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Integration of Quick Response Code Scanning into a Hearing Health Board Game: Development, Promotion, and Satisfaction Evaluation

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With the increasing prevalence of Computer, Communication, and Consumer electronic devices product use and its impact on hearing, as well as the growing importance of sustainability concepts, in this study, we developed a digital board game grounded in universal design principles, entitled Sound Forest Adventure, for hearing health education. Suitable for ages 7 and above, the game integrates QR-code-based interactive mechanisms and is intentionally designed to be accessible and usable by individuals across different age groups. Through interactive gameplay, it aims to promote hearing protection and support physical and mental well-being by enhancing hand–eye coordination, while simultaneously conveying knowledge related to hearing health. In alignment with United Nations/UNESCO Education for Sustainable Development, updatable and expandable digital content was used to replace traditional physical cards, thereby reducing resource waste caused by card loss and repeated printing. This board game was developed using the Design-based Research methodology. Through iterative processes of analysis, design, testing, and evaluation, three game modes with varying levels of complexity were created. In this study, we conducted gameplay testing with two groups: one group used traditional paper cards, whereas the other used QR-code-based cards. The gameplay and rules were identical for both groups; the only difference lay in the event cards—one group used paper-based cards and the other used digital cards. The digital card group was provided with a tablet and a QR code event card. Participants scanned the QR code using the tablet to access the Sound Forest Adventure digital event card webpage. A five-point Likert scale questionnaire was administered to assess satisfaction with the board game. A total of 18 participants took part in the study, divided into two groups of nine. The paper card group achieved a mean score of 4.33, whereas the digital card group achieved a mean score of 4.83. A Wilcoxon signed-rank test revealed a Z value of −2.739 and a p value of 0.006, indicating a statistically significant difference between the two groups. These results suggest that participants were more satisfied with the

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digital card format than with traditional paper cards. Open-ended questionnaire responses also provided positive feedback regarding the digital cards. Finally, we recommend that future designs integrate additional technological features, increase game difficulty, and allow for offline use to avoid dependence on internet connectivity.

1. Introduction

Rowe and Kahn[1] proposed the concept of "successful aging", emphasizing the maintenance of low risk of disability and disease, high levels of cognitive and physical functioning, and active social engagement throughout the aging process in order to achieve holistic physical and mental well-being among older adults. Surveys conducted by Taiwan's Ministry of Health and Welfare indicate that approximately 70% of adults aged 65 and above perceive that their health conditions do not limit their daily activities; however, 64.88% of this population suffer from chronic diseases and the prevalence of hearing impairment is as high as 70%, the highest among all age groups.[2,3] Therefore, even when external mobility remains relatively intact, older adults still need regular exercise and adequate nutrition to improve frailty and prevent disability and dementia.[4] As individuals age, psychological stress and lifestyle changes associated with aging may give rise to mental health issues such as substance or alcohol misuse, which in turn affect nutritional absorption, hygiene habits, and memory function.[5] Adult hearing typically begins to deteriorate gradually from around the age of 50, representing an irreversible aging process that may lead to cognitive decline, increased fall risk, and emotional and social problems.[6–8] Studies have shown that the more severe the degree of hearing loss, the higher the risk of developing dementia.[9] Related studies in Taiwan have also confirmed a positive correlation between hearing loss and dementia, identifying hearing loss as a significant risk factor.[10,11] Consequently, early hearing health care and screening are recommended for middle-aged and older adults aged 45–64, along with the appropriate use of hearing aids as needed, to delay hearing deterioration and reduce the risk of dementia.[8] The World Health Organization also called for global attention to hearing health on World Hearing Day 2023, emphasizing the importance of maintaining the quality of life and reducing social burden.[12]

