Design and Development of a Sandbox Game for Financial Security Literacy Education for Community-dwelling Elders of China

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Abstract

As China's society ages rapidly and financial services digitize quickly, the elderly face complex financial risks. Enhancing financial security literacy among the elderly is critical for protecting assets, ensuring retirement well-being, and maintaining social stability. This paper proposes integrating "sandbox gameplay", an interactive and immersive experiential learning style, into elderly financial security education. According to the learning features of community-dwelling elders, including physiological and cognitive changes, preference for visual and tangible learning, the paper presents 10 rounds of practical sandbox games such as “Wallet Assessment Adventure”, “Safe Granary Meet & Greet”, “Pension Ledger Sorting Fun”, “The 'Actors' in the Community”, “Incoming Call: Oscar-Worthy Scam Call”.Based on sandbox game, the paper elaborates the sandbox game's core gameplay, reward mechanism, and round breakdown in detail, and also proposes implementation suggestions for different application scenarios to provide an effective and innovative way for elderly financial security education.

Keywords: Community-dwelling Elders; Financial Security Literacy; Sandbox Game; Experiential Learning; Community Education

1.The financial security of community-dwelling elders of China faces significant risks amid the silver tsunami.

According to the report of Ministry of Civil Affairs of China, until the end of 2024, China's population aged 60 and above exceeds 310 million, accounting for 22% of the total population, indicating an irreversible trend of societal aging. Concurrently, financial services have become deeply integrated into daily life, with mobile payments, online wealth management, AI customer service, and other digital services becoming mainstream. While these services should, in principle, bring convenience, they have inadvertently created a "digital divide" between older adults and the modern financial system.

The elderly often have accumulated savings over their lifetimes, which makes them prime targets for financial fraud. Frequent incidents such as "reverse mortgage" scams, fraudulent financial products, telecom and online fraud, as well as "pig-butchering" scams (romance-investment traps), have led to significant financial losses and psychological trauma for many older adults. At the core of this issue is the fact that seniors' current level of financial literacy is insufficient to cope with the increasingly complex financial risk environment. Therefore, improving financial security awareness among the elderly is no longer an optional initiative—it has become essential for safeguarding personal well-being, family harmony, and social stability.lity.

2. **Enhancing the financial security literacy for community-dwelling elders of China is immediately urgent.**

Enhancing the financial security literacy addresses the real needs of a high-risk financial environment. The diversification of financial market products and the constant evolution of highly deceptive fraudulent tactics pose severe challenges to older adults. Due to limitations in information access channels, the elderly often lack the ability to discern new types of financial scams, easily falling prey to unscrupulous individuals. Therefore, enhancing their financial literacy is essentially about equipping them with the ability to identify risks and avoid financial traps.

Enhancing financial security literacy is fundamental to safeguarding personal assets and quality of life in later years. A financial fraud can deplete an elderly person's lifelong savings, not only drastically reducing their standard of living but also potentially leading to serious health problems and family conflicts.

Moreover, improving financial security literacy is essential for adapting to the digitalization of finance and benefiting from technological advances. Simply rejecting digital financial tools is not a viable solution; instead, the focus should be on guiding older adults to use modern financial services safely and effectively. With adequate literacy, seniors can acquire skills such as conducting secure mobile banking transactions, distinguishing legitimate applications from fraudulent links, and protecting sensitive personal information.

Enhancing financial security literacy is the long-term consideration for reducing family and societal burdens. Elderly individuals falling victim to scams is not only a tragedy for individual families but can also lead to a series of social problems, increasing social assistance costs and consuming judicial resources. Preventing fraud through education at the source represents a highly cost-effective social investment.

3. Learning characteristics of community-dwelling elders in financial security literacy

Current financial education activities for the elderly, conducted by communities and financial institutions, predominantly rely on traditional methods such as distributing leaflets and hosting lectures. These are often dull and monotonous in form, fail to stimulate learning interest among the elderly, and result in very low knowledge retention and application rates. Consequently, exploring a new educational model that aligns with the physical, mental, and cognitive patterns of older adults has become an urgent imperative.

