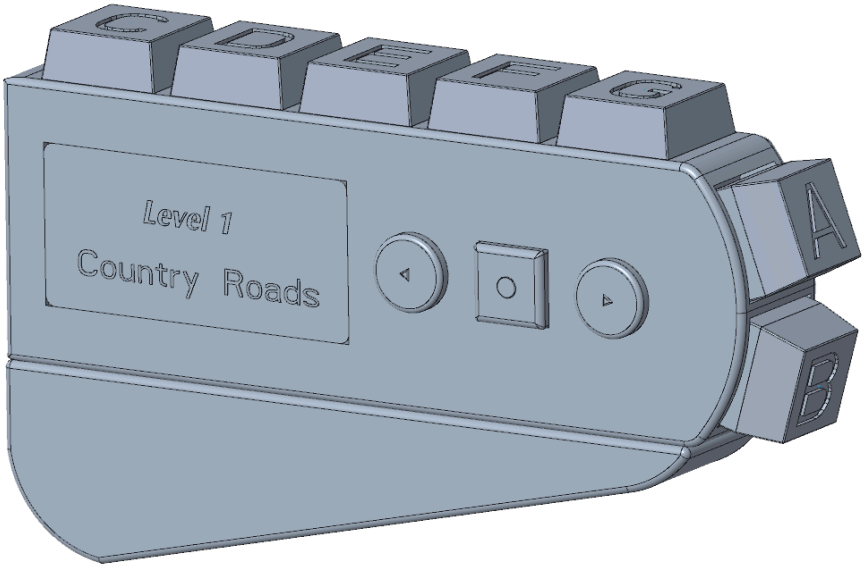

LEVEL 1
TAKE ME HOME,
COUNTRY ROADS

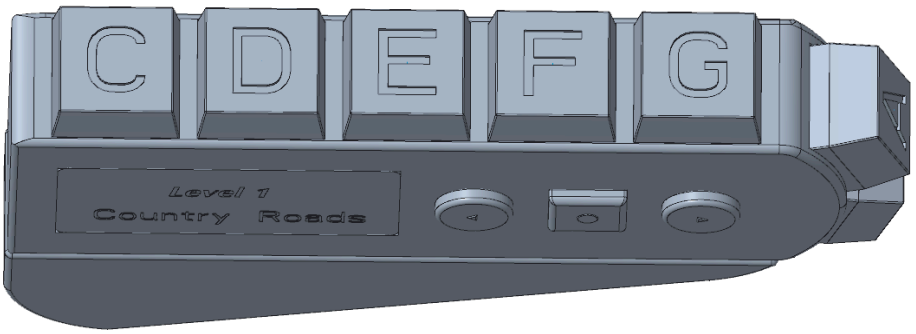

LEVEL 2
Dreams

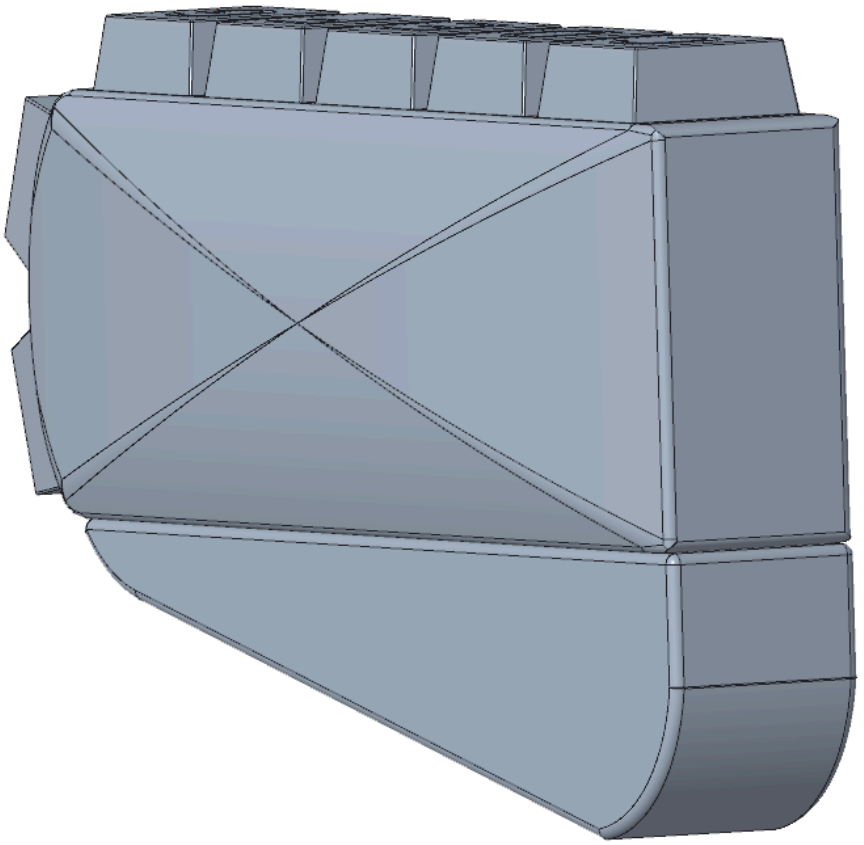


3. 3D model and renders

This is a 3D model of the Hand Piano created using **Creo Parametric**. With these images, you can see how the device would look in real life, including the ergonomic shape, the elastic band, and how each key is labeled with its corresponding note.