Csikszentmihalyi[13] noted that board games, as learning media, can provide diverse cognitive stimulation and help delay cognitive decline in older adults. Their group-based interactive nature facilitates the experience of flow during gameplay, enhancing happiness and self-worth. By understanding rules and completing game tasks, older adults can engage in cognitive training while fulfilling social needs, achieving dual benefits of health promotion and leisure. Accordingly, in this study, we integrated information technology into board game design by developing a board game that combines digital cards with a web-based system, thereby strengthening learners' hearing health awareness and overall physical and mental well-being. This approach also aligns with United Nations/UNESCO Education for Sustainable Development, which emphasizes the cultivation of health, well-being, and responsible lifestyles (SDG 3 and SDG 12). SDG 3 aims to ensure healthy lives and promote well-being for people of all ages. Through health promotion activities, preventive interventions, and educational tools—

such as health learning designs that integrate games and technology—it is possible to enhance public awareness of health-related issues and encourage the adoption of positive health behaviors. SDG 12, on the other hand, focuses on ensuring sustainable consumption and production patterns by reducing the use of single-use materials, extending product life cycles, and adopting digital and low-carbon design strategies. These approaches contribute to energy conservation, carbon reduction, and sustainable resource utilization, thereby generating positive impacts on society.[14] By replacing traditional physical cards with updatable and expandable digital content, the design reduces resource waste caused by card loss and repeated printing. This not only enhances the flexibility and lifespan of teaching materials but also reduces environmental impact, thereby achieving educational objectives that balance health promotion and sustainable development.

Through diverse forms of interaction such as cooperation, competition, and communication, board games can promote interpersonal interaction and enhance concentration through strategic and skill-based challenges, activating cognitive functions and encouraging social participation.[15,16] Chang[17] categorized the integration of digital technology and board games into three types: digital boards, digital accessories, and mobile devices. Among these, mobile devices incorporating apps, QR codes, or augmented reality effectively extend the board game experience. Previous studies have shown that integrating QR codes into board games enhances learning motivation and engagement, yielding positive learning outcomes in contexts such as marine education and medical and nursing education.[18,19] In the design of board games for older adults, emphasis should be placed on interactivity, ease of operation, memory association, and technological integration. The readability and usability of mobile device interfaces directly affect older adults' learning performance.[20,21] Lin[22] further noted that experience-oriented technology-based board games can enhance older adults' learning motivation. QR codes are now widely used in everyday contexts and offer advantages such as ease of operation, high interactivity, and flexible application. By simply scanning with a mobile device, users can access multimedia content, making QR codes more accessible than traditional digital games. On the basis of the above literature, we adopted mobile devices and QR codes in this study as a means of technological integration in digital board games to strengthen learning interaction and enhance the integration of educational and entertainment benefits.

Brown[23] proposed design-based research (DBR), which emphasizes examining the research process from a macro perspective and gradually optimizing outcomes through a cyclical mechanism of "design–implementation–testing–redesign."[24] Related studies that integrate design thinking concepts have summarized DBR into four cyclical stages, namely, analysis, design, testing, evaluation, and redesign, and have successfully applied this framework to augmented reality board games and game-based instructional material development with positive results.[25,26] Following the DBR framework, we continuously incorporated feedback and revisions during the testing and evaluation stages to ensure that the digital board game design aligned with research objectives and market needs.

2. Research Purpose

The purpose of this study is to develop a board game applicable to ages 7 and up, centered on hearing health that integrates QR code technology, using the DBR model. In addition, participant satisfaction with the game is evaluated through systematic observation and questionnaire surveys.

3. Research Method

We employed a DBR methodology to examine the feasibility and user feedback of a board game applicable to ages 7 and up, designed to accommodate users across different age groups within varied usage contexts, as well as to explore the integration of information technology into board game design. Participants were categorized into two groups—older adults and younger users—according to their respective gameplay scenarios. The two groups were not intended for direct age-based experimental comparison; instead, a user-centered design framework was adopted to systematically collect and analyze user experience data from distinct user populations engaging with the same core game design. The development process involved iterative cycles of literature review, semi-structured interviews, and multiple rounds of testing, including α and β testing phases, to progressively refine the digital board game (Fig. 1).

