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ADAPTING ICT FOR ELDERLY INCLUSIVENESS: A CASE STUDY ON DEVELOPING A VINTAGE DIGITAL COMMUNICATION DEVICE

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Abstract. This study explores the development of a vintage digital communication device aimed at improving digital inclusiveness among elderly users. The research question centers on how retrofitting existing designs can enhance usability and social connection for this demographic. The device prototype was successfully developed with functionality ranging from basic communication to enhanced audio and internet connectivity at a cost of $34.99–$112.53. Feedback from elderly users highlighted improved ease of use and strengthened family connections. Retro technology enthusiasts expressed enthusiasm for the concept, indicating potential appeal beyond the primary target audience. Technical challenges, such as power instability and interference, were resolved during development, enhancing the device’s reliability. The findings suggest that adapting ICT to align with familiar designs can significantly enhance elderly inclusiveness, promoting social and digital integration.

Keywords: inclusiveness, information and communication technologies (ICT), digital communication device, social inclusion, rotary dial telephone, digital exclusion.

Introduction

Information and Communication Technologies (ICT) are transforming our lives at a remarkable pace, becoming an essential part of the global digital ecosystem [1]. ICT are not only vital for professionals in IT and computer engineering but also are vital for practically everyone in any sphere of life. Information and communication technologies are becoming increasingly essential for every segment of society, such as children and elderly (i.e., senior) citizens, in terms of accessing information, facilitating communication, getting social services, and so on [2].

Problem Statement

However, not all societal groups have equal access to or conditions for utilizing ICT. Elderly individuals, in particular, face challenges in adopting digital technologies, often finding themselves excluded from these opportunities [3]. Their limited interaction with technology leaves them at a disadvantage in the modern information age. This exclusion stems from various factors, including unaffordable costs, lack of basic skills, difficulty in accessing ICT, privacy and security concerns, low self-efficacy, and non-intuitive interfaces [4].

This digital exclusion not only hampers elderly individuals’ access to services but also contributes to social isolation–a growing concern with significant mental and physical health implications, including increased mortality rates [5]. It is necessary to systematically investigate and to take precautions regarding the needs of the aging society and the potential problems of accessing information technologies [2]. Addressing these challenges requires innovative solutions to enhance social inclusiveness and enable elderly citizens to benefit from ICT.

Review of Modern Information Sources on the Subject of the Paper

As global populations age, the proportion of elderly individuals is expected to rise significantly, with estimates suggesting that those aged 60 years and older will make up 22 % of the world's population by 2050 [8]. Preventing or mitigating social isolation among this group has become a top priority for policymakers worldwide [9].

Interestingly, this social isolation among the elderly is partly due to their difficulty with adapting to the rapid expansion of technology, while on the other hand, ICT hold immense potential as a tool to combat this issue, promoting social inclusion and improving overall well-being. ICT use by elderly citizens may have the potential to increase the quality of life of elderly population by improving the relationship with the family, as well as improving individual independence and inclusion in the society [2].

ICT offers unique opportunities to bridge social and spatial barriers, facilitating diverse forms of communication – textual, audio, and visual-anytime and anywhere [5]. Repeated use of mobile devices fosters connectivity and provides unrestricted access to information and knowledge [10, 11].

Existing solutions to enhance ICT inclusiveness for the elderly include online social platforms, animal robots, exercise games, interpersonal communication technologies, etc. [12, 13, 14]. However, these approaches often overlook the elderly's existing experiences and attitudes toward technology – the use and acceptance of ICT are closely connected to the experience and attitude of elderly citizens in ICT [2]. The introduction of unfamiliar devices may exacerbate resistance, requiring substantial training and tailored support to achieve acceptance and effective use [5, 1].

For many elderly people, the acquisition of digital skills is an entirely new learning process, requiring emotional, practical, and technical capabilities [10] that are challenging to develop later in life. They are unable to learn the digital skills on their own and require coaching which also is a tough call [1]. Consequently, many current digital solutions fail to meet the real needs of elderly users [15, 16].