Designing any educational product for the elderly must involve a deep understanding of their unique learning characteristics, and financial security education is no exception.

3.1. Cognitive and Physiological Profiles

Great Changes in Cognitive and Physiological Ability：

The learning processes of older adults are influenced by distinctive cognitive and physiological attributes that must be considered in educational design. Information processing speed is reduced. Older adults typically demonstrate a slower rate of information processing and require extended time to comprehend complex concepts.

Working memory is limited. Age-related constraints in working memory capacity present challenges in simultaneous processing and retention of multiple information elements. Common age-related sensory declines include reduced visual acuity and high-frequency auditory processing difficulties. And intelligence of problem-solving may decline with age, but accumulated knowledge remains robust.

3.2. Learning Preferences and Styles

High Preference for Experiential, Visual, and Concrete Learning Methods:

Older adults tend to rely more on their own or others' experiences rather than abstract theories. They are adept at learning through stories, cases, and analogies.

Forms that combine images and text, comics, short videos, etc., are more attractive than plain text. Visual information presentation helps reduce cognitive load and aids understanding and memory. For example, using a story of "opening a package" to metaphorically represent "information leakage after clicking an unknown link" is more impactful than a mere warning like "do not click unknown links."

The Paradoxical State of Being Both Dependent on and Unfamiliar with Online Behaviors:

An increasing number of older adults use smartphones for WeChat messaging, short video browsing, and online shopping, but their online behaviors often

contain significant security blind spots. They might be proficient in operating a specific app but lack understanding of underlying cybersecurity principles, such as permission management, personal information protection, etc.

They desire to integrate into digital life but simultaneously experience anxiety and lack of confidence, fearing that "pressing the wrong button will make the money disappear."

Older adults are afraid of mistakes and lack confidence, so creating low-stakes environments that normalize error-making as part of the learning process is essential for promoting engagement and risk-taking.

3.3 Social and Emotional Motivations

Community-dwelling older adults generally prefer group activities, and the learning process is also an important social occasion. They wish to learn through interaction, sharing, and mutual assistance.

Learning motivation is easily driven by emotion. Cases similar to their own or acquaintances' victimization experiences can greatly stimulate their willingness to learn, whereas mere lecturing tends to cause resistance and resentment.

In summary, the ideal financial security education model for the elderly should be characterized by a slow pace, concrete content, diverse formats, permission to make mistakes, and the promotion of social interaction. Sandbox gameplay precisely meets these needs.

4. Game Design Philosophy and Principles

4.1. Design Philosophy

The core design philosophy of this game is "experiential learning." It follows philosopher John Dewey's concept of "learning by doing" and David Kolb's experiential learning cycle model.

Concrete Experience (CE)

During this stage, learners engage directly in hands-on activities, immersing themselves in authentic situations through active participation. It is an affective process that encourages full involvement within a new context.

In the sandbox game, older participants take part in simulated scenarios—such as responding to a fraudulent phone call or distributing pension funds using physical props like sandbags. These activities offer immediate emotional and sensory engagement, grounding the experience in realism.

Reflective Observation (RO)

After participating, learners consciously reflect on the experience from various angles. They consider What and How questions.

Within the sandbox game, a facilitator (such as a social worker or volunteer) guides a group

discussion once each round concludes. By prompting with questions like “What signs indicated that call might be a scam?”, the facilitator encourages players to verbalize their reflections and share insights.

Abstract Conceptualization (AC)

Learners engage in logical reasoning to draw out general principles or conceptual rules from their reflections. They formulate answers to questions like “What does this mean?”

Applied to the sandbox game, the facilitator helps elders connect gameplay experiences with real-world financial safety knowledge. For example, they generalize that “any investment offering guaranteed high returns with zero risk is likely fraudulent,” or that “genuine government agencies will never ask for wire transfers over the phone.” These insights become actionable anti-fraud principles.

