The Development of the Enrichment Curriculum to Enhance Awareness and Literacy about Call Center Scams through Problem-Based Learning Integrated with AI Chatbot Technology for Third-Age University Students in Phitsanulok Municipality

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Abstract: The objectives of this research were: 1) To study the basic information for developing a curriculum to enhance Awareness and literacy about call center scams through problem-based learning (PBL) integrated with an AI chatbot for senior university students at the University of the Third Age, Phitsanulok Municipality; 2) To develop a curriculum that enhance awareness and literacy of call center scams. 3) To implement and educate the curriculum, with the following: 3.1) To assess elderly learners ' awareness of call center scams; 3.2) To explore the opinions of elderly learners toward the curriculum and 4) To revise and improve the curriculum for enhancing awareness of call center scams. The sample group consisted of 18 senior students enrolled in the "Computer and Social Media Use" course at the University of the Third Age, Phitsanulok Municipality. The sample was selected through simple random sampling by drawing lots, using the class group as the sampling unit. The research instruments included: 1.the curriculum, and an awareness assessment. Statistics used in data awareness assessment. as Statistics used Average and Standard Deviation. The research findings that 1) Call center scams significantly impact elderly people 2) The Enrichment curriculum comprised five components: (1) Principles, (2) Objectives, (3) Content, (4) Activity Learning, and (5) Evaluation. 3) After participating in the curriculum, senior students demonstrated a high level of awareness of call center scams and expressed positive opinions that the curriculum effectively enhanced their awareness. 4) The curriculum was revised in terms of content, media, and the scope of participants to be more inclusive.

Keywords: Curriculum, Awareness and literacy about call center scams, Problem-Based Learning (PBL), AI Chatbot

Introduction

Thailand has now fully entered an aging society, with the number of elderly people increasing rapidly, making it the third fastest-aging country in the world. At the same time, the situation involving cyber threats and online fraud has intensified, significantly affecting the elderly. A 2024 study found that over 36 million Thais have been deceived online, with 18.37 million actually losing assets. Among the victims, 22% were elderly individuals. This situation indicates that the elderly have become a key target group for cybercriminals, due to factors such as the digital skills gap, growing up in a pre-digital era, and certain social and psychological characteristics that may make older adults more trusting or less cautious in using technology (Thai Health Promotion Foundation (ThaiHealth), 2024). The Third-Age University students in the Phitsanulok Municipality, who are elderly individuals still eager to learn and capable of self-care, represent a group of older adults who may face real-life cyber threats. These active seniors often lead independent lives and possess financial assets, making them frequent targets of fraud, especially "call center scams."

Call center scams refer to groups of criminals who use phone calls to fraudulently impersonate officials from government agencies, banks, private companies, or other trusted individuals. Their goal is to deceive victims into transferring money, disclosing personal

information, or engaging in actions that result in serious damage (Office of The National Broadcasting and Telecommunications Commission, 2024). The methods of deception are designed to cause confusion and panic, leading victims to act without careful consideration and follow the criminals' instructions. One well-known case involved an 81-year-old former employee, who received a video call from scammers impersonating police officers. He was manipulated into following instructions via the LINE application, eventually losing 19 million baht from his bank account and even mortgaging his house for another 3 million baht, totaling over 22 million baht in losses. Such repeated incidents emphasize the urgent need to build resilience in the elderly, enabling them to effectively protect themselves from cyber deception (Isranews, 2025).