3.1 "Sound Forest Adventure" board game

3.1.1 Game setup instructions

First, place the game board [Figs. 2(a) and 3]. After scanning the digital event cards with the tablet [Fig. 2(b)], place them on the table to form a deck [Fig. 2(c)]. Each player selects a corner of the board and chooses a color of ear game pieces [Fig. 2(e)]. Take 4 pieces and place them in the starting point area (Fig. 3), with the red ear icon facing up [Fig. 2(e)].

3.1.2 Game rules

(1) On your turn, first move one game piece according to Chinese checkers rules, then draw 1 event card on the tablet [Fig. 2(c)].
(2) Yellow cards (Sound Cards and Good Habit Cards) and green cards (Invincible Cards) are used on yourself; red cards (Noise Cards and Bad Habit Cards) are used to attack other players [Fig. 2(d)].
(3) When game pieces show three yellow ear icons [Fig. 2(e)], you can obtain one sound token [Fig. 2(f)].
(4) When you have collected three sound tokens, you can teleport one game piece to any position, and must return the three sound tokens.
(5) The first player to move all four of their game pieces to the home area on the opposite diagonal wins (Fig. 3).

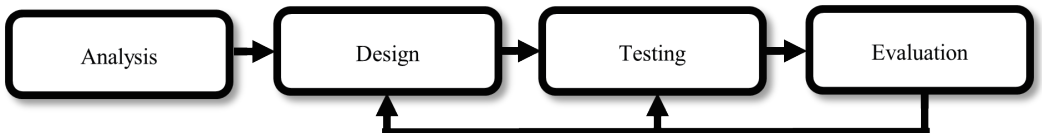


Fig. 1. DBR.

(a) (b)

(c) (d)

Fig. 2. (Color online) Digital board game components.
(a) Game board (players start from the four corners of the board; the first player to reach the diagonal home area is the winner).
(b) Digital event card (Chinese in red circle: scan this card with a mobile phone/tablet for automatic card drawing).
(c) Tablet shows event cards in the deck (upon scanning the digital event card (b) with the tablet, the screen will randomly display an event card. Chinese in red circle: obtaining one sound token: an ear game piece is in a quiet park area).
(d) Three types of color card (yellow, red, and green). [Chinese in red circle: Yellow (Sound Cards and Good Habit Cards): gain one sound token when you have an ear game piece on a quiet road area. Red (Noise Cards and Bad Habit Cards): lose one sound token when you have a red ear game piece on a noisy road area. Green (Invincible Cards): can be kept in hand and can negate one red card].

(e) (f)

Fig. 2. (Color online) (Continued) Digital board game components.
(e) Ear game pieces [There are four colors of ear game pieces (white, yellow, green, and black). Each piece has a yellow ear icon on one side and a red ear icon on the other side, which can be used to increase game difficulty based on the circumstances].
(f) Sound tokens (when three sound tokens are accumulated, the player may exchange them for one fast-move opportunity during the game, allowing a piece to move to any space on the board, including the diagonal home area).