Active Experimentation (AE)

At this stage, learners apply newly acquired concepts in practice, testing their validity in unfamiliar contexts. This active application generates new experiences, continuing the learning cycle.

In the sandbox game, participants implement learned principles in later rounds or actual daily situations. For instance, when facing a suspicious call or an investment lure, they deliberately use the “anti-fraud principles” to assess and react—thus validating and reinforcing what they’ve learned.

4.2 Sandbox Game

Sandbox Game originally referred to a type of games whose core feature is an open, free environment that allows players to create and alter the virtual world. Applying this concept to education manifests as a highly simulated, risk-free, exploration-encouraging simulated learning system.

By allowing older adults to personally operate and make decisions within a simulated real financial environment, and immediately see the consequences of those decisions (whether good or bad), financial security knowledge can be deeply internalized, forming a conditioned reflex for risk prevention.

In the context of financial security education, the sandbox game serves as a digital "financial security laboratory." Within this laboratory, older adults can be provided things as below.

Safely "Make Mistakes"

They can click suspicious links, answer scam calls, or purchase high-yield financial products, with the only "cost" being virtual currency and system feedback

warnings, absolutely without causing real financial loss. This sense of "frustration" is precisely the best learning opportunity.

Immersive Experience

Highly replicating familiar scenes like the WeChat interface, banking apps, and incoming calls creates a strong sense of immersion, seamlessly connecting learning content with real life.

Autonomous Exploration and Discovery

Linear learning is not enforced; players are free to choose to explore different financial scenarios (e.g., supermarket payments, financial product purchases, receiving "public security" calls), discovering risk points themselves during exploration, leading to a more firm memory.

Immediate Feedback and Positive Reinforcement

Any operation receives immediate, visual feedback. Correct choices earn positive reinforcements like points and badges; wrong choices result in decreased virtual assets and pop-up,clear "anti-fraud tips" for teaching.

4.3. Fundamental Transformations achieved in Financial Security Literacy Education Learning Participation Mode Transformation

From "passive listening" to "active participation". In the sandbox game model, the role of the elderly shifts from passive listeners to active participants, significantly enhancing learning initiative.

Knowledge Transfer Method Transformation

From "abstract knowledge" to "concrete experience". Through the sandbox game, financial risk knowledge is no longer abstract theoretical text but becomes concrete and profound experiential understanding through simulated "virtual victimization".

Attitude Towards Technology Application Transformation

From "fearing technology" to "mastering technology". Through repeated practice in the sandbox game, older adults can proficiently master the safe operation of digital finance and enhance confidence in technology application.

Learning Environment Transformation

From "individual learning" to "community learning". The sandbox game allows for the design of team cooperation elements. Older adults can discuss, remind, and even compete with each other within the game, greatly enhancing the fun and social interactivity of the learning process.

5.Sandbox Game Scenarios

5.1. Game Scenario Design

Based on the provided "Silver Shield Operation" community live-action sandbox game plan, this study outlines a 10-round implementation process.

5.2 Overall Game Setting:

Game Name: Silver Shield Operation

Slogan: Guard Your Purse, Joyfully Foil Scammers!

Core Gameplay: Elderly players form "Smart Silver Agent Teams" and group to challenge all levels. Each level features community staff or volunteers acting as Non-Player Characters (NPCs), such as "scammers", "bank managers", "good neighbors", etc. Through live interaction, physical props, and fun tasks, participants learn relevant knowledge through entertainment.

Reward Mechanism: Participants receive a physical "Shield Medal" for successfully passing each level. Ultimately, based on the number of medals collected, participants can exchange them for practical gifts (e.g., eggs, towels) and are awarded an "Honorary Graduation Certificate."

This game aims to enhance the fraud prevention awareness and financial knowledge of the elderly through gamification, while also providing an interactive, educational, and entertaining community activity platform.