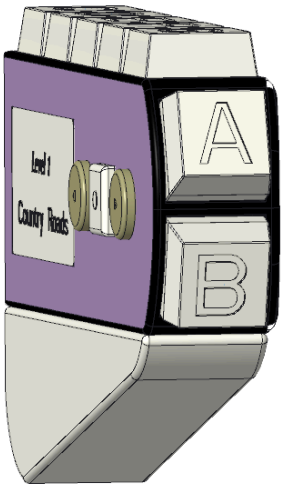


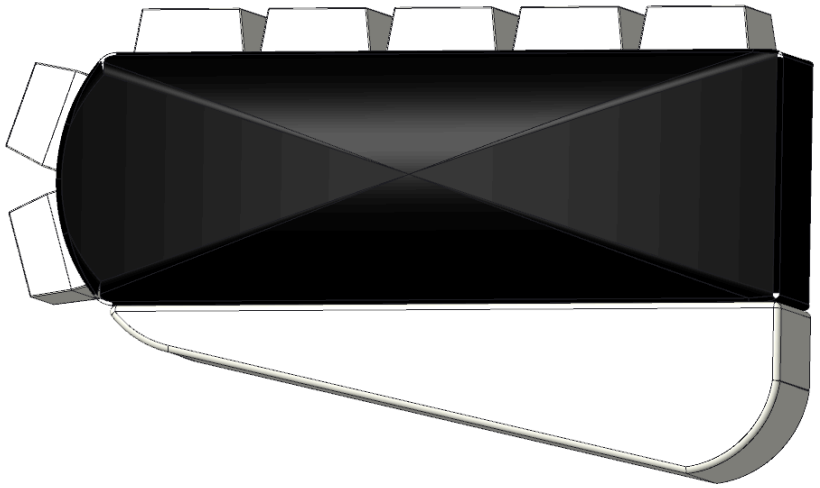

C D E F G
Level 1
Country Roads




Level 1
Country Roads

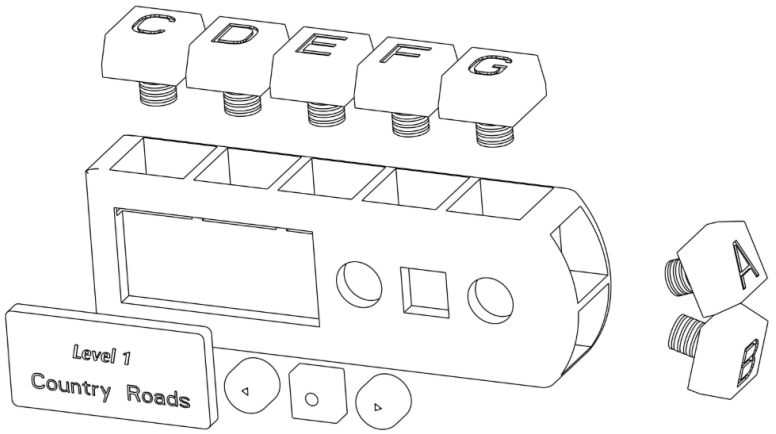

C
D
E
F
G

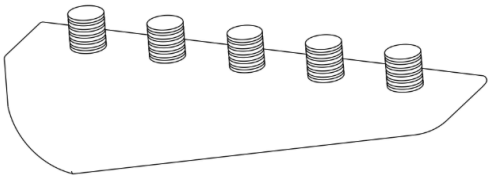

A
B
Level 1
Country Roads



4. Exploded and BOM

This exploded view shows all the components of the Hand Piano, clearly illustrating how each part fits together. The accompanying bill of materials identifies every element.