This raises a critical question: how can new technologies be presented to elderly individuals in a way that aligns with their existing experiences and familiarity? Studies suggest that solutions should prioritize user-friendly interfaces, simplified procedures, and familiar designs [17, 18]. Pruszyński et al. stress that it is of crucial importance for new technologies to be presented to elderly people in a well-known manner – these endeavors should recognize the fact that the stay of older people in a well-known, friendly environment with which they are emotionally connected, improves their well-being and improves the quality of life [19].

Objectives and Problems of Research

In this paper, we propose a novel solution: a vintage digital communication device that integrates modern technologies while preserving a design familiar to elderly users. This "reversed" approach to ICT utilization combines the aesthetic and functional simplicity of a rotary dial telephone with contemporary mobile network compatibility. This device bridges the gap between familiarity and modern technology, allowing elderly individuals to communicate easily with family and friends. By doing so, it aims to enhance their quality of life and well-being through increased connectivity and inclusiveness [6, 7].

Main Material Presentation

To develop and evaluate the proposed solution, we followed a structured methodology comprising three key stages: (1) Concept Development, (2) Identification of Domain-Specific Objects and Processes, and (3) Device Production and Analysis of Findings. We detail each stage of the methodology below.

Concept Development. The idea for the device stemmed from personal experiences, literature reviews, and communication with elderly relatives. We recognized that the familiarity of rotary dial telephones could serve as a bridge for elderly users to access modern mobile communication technologies. This led us to propose a novel concept – integration of contemporary mobile technologies into vintage rotary dial telephones. The core features of the concept are summarized in Table 1.

Table 1

Core features of the vintage digital communication device concept

Feature	Description
Innovation	Blending retro design with cutting-edge technology. Retrofitting classic devices with mobile communication capabilities
Social Focus	Mitigating the digital divide among the elderly by leveraging familiar designs. Promoting inclusiveness through accessible communication tools for elderly individuals and social institutions
Technical Aspects	Employing SIM modules to enable connection to 2G/3G mobile networks. Facilitating modern power supply options via USB or an adapter

Also, at the idea development stage the following arguments were formulated to further justify the concept:

– The design addresses the issue of social isolation by enabling the elderly to communicate more comfortably using familiar devices.

– Minimal production costs make the device affordable for a broader audience.

Reusing old telephones contributes to environmental sustainability by minimizing electronic waste.

Identification of domain-specific objects and processes. To ensure effective implementation of the concept, we identified the essential objects, processes, and requirements for the device. Table 2 summarizes the set of the subject domain objects.

The connection between objects is provided as follows:

– The telephone apparatus integrates the mobile communication module and power system, enabling seamless operation.

– The SIM module facilitates voice communication, while the power system ensures autonomy and reliability.

Table 2

Objects of the subject domain

Object	Description
Telephone Apparatus	*Design*. Preserves the classic rotary or push-button interface. *Modernization*. Incorporates a SIM module, LED indicators, and sound signals
Mobile Communication Module	Supports 2G/3G standards with a mini-SIM slot and a built-in or external antenna
Power System	Includes grid connection via an adapter and USB-based alternative power supply. Features such as charge-level indicators ensure user convenience
Users	Primary audience: Elderly individuals, prioritizing ease of use. Secondary audiences: Social institutions and retro technology enthusiasts

Key processes include communication setup, mobile network integration, device configuration, and user operation. These processes were identified to ensure seamless functionality for end users.

According to the main object and key processes identified, the product requirements were formulated as follows:

Functional Requirements. Enable calls on 2G / 3G networks, provide an analog interface for dialing, and support status indicators.

Non-Functional Requirements. Ensure ease of setup, at least 8-hour standby autonomy, and reliable operation in remote areas.

Social Requirements. Promote inclusiveness and facilitate integration into elderly support programs.

Device production and analysis of findings. After the conceptualization and identification phases, the implementation involved the following steps:

(1) *Identification and procurement of parts* – identify and acquire components that meet the functional requirements established during the conceptualization stage.

(2) *Assembly and technical feasibility testing* – the components to evaluate engineering feasibility and address potential challenges in integration.