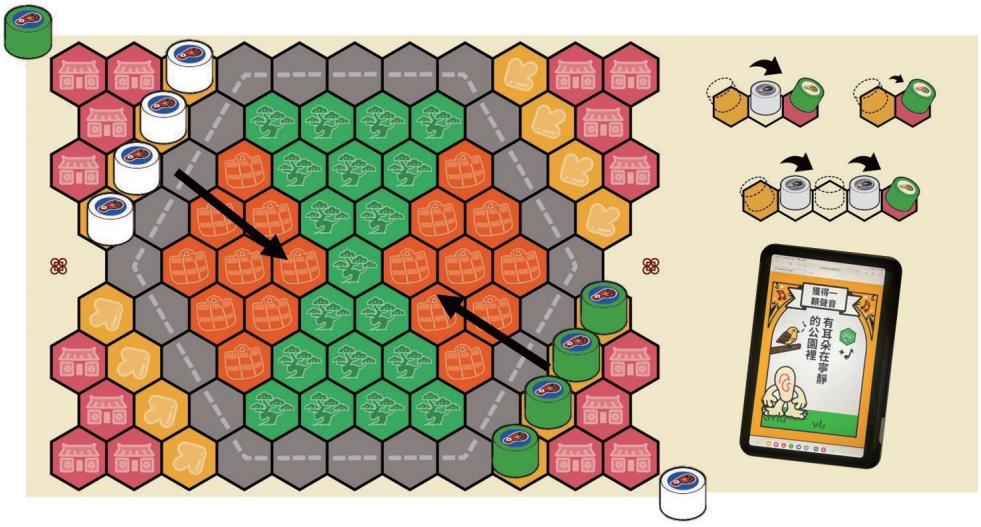


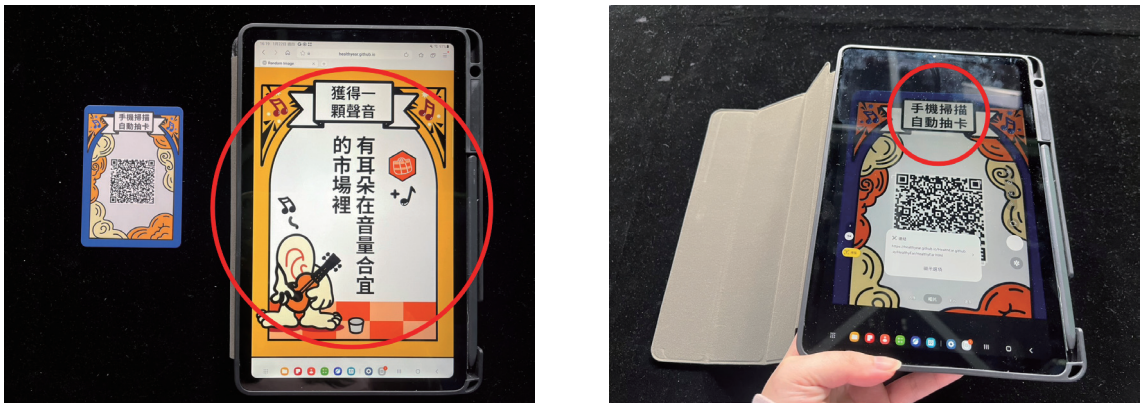
Fig. 3. (Color online) Digital board game was progressed according to advanced game rules (There are five color-coded areas: yellow: Starting Point Area, red: Home Area, gray: Road Area, orange: Market Area, and green: Park Area. Following Chinese checkers rules, the player who first moves from the Starting Point Area to the diagonally opposite Home Area wins).

3.2 Digital board game promotion activity

This promotional event first introduces the gameplay of the Sound Forest Adventure game and the usage of digital event cards. Participants use a tablet to scan the QR code on the digital event card, which directs them to the card-drawing webpage. We developed a random event card-drawing program for a digital game using Visual Studio Code. The program links each

card to corresponding hearing-related events and informational web pages. The data and images were then uploaded to GitHub Pages to create a web-based digital card-drawing system. By scanning a QR code, players can access and view the content of each game event card. By clicking on each displayed card, they can access detailed hearing care knowledge. In the game, participants refresh the webpage to draw the next card by using the "refresh" function [Figs. 4(a) and 3(b)].

During the group game, the use of tablets allows for smooth digital card drawing and ensures that all participants can clearly view the card content [Figs. 5(a) and 4(b)]. Through this process, they learned correct hearing health concepts, which help them maintain their hearing well-being. After the activity, participants are also asked to complete a feedback questionnaire, providing valuable insights for this study.