Research-based solutions for addressing cyber fraud, particularly from call center scams, emphasize the importance of continuous public awareness campaigns and education initiatives to prevent victimization (Naowauraairattana, 2024). Given this context, the research team was motivated to develop a curriculum to raise awareness and prevent deception by call center scams. This was implemented through a Problem-Based Learning (PBL) approach, an instructional method where learners gain knowledge by solving complex problems. Teachers serve as facilitators of learning. The core of PBL lies in complex, real-world problems that do not have a single correct answer. Students collaborate in groups to identify what they need to learn to solve the problem, engage in Self-Directed Learning (SDL), apply their new knowledge, reflect on what they have learned, and evaluate the effectiveness of their strategies. Furthermore, the approach was integrated with AI Chatbot technology, based on research findings that interactive online learning tools, including AI chatbots, have been successfully applied to elderly learners, with the level of interactivity rated as very high (Chabjon et al., 2020). Research objectives composed of 1) To study the fundamental information for developing a curriculum to enhance awareness and literacy about call center scams using problem-based learning (PBL) integrated with an AI chatbot for senior university students at the University of the Third Age, Phitsanulok Municipality. 2) To develop a curriculum to enhance awareness and literacy about call center scams using problem-based learning integrated with an AI chatbot for senior university students at the University of the Third Age, Phitsanulok Municipality. 3) To implement and examine the outcomes of the developed curriculum, as follows: 3.1) To assess students' awareness and literacy about call center scams. 3.2) To study the opinions of elderly students toward the curriculum. 4) To revise and improve the curriculum to enhance awareness and literacy about call center scams using problem-based learning integrated with an AI chatbot for senior university students at the University of the Third Age, Phitsanulok Municipality.

Research methodology

Population and sample: The population consisted of elderly students from the University of the Third Age, Phitsanulok Municipality. The sample group consisted of 18 senior students enrolled in the "Computer and Social Media Use" course at the University of the Third Age, Phitsanulok Municipality
The research was conducted in four phases as follows:
　Phase 1: Studying Background Information
　　The researcher reviewed reports from agencies and academic documents related to the elderly, particularly focusing on digital skills development policies and the challenges faced by the elderly. The identified challenges were discussed with elderly students to gather their needs. A focus group discussion was then held with stakeholders, including

representatives from the Education Department of Phitsanulok Municipality, instructors from the University of the Third Age, and elderly learners. The discussion topics included: 1) "Today, we will talk about call center scams. Has anyone heard of them?" 2) "How do these scams affect the elderly?" and 3) "What knowledge or methods do you need to protect yourself from these scams?". The data obtained were analyzed to draw conclusions for curriculum development.

Phase 2: Curriculum Development

2.1 The data from Phase 1 were used to design and draft the curriculum. The curriculum was based on the educational philosophies of Progressivism and Reconstructionism, focusing on solving real-world problems and improving society. The curriculum components followed the model of Bousonte (2019), which includes:(1) Principles, (2) Objectives, (3) Content, (4) Learning activities, and (5) Evaluation. The curriculum was developed using Taba's (1962) model, which includes 7 steps: 1) Diagnosing needs, 2) objectives, 3) Selecting content, 4) Organizing content, 5) Selecting experiences, 6) Organizing experiences, and 7) Evaluating.

2.2 The curriculum content was structured from simple to complex and from abstract to concrete, with learning experiences selected to promote awareness. Based on related literature, problem-based learning (PBL) was chosen as a method to foster critical thinking and awareness. The learning process included 7 steps: 1.Problem Presentation 2.Problem Analysis 3.Hypothesis & Solution Mapping 4.Research and Inquiry 5.Solution Development 6.Presentation & Reflection 7.Conclusion & Evaluation (Office of the Education Council, 2007; Yuangsoi & Meesuwan, 2024; Hatipolu et al., 2023) From step 2 onward, an AI chatbot was integrated to support information delivery. Learning outcomes were measured using an awareness assessment and a learner opinion questionnaire.

2.3 The draft curriculum was validated by three experts, yielding high appropriateness (M = 4.27, S = 0.59). The curriculum was then revised based on expert recommendations and tested with 30 elderly learners (not part of the main sample) in a tryout session. Observations and feedback suggested the initial problem should reflect real-life experiences of elderly learners, and problem scenarios should be presented as video news clips with audio and animation. The chatbot should be accessible via QR code for convenience.