(3) *Economic evaluation* – estimate production costs to assess the financial viability of large-scale manufacturing.

(4) *Analysis and presentation of findings* – document all technical, economic, and social findings were to evaluate the overall feasibility and potential impact of the device.

This structured methodology allowed us to systematically explore the technical, economic, and social dimensions of the project, ensuring a comprehensive evaluation of its potential to bridge the digital divide for elderly users. The following paragraphs detail the implementation of these four major steps.

Technical implementation. The technical implementation involves identifying the necessary components, assembling them, and testing the device's functionality. For clarity and structure, the section is divided into two subsections: (1) identification of main and supplementary components, and (2) the assembly process.

The first subsection outlines the components required for the prototype, categorized into core components for mandatory functionality and auxiliary components for enhanced or optional features. The second subsection provides an overview of the steps taken to assemble these components into a fully operational device.

Identification of main and supplementary components. The successful operation of the device depends on a combination of main and auxiliary components. The main components are essential for the device's core functionality, enabling basic telephony operations. The auxiliary components, while not mandatory, allow for enhanced functionality, such as improved audio quality or internet communication capabilities.

The components are listed in Table 3 below, categorized by their role in the device. Main components are required for basic operation, while auxiliary components provide additional features or improvements.

Table 3

Components of the vintage digital communication device

Component	Type
Arduino Uno	Main
GSM Module	Main
Speaker (1 W)	Main
Power Supply 12V 5 A	Main
Antenna Ant-GSM-17 sm	Auxiliary
Amplifier TDA7297	Auxiliary
3S Protection Board	Auxiliary
Battery 18650	Auxiliary
Type-C Connector	Auxiliary

The components labeled as "Main" are critical to the device's operation, while "Auxiliary" components can be added to enhance or customize functionality based on specific user needs.

So, the core functionality of the device is achieved using the following main components:

– *Arduino UNO board* – serves as the central microcontroller, managing operations such as dialing, signaling, and communication with other modules. An equivalent analog, "Ukraino Uno", may be used as an alternative;

– *GPRS/GSM Shield SIM900* – facilitates mobile network connectivity, allowing the device to make and receive calls via a SIM card;

– *Power Supply 12V 5A* – provides reliable electrical power to support the microcontroller and GSM module;

– *Wire 22 AWG* – used for internal wiring, ensuring stable connections between components;

– *SIM Card* – enables access to the mobile network, serving as the primary communication link.

These components ensure the device is functional as a standalone communication tool. Table 4 provides a visual representation of these components to facilitate understanding.

Table 4

Visual representation of the main components

Component Title	Q-ty	Image
Ukraino UNO board	1	
GPRS / GSM Shield SIM900	1	
Power Supply 12V 5A	1	
Wire 22 AWG	3 metres	
SIM card	1	

For users requiring enhanced audio performance, the following optional components can be integrated:

– *Speaker (10 W)* – improves audio output, ensuring clear communication, especially beneficial for elderly users with hearing impairments;

– *Class AB Audio Amplifier TDA7297 (2×15 W)* – enhances audio signal quality and volume for an optimal listening experience.

These components offer personalized improvements, catering to specific user requirements. Visual representations of these components are shown in Table 5.

Table 5

Visual representation of additional components

Component Title	Q-ty	Image
Speaker (10 W)	2	
Class AB Audio Amplifier TDA7297 (2×15 W)	1	

To expand the device's functionality for internet-based communication, the following components are included in an optional module:

– *Open-Source Microcomputer Orange Pi One H3 (512 MB)* – adds computational power for internet-based services, such as messaging and basic web browsing;

– *GPRS/GSM Shield SIM900* – handles mobile network operations for both calls and data transmission;

– *SIM Card* – enables mobile network connectivity for internet access.

This module extends the device's capabilities to include digital communication, making it versatile for broader applications. Images of the components for this module are presented in Table 6.