5.3. Round Breakdown:

Round 1：Warm-up
Learning Objective: Gain an intuitive understanding of personal spending needs and risk preferences. **Name：** Wallet Assessment Adventure **NPCs：** Enthusiastic "Community Financial Advisor" **Players' Interaction: "**Financial Preference Wheel." Players spin a large wheel, with the pointer landing on various life scenarios (e.g., "overseas travel," "hospital check-up"). **Players' Task:** Take the corresponding amount of prop bills to simulate the expenses needed for the landed scenario. **Humorous Element:** Includes a lighthearted scenario option like "Buy new speakers for square dancing."
Round 2： Hands-on:
Learning Objective: Remember the key features of core stable financial products in a relaxed atmosphere. **Name："**Safe Granary" Meet & Greet

NPCs： Three actors portraying "Uncle National Bond," "Auntie Certificate of Deposit," and "Brother Money Fund" **Players' Interaction**: "Product Speed-Dating." Each NPC introduces themselves (and the core features of their corresponding financial product) in one sentence. **Players' Task:** Players hold up signs labeled "Reliable" or "Unreliable" to vote after each introduction. **Humorous Element:** "Brother Money Fund" humorously boasts about the advantages of money market funds.
Round 3： Contest
Learning Objective: Practice pension fund allocation through hands-on participation to strengthen memory. **Name：** Pension Ledger Sorting Fun **NPCs：** Host **Players' Interaction:** "Sandbag Toss Game." Four baskets are labeled "Living Expenses," "Medical Reserve," "Entertainment," and "Emergency Fund." **Players' Task:** Each player receives 10 sandbags (representing money) and tosses them into the baskets to allocate funds; the host provides comments on each player's allocation plan. **Humorous Element:** Upbeat music plays when a sandbag lands in the "Entertainment" basket.
Round 4： Skits:
earning OObjective Identify common street scam tactics through realistic situational practice. **Name：** The 'Actors' in the Community **NPCs：** Volunteers playing the roles of "Salesman," "Miracle Doctor," and "Prize Caller" **Players' Interaction:** "Spot the Flaw." Players walk through a miniaturized scene and randomly encounter NPCs who initiate scripted interactions. **Payers'T ask:** Players must loudly point out "Where is the scammer's flaw?" (e.g., "Your 'miracle drug' has no approval number!"). **Humorous Element:** NPCs use exaggerated, comedic acting styles
Round 5： Incoming Call
Learning Objective: Practice "delay tactics" (stalling) and "verification

tactics" (fact-checking) for dealing with scam calls. **Name:** Oscar-Worthy Scam Call **NPCs:** "Actor" volunteer (interacting via phone from behind a screen) **Players' Interaction:** "Phone Answering Contest." A phone on-site rings, and players take turns answering it; the NPC uses over-the-top acting to simulate scam scenarios. **Players' Task:** Use standard response scripts to end the call. **Humorous Element:** The NPC's lines are deliberately designed with obvious flaws to create a comedic effect.
Round 6: Decryption
Learning Objective: Deconstruct the verbal tactics and traps used in health product scams. **Name:** The Conspiracy in the 'Eggs' **NPCs:** An "enthusiastic" health product salesman **Players' Interaction:** "Egg Challenge." The NPC attracts players with real eggs, then promotes a "Cosmic Energy Water Purifier" (a prop). **Players' Task:** Identify the most suspicious statement from a set of sales pitch cards; those who answer correctly win the real eggs. **Humorous Element:** The sales pitches are extremely exaggerated and absurd.
Round 7: Game Theory
Learning Objective: Understand the contagious nature and potential dangers of illegal fundraising. **Name:** High-Interest Temptation 'Tap' **NPCs:** A "mysterious wealthy" neighbor **Players' Interaction:** "Tap-on-the-Shoulder Temptation." The "wealthy" NPC taps players on the shoulder, whispers about a "secret investment project," and urges **them to recruit others.** **Players' Task:** Avoid being tapped a second time (like in a game of tag) and shout, "I refuse! This is a pyramid scheme!" **Humorous Element:** Creates a lighthearted "chase" game atmosphere.
Round 8: Observation
Learning Objective: Learn to identify red flags in online dating scams. **Name:** 'Rose Detective'