2.4 The curriculum was revised based on expert advice and tryout results.

Phase 3: Curriculum Implementation

3.1 The revised curriculum was implemented with the sample group to evaluate its effectiveness in promoting awareness of call center scams. Learning outcomes were assessed using a 5-point Likert's scale awareness assessment developed by the researcher. The assessment consisted of four areas: 1) Knowledge and understanding of call center scams 2) Daily behavior 3) Response to risky situations 4) Attitudes and awareness. The assessment was adapted from the National Cyber Security Agency (2024), validated by three experts, and pilot-tested with elderly learners outside the main sample. The reliability coefficient (Cronbach's Alpha) was found to be 0.81 (M = 4.48, S = 0.60), indicating high reliability.

Phase 4: Evaluation and Curriculum Improvement

After the curriculum implementation, elderly learners reflected on their experiences. Observations from the instructors and assistant teachers were also collected. These insights were used to further revise and enhance the curriculum for improved quality and completeness. Data collection conducted by explain and clarify the implementation of the learning activities based on the curriculum to the elderly learners. Also, conduct the learning activities according to the designed instructional plan and upon completion of the

learning activities, have the elderly learners complete a self-assessment form. Analyzed the data by using arithmetic mean, percentage, and standard deviation.

Research results

1. Findings from the Study of Background Information for Enrichment Curriculum Development. From interviews, informal discussions, and focus group conversations with key stakeholders—namely relevant agencies, university instructors, and elderly students—it was found that call center scams have had a significant impact on the elderly. Many participants had direct experiences with scam calls, while some had relatives who were deceived and financially affected by such scams. The forms of deception varied widely. When asked about their methods for preventing these scams, it was revealed that their basic knowledge and awareness of scam tactics were insufficient to effectively protect themselves or advise others. Therefore, all involved parties agreed that raising awareness of call center scams among the elderly is both important and urgently needed.

2. Results of Curriculum Development. The developed curriculum consisted of five key components: Principles, Objectives, Content, Learning Activity, and Evaluation (Bousonte, 2019) The researcher then developed the curriculum following Taba's (1962) seven-step model, resulting in a curriculum with the following detailed components:

Curriculum principles:

1. Emphasize self-directed learning through exploration, inquiry, problem-solving, real-life experiences, and active participation in both thinking and practice.

2. Use real-life and familiar situations as the foundation for learning, allowing learners to analyze problems, conduct research, and develop their own solutions—promoting critical thinking and real-world application.

3. Integrate artificial intelligence (AI) technology to simulate conversations with call center scammers and provide learners with tools to practice decision-making in risky scenarios.

4. Focus on group activities, discussions, and sharing of life experiences among learners to promote meaningful collaborative learning.

5. Aim to develop learners' awareness, public-mindedness, and capacity to serve as leaders or knowledge disseminators within their communities.

Curriculum Objectives:

1. To provide learners with fundamental knowledge about call center scams and preventive strategies.

2. To foster awareness and critical understanding of call center scams.

3. To ability to respond appropriately when encountering call center scams

Curriculum content

Unit 1: Origins and Deceptions of Scammers

1.1 Origins of Call Center Gangs. The content composed of 1) Use of telephone and internet technology as tools for deception. 2) Organized operations or transnational criminal networks. 3) Scammers impersonating official agencies

1.2 Types of Scams The content composed of 1) Parcel delivery scam. 2) Intimidation tactics. 3) Claims of irregular financial accounts or use of mule accounts. 4) Encouraging the victim to download malware apps. 5) Investment fraud schemes and 6) Pension-related scams

Unit 2: Warning Signs of Becoming a Victim
    2.1 Principles of Identifying Suspicious Calls
    2.2 Judging Whether the Caller Is a Call Center Scam
Unit 3: Prevention Practices and Strategies
    3.1 Actions to Take Upon Receiving a Suspicious Call
    3.2 Preventive Measures and Best Practices
Unit 4: Channels for Seeking Help
    4.1 Authorized Support Agencies
    4.2 Contact Channels

Learning Activity

Problem-Based Learning (PBL) integrated with AI Chatbot, with the following:

Step 1: Problem Presentation
- Begin with a news video or simulated case of a victim being scammed by a call center gang
- Students discuss: "Why do people fall victim to such scams?"