(a) (b)

Fig. 4. (Color online) Tablet scans digital event card instructions. (a) Event card and tablet (Chinese in red circle: obtaining one sound token: an ear-shaped token is located in a marketplace with an appropriate sound level). (b) Scan event card (Chinese in red circle: mobile phone scanning for automatic card drawing).

(a) (b)

Fig. 5. (Color online) Tablet replaces board game event cards (the area marked with a red circle is the tablet).

3.3 Participants

A total of 18 participants with prior experience in board games were recruited for this study and divided into two groups of nine on the basis of their gameplay formats. The older adult group used traditional printed event cards, whereas the younger group used digital QR code cards during gameplay. The group using traditional printed event cards reported an average satisfaction score of 4.33, whereas the group using the digital QR code card version reported a higher average satisfaction score of 4.83 (Table 1).

4. Research Tools

A questionnaire survey was used to collect players' testing opinions, and a five-point Likert scale was used, with "1" to "5" representing "strongly disagree" to "strongly agree", and the higher the score, the higher the degree of agreement. Considering differences in cognitive load, attention span, and response tolerance among older adults, a concise questionnaire consisting of five items was administered to this group (Table 2). The questionnaire focused on core gameplay experience and basic user perceptions in order to ensure response quality and data validity. This approach is consistent with research practices in aging-related studies that emphasize adapting measurement instruments to participants' characteristics.

In contrast, the younger participant group not only engaged in the physical board game but also interacted with a tablet device to complete game tasks by drawing digital QR code cards, which involved a higher level of information technology interaction. Accordingly, a 12-item questionnaire was designed for this group (Table 3), encompassing not only basic gameplay experience but also items related to digital interface operation, technological interactivity, and overall user experience. These items were primarily intended to collect feedback on the integration of information technology into the board game and were not used for quantitative comparisons across age groups.

Table 1
Description of participant groups.

Group	*N*	*M*	*SD*
Traditional printed event cards	9	4.33	0.543
Digital QR code cards	9	4.83	0.38
Total	18		

Table 2
Board game satisfaction survey questions (traditional printed event cards).

1.	This board game helps me better understand how hearing health care relates to lifestyle habits.
2.	This board game supports my learning in the field of hearing health care.
3.	The board game's content features readable fonts and well-designed patterns overall.
4.	This board game adds fun and makes hearing health practice more enjoyable.
5.	I would welcome opportunities to join similar hearing health care learning programs in the future.

Table 3
Board game satisfaction survey questions (digital QR code cards).

1.	I believe digital board game focused on hearing health care has significant value.
2.	This digital board game sparks my interest in exploring hearing health care further.
3.	This digital board game helps me better understand how hearing health care relates to lifestyle habits.
4.	This digital board game supports my learning about hearing health care.
5.	This digital board game inspires me to pursue additional knowledge about hearing health care.
6.	The rules of this digital board game are simple and well-explained.
7.	Operating this digital board game is easy and doesn't demand much of my time or energy.
8.	The font and visual design of this digital board game are clear and legible.
9.	This digital board game is entertaining, and I'm eager to play it again.
10.	I plan to share this digital board game with others and invite them to play.
11.	I would recommend that relevant organizations acquire this digital board game for hearing health care education and programs.
12.	I look forward to engaging in more hearing health care learning experiences like this one.

5. Results

A Wilcoxon signed-rank test indicated a significant difference ($Z = -2.739$, $p = 0.006$), suggesting higher satisfaction with the digital version compared with the traditional format (Table 4).

6. Discussion

In this study, we integrated health promotion (SDG 3) and sustainable design (SDG 12), emphasizing the two core issues of human health and environmental sustainability. Through a digital, interactive, and educational design, information technology—specifically a QR code scanning mechanism—was applied to a hearing-health board game to enhance health learning effectiveness while promoting energy conservation, carbon reduction, and sustainable resource utilization.