Table 6

Additional module for integrating Internet communication

Component Title	Q-ty	Image
Open Source Microcomputer Orange Pi One H3 (512 MB)	1	
GPRS / GSM Shield SIM900	1	
SIM Card	1	

The integration of internet communication requires the use of two separate SIM cards, each serving distinct purposes:

Core Telephony Functions. The first SIM card is dedicated to basic mobile telephony tasks, ensuring uninterrupted calling functionality;

Internet-Based Communication. The second SIM card supports data connectivity for the additional internet communication module.

This dual-SIM configuration ensures bandwidth optimization, since by dedicating one SIM card to telephony and the other to internet communication, you avoid competition for network resources between voice calls and data usage, ensuring reliable operation for both functionalities. Additionally, reaping the telephony and internet functionalities separate provides redundancy. If one system (e. g., the internet module) encounters issues, the other (e. g., core calling) remains unaffected.

And finally, the dual-SIM configuration provides flexibility for users to choose cost-effective network plans. Some mobile network providers offer plans optimized for specific purposes, such as voice-only or data-only services, so using two SIM cards allows users to choose the most cost-effective or reliable plans for each function.

The assembly process. Before beginning the physical assembly, the relevant components were programmed to ensure the system's functionality. This step involved writing and uploading custom code to the Arduino Uno microcontroller to control the rotary dial telephone and its GSM Shield. The key functions implemented in the code were:

1. *GSM Shield Initialization* – ensured the GSM module's readiness and initialized its operation.
2. *Pulse Dialing Processing* – interpreted the pulses generated by the rotary dial to decode the dialed number.
3. *Dialing a Number* – processed the full number once dialed and, after a timeout check, initiated a call through the GSM module.
4. *Receiving an Incoming Call* – detected incoming calls and triggered a ringtone to notify the user.
5. *Ending a Call* – terminated an active call when the handset was hung up.

This programming stage was critical in bridging the gap between the vintage rotary dial mechanism and the modern GSM communication module, enabling seamless integration. With the software setup completed, the assembly process moved to the physical integration of components.

Fig. 1. The telephone case after cleaning

The assembly process for the rotary dial telephone involved a series of systematic stages, each focusing on integrating modern components into the vintage design while ensuring functionality and stability. Below is a description of the process, illustrating the transformation of the old device into a fully operational prototype.

Stage 1 – Cleaning the Case of Unnecessary Parts. The first step in the assembly process was to prepare the vintage telephone case for modernization. This required removing obsolete components that no longer served any functional purpose, such as outdated wiring, modules, and other mechanical parts. Special care was taken to preserve the structural integrity and aesthetic of the case while expanding it to accommodate modern components. For instance, space was created to install the battery pack and SIM module, which are critical for the device's updated functionality. Fig. 1 shows the case after it was thoroughly cleaned and modified to house the new components, demonstrating the careful balance between preservation and adaptation.

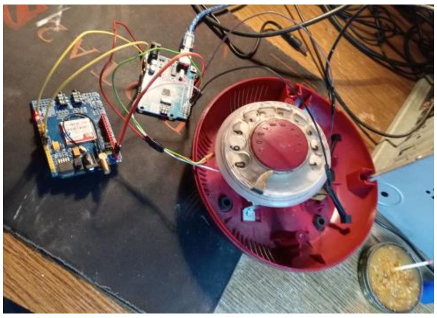

Fig. 2. Testing components outside the case

Stage 2 – Assembly and Testing of Components Outside the Case. Before integrating the components into the case, their functionality was tested individually and as a system outside the enclosure. This stage ensured that the main modules were operational before final assembly. Key tasks included:

– Connecting the SIM card to the GSM module to confirm network connectivity.

– Powering the modules via a USB adapter to validate the power supply's reliability.

– Transmitting a voice signal through a test speaker to ensure clear audio output.

A breadboard was used during this stage for ease of setup and testing, allowing components to be connected and adjusted quickly. Fig. 2 illustrates the components during this testing phase, showcasing the working system outside the case.

Stage 3 – Assembling Components into the Case. After successful testing, the components were integrated into the case to test the device under conditions approximating its real-world operation. During this stage:

– All modules were carefully assembled into the case, ensuring secure placement and proper connections.