Step 2: Problem Analysis
- Analyze real case studies
- Identify the type of scam involved
- Students use the AI Chatbot to ask questions about each scam type

Step 3: Hypothesis and Solution Mapping
- Students hypothesize: "How would I know if I'm being scammed?"
- Propose ways to detect suspicious calls and initial decision-making strategies

Step 4: Research and Inquiry
- Practice using AI Chatbot and official websites (e.g., Thaipoliceonline.com) to search for prevention methods
- Investigate strategies and lessons from scam survivors

Step 5: Solution Development
- Design posters or short videos showing how to prevent being scammed
- Role-play phone call scenarios and safe refusal techniques

Step 6: Presentation & Reflection
- Students present posters or simulated call scenarios
- Peer feedback and suggestions for improvement

Step 7: Conclusion & Evaluation
- Summarize key knowledge on how to report cyber threats
- Complete pre- and post-learning assessments
- Reflect on lessons learned from the chatbot and activities

Assessment Criteria

To successfully complete the training program, participants must:

1. Demonstrate an improved level of awareness and understanding of call center scams (at least at a "good" level)

2. Attend at least 80% of the training activities

3. To implement and study the results of the developed curriculum as follows:

    3.1 To examine the awareness of call center scams – as shown in table 1

Table 1: Results of the Assessment Awareness and literacy about call center scams among Third-Age University Students, Phitsanulok Municipality (N=18)

Awareness and literacy about call center scams	M	SD	Interpret
1. Knowledge and understanding of call center scams	4.72	0.63	highest
2. Daily behavior	4.17	1.07	high
3. Response to risky situations	4.28	0.95	high
4. Attitudes and awareness	4.76	0.52	highest
Considering all four areas as a whole	4.48	0.86	high

From Table 1, the results of the assessment on awareness of call center scams among Third-Age University students in Phitsanulok Municipality (N=18) revealed that the overall awareness across all four aspects had an average score of 4.48, which indicates a high level of awareness.

3.2 To study the opinions of elderly learners toward the curriculum

After implementing the curriculum, the researcher conducted interviews to gather feedback on the learning activities based on Problem-Based Learning (PBL) integrated with an AI Chatbot. Elderly learners expressed that using real-world problems, case studies, news, and events related to scams by call center gangs raised their awareness and vigilance against such deceptions. They particularly strongly agreed with the use of real news as a basis for learning, analyzing, and synthesizing questions to explore root causes and appropriate response strategies when faced with scam situations. As for the AI Chatbot, elderly students stated that it was a helpful tool for seeking guidance on issues related to call center scams. However, some limitations were noted regarding access — the chatbot's application interface was too complex, which made it difficult for some learners to use.

4. Curriculum Improvement

After the learning activities were completed, elderly learners were asked to reflect on their learning experiences. Feedback from students, classroom observations by instructors and assistant teachers were used to revise and enhance the curriculum. Key areas for improvement included:

1. Post-course follow-up: Since scam tactics are evolving rapidly and continually adapting to current contexts, the curriculum should be updated to include newer scam techniques. In addition, short follow-up activities should be considered to strengthen awareness of emerging fraud schemes.

2. Simplifying access to the AI Chatbot: To enhance usability, the chatbot should be made accessible directly from the learner's smartphone screen, rather than requiring the scanning of a QR code.

3. Family involvement: Due to age-related cognitive decline, elderly learners may struggle to make decisions in real-life scam situations. Therefore, including family members in the learning process — particularly younger relatives who are more digitally literate — could help reduce the risk of elderly individuals falling victim to scams.