A total of 18 participants were divided into two groups to experience the board game in both traditional paper-card and digital card-drawing formats. The overall mean satisfaction score for both formats exceeded 4 points. The satisfaction score for the traditional card-based board game was 4.33, while participants using the digital card format reported a higher satisfaction score of 4.83. The findings regarding satisfaction with the digital board game are consistent with those of Chao *et al.*,[27] who conducted a digital board game study on healthy eating with 38 university students and reported a high participant satisfaction score of 4.71, affirming that board games can effectively enhance health and nutrition awareness. Unlike Chao *et al.*,[27] who conducted only a single satisfaction survey, we compared two different formats and found that digital board games offer greater diversity, ease of operation, enhanced interactivity, and higher scalability. Furthermore, board games encourage participants to apply strategies through cooperation and competition, thereby activating cognitive processes and improving concentration. When combined with technologies such as mobile applications, AR/VR, or QR codes and supported by

Table 4
Summary table of Wilcoxon signed-rank test for quantitative relationship concepts.

Group	Number of students	Average rank	Sum of ranks	*Z*	*P* (Two-tailed)
Traditional printed event cards	9	6.11	55.00	−2.739	.006
Digital QR code cards	9	12.89	116.00		
Total	18				

*P***<0.01

mobile devices, board games can further extend gameplay experiences, increase engagement, and enhance learning motivation. The results of this study are consistent with the positive findings of Lu *et al.*,[18] Chao *et al.*,[19] Su,[20] Chen,[21] and Lin.[22]

Owing to time constraints, this study was limited by a relatively small sample size. Future research is recommended to conduct testing and collect questionnaire feedback with larger participant groups in diverse settings to further validate the effectiveness of technology-integrated digital board games in enriching gameplay experiences while balancing educational value and enjoyment.

In this study, questionnaire instruments were designed in accordance with the characteristics of different user groups. While this approach enhanced the appropriateness and validity of data collection, it also resulted in differences in the number and content of questionnaire items between the two groups, thereby limiting the possibility of comprehensive quantitative comparisons across age groups. Future research may consider developing a core measurement scale applicable to age-inclusive populations, complemented by group-specific items, to further validate the findings of this study. Overall, this study constitutes an exploratory investigation oriented toward design application and usage contexts. Its primary focus is to examine the feasibility of age-inclusive board game design and the integration of information technology, rather than to establish causal inferences regarding age-related differences.

7. Conclusions

In this study, we adopted a DBR approach, developing this hearing health board game through iterative cycles of analysis, design, testing, and evaluation, combined with QR code scanning functionality. The game can be played using either traditional paper or digital event cards. Compared with traditional paper cards, participants expressed greater satisfaction with the digital card format, finding it more efficient to draw cards using a tablet. The random card-drawing function was considered both convenient and eco-friendly. Participants also expressed interest in exploring other forms of technology integration beyond the current approach. The inclusion of QR code scanning in the board game was praised for its convenience, as it eliminates the need for multiple physical props. The simple and accessible design received positive feedback for accommodating players from diverse backgrounds. Finally, we suggested that future developments can incorporate more technological features (for example, the game can incorporate AR/VR applications through scanning, as well as allow virtual players to participate

in the game), increase gameplay difficulty, and enable offline play to avoid reliance on internet connectivity. In the digital era, an increasing number of people are becoming accustomed to using electronic devices; therefore, there are limitless possibilities for the development of board games.