SCALE 3:2

13	TECLAS_G	1	
12	TECLAS_F	1	
11	TECLAS_E	1	
10	TECLAS_D	1	
9	TECLAS_C	1	
8	TECLAS_B	1	
7	TECLAS_A	1	
6	PARTE_DE_ABAJO	1	
5	PANTALLA	1	
4	LETRASPANTALLA	1	
3	BOTONCUADRADO	1	
2	BOTONCIRCULAR	2	
1	BASE_PRINCIPAL	1	
Marca	Descripción	Nº Piezas	Material

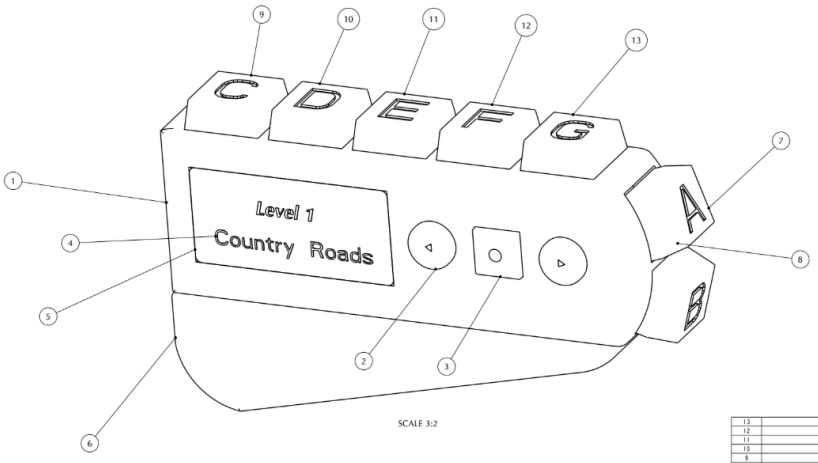
Método Proyección	Unidad dimens.	Toler. geom.	Fecha	Denominación:
	mm.	ISO2768-m		
		Toler. general		
Escala	Estado superficial	ISO2768-K	Nov-21-25	PIANO_COMPLETO_
3:10	UNE 1037	UNE A3		

Denominación:

Explosion

TECNUN	Nº Plano:	Nota:

Formato Din A-3 (420x297)



SCALE 3:2

13	TECLAS_G	1	Polypropylene / Steel
12	TECLAS_F	1	Polypropilene /Steel
11	TECLAS_E	1	Polypropilene /Steel
10	TECLAS_D	1	Polypropilene /Steel
9	TECLAS_C	1	Polypropilene /Steel
8	TECLAS_B	1	Polypropilene /Steel
7	TECLAS_A	1	Polypropilene /Steel
6	PARTE_DE_ABAJO	1	Polypropilene
5	PANTALLA	1	Liquid Crystal Display
4	LETRASPANTALLA	1	Digital Text
3	BOTONCUADRADO	1	Polypropilene
2	BOTONCIRCULAR	2	Polypropilene
1	BASE_PRINCIPAL	1	Polypropilene
Marca	Descripción	Nº Piezas	Material

Método Proyección	Unidad dimens.	Toler. geom.	Fecha	Denominación:
	mm.	ISO2768-m		
		Toler. general		
Escala	Estado superficial	ISO2768-K	Nov-21-25	PIANO_COMPLETO_
3:10	UNE 1037	UNE A3		

Denominación:

Bill of Materials

TECNUN	Nº Plano:	Nota:

Formato Din A-3 (420x297)

13	TECLAS_G	1	Polypropylene / Steel
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11	TECLAS_E	1	Polypropilene /Steel
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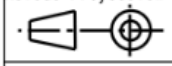
3	BOTONCUADRADO	1	Polypropilene
2	BOTONCIRCULAR	2	Polypropilene
1	BASE_PRINCIPAL	1	Polypropilene
Marca	Descripción	Nº Piezas	Material

Metodo Proyección	Unidad dimens.	Toler. geom.	Fecha	Denominación:
	mm.	ISO2768-m		
		Toler. general		
Escala	Estado superficial	ISO2768-K	Nov-21-25	PIANO_COMPLETO_
3:10	UNE 1037	UNE A3		

Denominación:

Bill of Materials

	Nº Plano:	Nota:
TECNUN		

5. How can the prototype be made?

The prototype can be made with many types of materials that allow you to mold ergonomic and organic shapes such as clay or foam. It can also be 3D printed.