Discussion

1. Findings from the Preliminary Data for Curriculum Development from interviews and discussions with key stakeholders including related agencies, instructors, and elderly students several important insights emerged. It was found that call center scams significantly affect the elderly. Many had direct experiences with such scams, and some had family

members who were deceived and lost money. These scams came in various forms. When asked about how they protect themselves from such threats, it was revealed that their basic knowledge and awareness of scam tactics were insufficient to defend themselves or advise others. Therefore, all stakeholders agreed that raising awareness of call center scams among the elderly is essential and urgent. This aligns with efforts by both public and private sectors that have developed training curricula, such as the *"Senior Citizens Media Literacy Course: Stop, Think, Ask, Act — Preventing Scam Victimization"* by the Ministry of Social Development and Human Security (Phanchuphet, 2024).

2. Results of Developing the Awareness-Building Curriculum on Call Center Scams Using Problem-Based Learning (PBL) Integrated with AI Chatbot for Third-Age University Students in Phitsanulok Municipality The developed curriculum comprised five components: Principles, Objectives, Content, Activity Design, Assessment These components align with Taba (1962) and Tyler (1949), who emphasized that a curriculum should include goals, content, learning activities, and evaluation. Following Taba's seven-step model (1962), the researcher developed the curriculum as follows: (Diagnose needs – through group discussions with stakeholders and elderly learners Set objectives – based on the specific needs of the elderly learners Select content – by researching topics relevant to call center scam awareness Organize content – arranged from simple to complex, abstract to concrete. Select learning experiences – teaching methods and strategies that promote awareness. Organize learning experiences – sequencing experiences to align with the content. Evaluation – determine assessment methods and tools. The curriculum was reviewed by three experts, and the overall appropriateness rating was high (M = 4.27, S = 0.59). This is consistent with a study by Boonrod (2022), who developed a *coffee handicraft training curriculum* for higher education students using Taba's 7-step process, resulting in a very high-quality curriculum (M = 4.85, S = 0.23)

3. Results of Curriculum Implementation and Evaluation

3.1 Awareness of Call Center Scams

Assessment results revealed that overall awareness among Third-Age University students was high. This may be due to the use of real news cases as a starting point for learning within the PBL framework. In addition, the issue of deception of call center scams is a topic that is of interest to the elderly student group. This is consistent with Yuangsoi, & Meesuwan (2024) and Dhammavaddhano & Thongdee (2022) who also used real-life news to engage learners and increase interest.PBL promotes deep learning and the ability to assess complex situations. Likewise, Barrows, & Tamblyn (1980) suggested that PBL is suitable for building awareness in modern contexts, such as fake news, online privacy, and digital ethics, where learners analyze real scenarios, ask questions, critique sources, and seek knowledge from multiple perspectives (Hung, 2021).

3.2 Learners' Opinions on the Curriculum

Through post-implementation interviews, elderly students shared their experiences with PBL integrated with AI Chatbot. They expressed that real problems, case studies, news, and scam events helped them become more cautious and aware of call center scams. They particularly appreciated using current events as a basis for discussion and analysis, which led to identifying causes and practical solutions. Regarding the AI Chatbot, students said it was a useful tool for seeking guidance, though some mentioned difficulty accessing the app due to its complexity, which hindered ease of use. These findings align with Jabjone et al. (2020), who found that interactive online learning tools like AI chatbots are highly effective for elderly learners.

4. Curriculum Improvement

After implementing the learning activities, learners were invited to reflect on their experiences. Feedback from students, teachers, and assistant teachers was used to improve the curriculum. Key suggestions included: 1. post-training follow-up: As scam tactics evolve quickly, the curriculum must keep pace with new forms of deception. Periodic mini-sessions or updates may help sustain awareness. 2.Simplify AI Chatbot access: Replace QR code scanning with direct access from elderly learners' mobile devices to enhance usability. 3.Family involvement: Include family members in learning activities, as cognitive decline may reduce elderly learners' decision-making ability in scam situations. Having tech-literate relatives involved could reduce the risk of victimization. These improvements align with Bousonte (2024), who recommends consultation with stakeholders after curriculum implementation to assess success and gather insights for further development.

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