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References

1 J. W. Rowe and R. L. Kahn: The Gerontologist **37** (1997) 433. https://doi.org/10.1093/geront/37.4.433
2 Ministry of Health and Welfare: https://dep.mohw.gov.tw/dos/lp-5095-113-xCat-y106.html (accessed December 2025).
3 Ministry of Health and Welfare: https://www.mohw.gov.tw/dl-69412-2753747a-3580-4678-8eca-be1dd40b1599.html (accessed December 2025).
4 C. Wang: Changhua Christian Hospital **35** (2018) 6.
5 C. Hsieh, S. Liu, and C. Chang: J. Nursing **50** (2003) 56. https://doi.org/10.6224/JN.50.3.56
6 H.-P. Chang: National Digital Library of Theses and Dissertations in Taiwan (2008) https://hdl.handle.net/11296/rc6x59 (accessed December 2025).
7 Y. Lo, Hui. Yeh, and T. Kuo: Taiwan Geriatrics & Gerontology **16** (2021) 118. https://doi.org/10.29461/TGGa.202105_16(2).0003
8 World Health Organization: https://www.who.int/news-room/facts-in-pictures/detail/deafness (accessed December 2025).
9 F. Lin, E. Metter, R. O'Brien, S. Resnick, A. Zonderman, and L. Ferrucci: JAMA Neurol. **68** (2011) 214. https://doi.org/10.1001/archneurol.2010.362
10 C. Liu and C. Lee: JAMA Netw. Open **2** (2019) 1. https://doi.org/10.1001/jamanetworkopen.2019.8112
11 G. Livingston, J. Huntley, A. Sommerlad, D. Ames, C. Ballard, S. Banerjee, C. Brayne, A. Burns, J. Cohen-Mansfield, C. Cooper, S. G. Costafreda, A. Dias, N. Fox, L. N. Gitlin, R. Howard, H. C. Kales, M. K. FMedSci, E. B. Larson, A. O. MBChB, V. Orgeta, K. Ritchie, K. Rockwood, E. L. Sampson, Q. Samus, Lon. S. Schneider, G. Selbæk, L. Teri, and N. Mukadam: Lancet **396** (2020) 413. https://doi.org/10.1016/S0140-6736(20)30367-6
12 World Health Organization: https://www.who.int/news-room/fact-sheets/detail/deafness-and-hearing-loss (accessed December 2025).
13 Mihaly Csikszentmihalyi: Flow: The Psychology of Optimal Experience (Walk Publishing, Taipei, 2019) Chap. 4.
14 United Nations: https://sdgs.un.org/2030agenda (accessed January 2026).
15 C. Yang, M. Chen, J. Shen, and C. Kuo: J. Social Dev. Study **19** (2017) 78. https://doi.org/10.6687/JSDS.2017.19.4
16 H. Liu and L. Lin: Academic Conf. Leisure Industry and Health Promotion (2018) 5.
17 Y.-S. Chang: National Digital Library of Theses and Dissertations in Taiwan (2017). https://hdl.handle.net/11296/8j397k (accessed December 2025).
18 S. Lu, C. Chu, and F. Lu: Elementary Education **53** (2013) 4.
19 M. Chao, W. Chen, and S. Lin: J. Hsin Sheng **23** (2021) 1.
20 Y.-R. Su: National Digital Library of Theses and Dissertations in Taiwan (2019). https://hdl.handle.net/11296/u92daw (accessed December 2025).
21 X.-Y. Chen: National Digital Library of Theses and Dissertations in Taiwan (2019). https://hdl.handle.net/11296/32c763 (accessed December 2025).
22 Y. Lin: J. Healthy Life and Successful Aging **14** (2022) 19.
23 A. L. Brown: J. Learning Sciences **2** (1992) 141. https://doi.org/10.1207/s15327809jls0202_2

24 Design-Based Research Collective: Educational Researcher **32** (2003) 5. https://doi.org/10.3102/0013189X032001005
25 J. Chao, Y. Chang, Y. Yeh, and Y. Lin: Res. Educational Communications and Technology **124** (2020) 1. http://doi.org/10.6137/RECT.202012_(124).0001
26 L.-X. Seo: National Digital Library of Theses and Dissertations in Taiwan (2023). https://hdl.handle.net/11296/gzhyfe (accessed May 2025).
27 J. Chao, C. Liu, C. Chao, and Y. Zeng: The 15th IEEE & 16th Int. Conf. Science, Education and Viable Engineering (2025).

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