NPCs: None (a pre-recorded video is played) **Players' Interaction:** "Let's Solve the Case." A simplified video of a "romance scam" (starring actors) is played. The video pauses at key moments. **Players' Task:** Identify and articulate the red flags when the host asks, "Is there a problem here? Where?" **Humorous Element:** The "handsome guy" in the video uses obviously fake backgrounds and over-the-top lines.
Round 9: Hands-on
Learning Objective: Practice mobile payment security features with assistance. **Name:** Mobile Payment Challenge **NPCs:** Tech-savvy "grandchild-generation" volunteer **Players' Interaction:** "Grandparent-Grandchild Teamwork." Elderly participants pair up with volunteers for guided mobile phone operation. **Players' Task:** Complete levels such as "Find the Payment Function," "Set a Payment Limit," and "Identify Scam Links." **Warm Aspect:** Reduces the elderly's fear of technology through collaboration and promotes intergenerational communication.
Round 10: Finale
Learning Objective: Consolidate emergency response procedures after falling victim to fraud and create a shared collective memory. **Name:** Ultimate Defense - Shield Dance **NPCs:** Community Police Officer (real person) **Players' Interaction:** "Scenario Q&A." The police officer poses a final challenge question regarding post-fraud actions. **Players' Task:** Collaborate to arrange emergency response step cards ("Freeze Account," "Report to Police," "Preserve Evidence") in the correct operational order. **Climax:** All participants receive commemorative medals, learn a simple "Anti-Fraud Gesture Dance," and take a group photo/video.

5.4. Sandbox Game Features:

Multi-sensory & Physical Engagement

The game emphasizes whole-person participation, integrating various methods such as auditory (answering calls, discussions), visual (performance, videos), verbal expression (pointing out scam red flags, shouting cues), and physical activities (tossing sandbags, gesture dances). This approach enhances learning

impressions and memory retention through multi-channel stimulation, effectively countering the dullness of traditional lecture-based education.

Cognitive Load Optimization & Complexity Simplification

A core design principle of the game is the transformation of complexity into simplicity. It converts abstract financial risk concepts into low-threshold physical interactions and gamified tasks like "tossing sandbags". This significantly reduces the cognitive load on older adults, allowing them to intuitively grasp key concepts without processing complex information, which suits their slower information processing speed.

Psychological Safety & Emotional Regulation

Game adeptly incorporates a humor-centric strategy, using exaggerated and theatrical role-playing, such as having participants interact with "Oscar-worthy" scam actors. This approach effectively mitigates psychological resistance among older adults, who may initially fear failure or feel embarrassed about being deceived. As a result, it fosters an environment where learners can openly acknowledge mistakes and develop a more positive and receptive attitude toward learning.

Immediate Feedback & Achievement System

A system of positive reinforcement is thoroughly integrated into the game mechanics. Each successfully completed round promptly rewards players with a physical "Shield Medal" and verbal recognition from their peers. Such immediate, material, and socially embedded feedback enhances participants' sense of accomplishment, substantially strengthening their confidence and motivation to continue learning complex content.

Social Interaction & Community Integration

The game is explicitly designed to facilitate social engagement, extending well beyond individual learning. Activities such as collaborative team tasks, group debates, scenario reenactments, and a concluding collective dance and photo session directly address older adults, profound need for social connection and community belonging.

In summary, the design highlights of this sandbox game focus on: lowering the barrier to entry through multi-sensory immersion and physical interaction; ensuring psychological safety through humor and gamification; motivating learning through immediate positive feedback; and ultimately embedding the learning process within a supportive social community environment. These highlights collectively address the core challenges faced by older learners, constituting an efficient, humane, and sustainable educational intervention model.

5.5 Application Scenarios:

5.5.1 Community Scenario

Venue Selection

Familiar, easily accessible, and barrier-free locations such as community activity stations, neighborhood committee activity rooms, or classrooms in universities are chosen for the elderly. The space should be spacious, bright, and well-ventilated.