– The location of the antenna was optimized for reliable signal transmission, and access to the SIM card slot was maintained for convenience.

Fig. 3. Semi-assembled device

– Testing revealed that the old speakers were inadequate for the device's requirements, prompting a decision to replace them.

Fig. 3 depicts the components neatly installed within the case, highlighting the thoughtful layout and design considerations.

Stage 4 – Replacing Old Speakers with Modern Ones. To address the issue of low audio power and quality, the old speakers were replaced with two modern 10W speakers. These upgrades significantly improved the clarity and volume of sound, making the device more suitable for elderly users. Additionally, a Class AB Audio Amplifier (TDA7297) was added to enhance the overall audio quality and voice transmission.

This stage also involved ensuring the proper placement of the speakers within the handset, maintaining the original design's look while achieving superior performance. Fig. 4 shows the old and new speakers, and Fig. 5 showcases the replacement process.

a b

Fig. 4. Old (a) and new (b) speakers

Stage 5 – Final Assembly of the Device. The final stage involved completing the assembly and conducting comprehensive testing of the device in its finished state. Tasks included:

– Fine-tuning the placement of antenna to optimize signal reception.

– Verifying the operation of the status indicator, which provides visual feedback during operation.

– Long-term testing to ensure the stability and reliability of the device under continuous use.

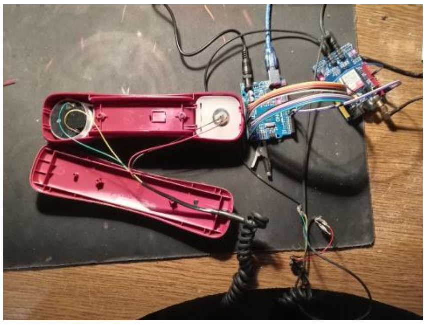

Fig. 5. Replacement of speakers

Fig. 6 illustrates the completed prototype, fully assembled and ready for further testing and refinement. The device maintains its vintage aesthetics while incorporating modern technology seamlessly.

Fig. 6. The completed device prototype

Overall, the development and assembly process resulted in a functional prototype that meets the outlined technical specifications. The device demonstrated stable performance under testing conditions that simulate real-world usage.

Economic evaluation. To provide a comprehensive assessment of the prototype's economic feasibility, all components were sourced from specialized retail shops in the Ukrainian market. Given the current unstable economic situation in Ukraine, the prices are presented in US dollars, calculated based on the exchange rate in October 2024. This approach ensures a more stable and universal understanding of the cost structure.

The cost evaluation is broken down into several configurations, ranging from a basic device with minimal functionality to a fully-featured model that includes enhanced audio performance, Internet communication capabilities, and auxiliary components. The following tables summarize these configurations and their associated costs.

Table 7 outlines the cost of a device with main functionality only, without additional modules. The total cost for this setup is $34.99, making it the most economical configuration.

Table 8 presents the cost of adding a module for enhanced audio performance, which includes modern speakers and an audio amplifier. The additional cost for this upgrade is $5.82.

Table 7

Cost of the device with main functionality only

Component Title	Q-ty	Unit price, $	Total cost, $
Ukraino UNO board	1	6.31	6.31
GPRS / GSM Shield SIM900	1	21.84	21.84
Power Supply 12V 5A	1	4.61	4.61
Wire 22 AWG, m	3	0.34	1.02
SIM card	1	1.21	1.21
			34.99

Table 8

Cost of the module for enhanced audio performance

Component Title	Q-ty	Unit price, $	Total cost, $
Speaker (10 W)	2	1.46	2.91
Class AB Audio Amplifier TDA7297 (2×15 W)	1	2.91	2.91
			5.82

Table 9 shows the cost of integrating an Internet communication module, which includes an open-source microcomputer and an additional GSM shield. This configuration adds $35.43 to the base cost.