Facilitator(NPCs) Characteristics

Priority should be given to social workers, community leaders, or popular senior volunteers. They should create a relaxed, cheerful, and familiar atmosphere, like gathering old friends. The facilitator should be a patient "organizer" and "encourager."

Incentive Mechanism

Physical medals, point cards are distributed immediately upon completing tasks.

Exchange of accumulated medals or points for practical daily necessities (e.g., eggs, towels, cooking oil) is encouraged after the event.

The "Community Financial Security Guardian" honorary certificates are awarded and a simple award ceremony can be held, which greatly satisfies the elderly's desire for social recognition.

Operational Considerations

Clear pathways free of clutter are ensured to prevent tripping. Common emergency medicines and staff aware of participants' common health conditions are needed. Activity intensity should be moderate, with scheduled breaks.

Participant privacy is protected; disclosing personal financial information is avoided during the game. Facilitators should mediate promptly to prevent arguments arising from differing opinions.

Feedback and Tracking Mechanism

A "Community Financial Mutual Assistance WeChat group" is established to share anti-fraud tips and reinforce learning.

Regular sharing sessions where past participants can share experiences of successfully identifying scams are organized to create positive reinforcement.

The longevity of learning effects is evaluated through participation rates in follow-up activities and interviews.

5.5.2 Banks or Securities Company Branches

Venue Selection

The branch's customer waiting area, VIP room, or financial salon area are chosen.

Sessions during off-peak hours (e.g., weekday mornings) are scheduled on a regular basis.

Facilitator(NPCs) Characteristics

Facilitators should be the branch's financial planners or relationship managers. They possess professional financial knowledge and high authority. They act as a "professional consultant," integrating simple financial knowledge into the gameplay.

Incentive Mechanism

Priority of branch’s service channels for business transactions can be provided.

Operational Considerations

Branches typically have standard first aid facilities. Disclosing personal financial information is avoided during the game. Facilitators should mediate promptly to prevent arguments arising from differing opinions.

Feedback and Tracking Mechanism

Types of questions asked by participants during subsequent business consultations are monitored to assess if risk awareness has improved.

5.5.3 Household Setting

Venue Selection

The activity is conducted in a spacious and warm family environment like the living room or study room.

Facilitator(NPCs) Characteristics

The facilitator should be an adult child or grandchild. He or she is a "supportive family member," whose core goals are "companionship" and "encouragement". The pace should be slow, praise should be abundant, and the focus should be on willingness to try rather than completing the game.

Incentive Mechanism

Immediate, exaggerated verbal praise and applause ("You're amazing, Mom/Dad!") can be provided.

Grandchildren can create and award handmade "Best Grandpa/Grandma" certificates.

Rewards for winning could be a family outing or cooking the elder's favorite home-cooked meal.

Operational Considerations

Home is the safest environment. Still, prolonged sitting should be avoided. The elder's emotions should be considered.

Feedback and Tracking Mechanism

This is the most effective setting for tracking. Children can observe the elder's real-time reactions to suspicious calls afterwards and provide timely reminders and reinforcement.

The elder is encouraged to share newly learned knowledge in the family group chat, with family members responding actively.

The game, as a new family tradition, can be established and held regularly for sustained reinforcement.

6. Conclusion

Confronting the challenges posed by the intertwining of aging and digitization, enhancing financial security literacy among the elderly is a systematic project requiring societal wisdom and innovative methods. The financial security sandbox game, designed based on experiential learning theory, with its safety, fun, immersion, and sociality, highly aligns with the learning characteristics of the elderly demographic. It can effectively overcome the drawbacks of traditional educational models, transforming dull knowledge into profound muscle memory and risk intuition.

It is not merely a game but a safe "training ground", a new "bridge" for intergenerational communication, and a new "platform" for community service. By promoting and applying such innovative models, we can more effectively help the elderly population cross the digital divide, guard their "purses", and allow them to age with greater composure and less risk on the path to enjoying their later years.

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