Table 9

Cost of the additional module for integrating Internet communication

Component Title	Q-ty	Unit price, $	Total cost, $
Open Source Microcomputer Orange Pi One H3 (512 MB)	1	12.38	12.38
GPRS/GSM Shield SIM900	1	21.84	21.84
SIM card	1	1.21	1.21
			35.43

Table 10 lists auxiliary components that further enhance the functionality and usability of the device. These include batteries, a Type-C connector, and an external antenna, amounting to an additional $36.28.

Table 10

Cost of the additional module for integrating Internet communication

Component Title	Q-ty	Unit price, $	Total cost, $
Antenna Ant-GSM-17 sm	1	5.58	5.58
3S Protection Board	1	1.21	1.21
Battery 18650	6	4.85	29.12
Type-C Connector	1	0.36	0.36
			36.28

In summary, the cost of the device ranges from $34.99 for the basic model to $112.53 for the fully-featured version with all additional modules and components included. This modular approach provides flexibility in tailoring the device to the user's needs and budget.

Results and Discussion

The development and testing of the vintage digital communication device prototype yielded important insights into technical, economic, and social dimensions. These findings highlight both the challenges encountered during the development process and the potential value of this device in addressing specific user needs.

Technical dimensions. The assembly and programming of the prototype revealed several technical findings, both expected and unforeseen:

Successful Integration of Components. The programming of the rotary dial functionality using Arduino Uno and the GSM Shield enabled smooth interaction between retro hardware and modern telecommunications networks; key functions – pulse dialing processing, initiating and receiving calls, and managing power cycles, were implemented effectively, demonstrating the feasibility of such integration.

Communication Interference. During testing, electromagnetic interference caused instability in communication signals. To mitigate this, an RC frequency filter (a resistor and a capacitor in series) was installed between the antenna input and ground, successfully stabilizing the signal and reducing high-frequency noise.

Power Supply Stability. The GSM module's operation was hindered by insufficient power supply, leading to erratic behavior. Adding a 1000uF 25 V capacitor between the module's ground and 5 V inputs smoothed out peak loads and ensured stable power delivery.

These technical findings underscore the importance of meticulous testing and iterative adjustments when developing devices that bridge legacy and contemporary technologies.

Economic dimensions. The economic evaluation highlights the scalability and market potential of the device:

Competitive Cost. The total cost of the device ranges from $34.99 for the basic configuration to $112.53 for the fully-featured model, making it significantly more affordable than the typical budget phone range of $150 to $350. This positions the device as an attractive option for specific niche markets.

Cost Reduction Through Wholesale Sourcing. Our cost analysis used retail component prices. In commercial production, wholesale pricing and bulk purchasing could further reduce costs, improving the device's market competitiveness.

Potential for Customization. The modular approach allows for tailored configurations based on user needs and budgets, providing flexibility in scaling production for different market segments, such as elderly users and retro technology enthusiasts.

These findings suggest that the device could achieve both economic feasibility and market differentiation, especially for underserved demographics.

Social dimensions. The device received highly positive feedback, emphasizing its social impact:

Enhancing Family Connections. Elderly users appreciated the simplicity of the device, which enabled them to communicate easily with their grandchildren and other family members. The rest of the fa-mily also valued the improved connectivity with older relatives, fostering stronger intergenerational bonds.

Appeal to Retro Enthusiasts. Retro technology enthusiasts praised the concept of integrating modern functionality into a vintage device, highlighting the innovation and nostalgia it evokes.

Promoting Social Inclusiveness. By addressing the challenges elderly individuals face with modern technology, the device promotes inclusivity, ensuring that more people can access and benefit from contemporary communication networks.

These social findings reinforce the significance of designing technology with empathy and inclusivity, creating products that bridge technological and generational divides.

The insights from these three dimensions provide a strong foundation for further refinement and exploration of the prototype's potential. These findings will also inform the conclusions and recommendations for future research and development.

Conclusions

The development and testing of the vintage digital communication device highlight the potential of adapting ICT to promote inclusivity for elderly individuals, addressing their unique challenges with modern technologies. One of the central findings is that the device provides a practical and user-friendly solution for elderly users, enabling them to communicate easily with family and friends. This aligns with studies indicating that when elderly individuals use digital technologies, they enhance their quality of life [20]. Moreover, this initiative resonates with broader discussions in Information Science about designing mechanisms for digital and social inclusion, particularly for those who are asymmetrically disadvantaged. These mechanisms aim to empower individuals with contemporary citizenship tools, fostering greater participation in the digital age [10].

By integrating modern communication technology into a familiar vintage design, the prototype demonstrates that technology can bridge generational divides. It empowers elderly users while fostering intergenerational connections, addressing both functional and emotional needs.

The device's affordability and modularity further strengthen its appeal, offering an inclusive solution that could be tailored to meet diverse needs and preferences.

While the prototype is a promising step forward, further developments and explorations are essential to enhance its impact and broaden its adoption:

Enhancing Autonomy. Some elderly users expressed concerns about connecting the device to the main grid. To address this, more effort should be put into making the device autonomous in terms of power supply. The auxiliary components we envisioned, such as batteries, can be further developed into a robust and integrated power solution, enhancing user convenience.

Expanding Feedback Collection. Current feedback is limited to a small group of relatives. Expanding the user base to include a greater audience, such as elderly users from diverse demographics, will provide more comprehensive insights into the device's usability and impact on social inclusiveness.

Collaborating with Social Authorities. Engaging with social authorities, care institutions, and social workers can provide critical feedback. Tailoring the device to meet the specific needs of social institutions could open pathways for broader adoption and integration into community support programs.

Exploring Market Potential. Beyond elderly users, the device has significant market potential among retro enthusiasts and niche markets, including retro-themed installations, hotels, events, parties, etc. Exploring these opportunities can help establish the device as both a functional tool and a design element.

Integrating 3D Printing. The application of 3D printing technology offers intriguing possibilities for cost reduction and product customization. Components of the device, including the outer case, could be 3D-printed to allow for personalization, such as engraving, colors, and retro design variations. This approach could also streamline production, especially for limited-edition runs or bespoke models tailored to user preferences. Research into the feasibility and material requirements for 3D-printing such components will be a valuable next step.

Refining Design and Features. Further efforts can focus on improving the device's durability, expanding its modular options (e. g., integrating advanced internet capabilities or multimedia features), and enhancing its user interface to cater to varying levels of tech-savviness.

Promoting Awareness. Raising awareness through collaborations with non-profits, retro tech communities, and advocacy groups for elderly inclusiveness could drive interest and adoption.

By addressing these prospects, the device has the potential to serve as a pioneering model of ICT adapted for elderly inclusiveness, fostering a meaningful blend of tradition and modernity while addressing critical social and technological challenges.

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АДАПТАЦІЯ НОВІТНІХ ТЕХНОЛОГІЙ ДЛЯ ІНКЛЮЗІЇ ЛІТНІХ ЛЮДЕЙ: РОЗРОБКА ВІНТАЖНОГО ЦИФРОВОГО ТЕЛЕФОНУ

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Анотація. У дослідженні розроблено вінтажний цифровий комунікаційний пристрій для підвищення цифрової інклюзивності серед літніх користувачів. Дослідницьке питання зосереджується на тому, як модернізація старих моделей може підвищити зручність використання та сприяти соціальній взаємодії цієї демографічної групи. Прототип пристрою успішно розроблений і продемонстрував функціонал базового зв'язку із можливістю покращення аудіо та інтернет-підключення за вартості від $34,99 до $112,53. Відгуки літніх користувачів підкреслили зручність використання. Ентузіасти ретротехнологій висловили захоплення концепцією, що свідчить про потенційну привабливість і за межами основної цільової аудиторії. Технічні виклики, зокрема нестабільність живлення та інтерференція, були вирішені під час розроблення, що підвищило надійність пристрою. Отримані результати свідчать, що адаптація ІКТ із урахуванням знайомих дизайнів може істотно підвищити інклюзію літніх людей, сприяючи їхній соціальній та цифровій інтеграції.

Ключові слова: інклюзивність, інформаційно-комунікаційні технології (ІКТ), цифровий комунікаційний пристрій, соціальна інклюзія, телефон із дисковим набором, цифрова відокремленість.