

Article

Research on Self-Developed Children's Epidemic Prevention Picture Nooks, Related Teaching Aids and Anti-Epidemic Objects

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Abstract: Situational picture books and teaching aids were created with epidemic prevention as the main focus of this research. Through the invention patent and design patent, this product was exhibited in the Green Idea International Invention Competition and won the bronze medal. The design concept included “mask knowledge and etiquette”, “healthy eating knowledge”, “correct steps to wash hands”, and “epidemic precautions” to make small anti-epidemic items, namely “mask creative shape stickers”, “mask pocket bags”, and “mask creative shape stickers”. There were small stickers with eyes, mouths, and ears in the shape of small animals designed to be attached to the mask to increase children's interest and willingness to wear them. The “Mask Carrying Bag” allowed children to store masks and avoid losing them after use. After the production of teaching aids, the quantitative research was completed, and the data from 100 research subjects confirmed reliability and validity through a questionnaire survey. Then, 34 education and security personnel were invited as research subjects to conduct pre-and post-tests. Through the dependent sample t-test, the effectiveness of research and development products was validated. The results showed that situational picture books, related teaching aids, and anti-epidemic objects were significantly better than traditional epidemic prevention teaching aids in improving children's hand-eye coordination, promoting children's interpersonal interaction, completing storage, promoting parent-child interaction, and practicality.

Keywords: Children's epidemic prevention picture books, Anti-epidemic objects, Teaching aids

1. Introduction

The COVID-19 epidemic was spreading, and more than 100 million people were infected worldwide. This virus is highly contagious and mainly infected by human-to-human transmission (Zhu et al., 2020). The world is trying to restore people's lives to normal. On May 8, 2019, the relevant principles of the “New Life Movement for Epidemic Prevention” were announced, including maintaining social distancing, doing personal hygiene protection, cleaning and disinfecting the environment, and implementing the real-name system and other epidemic prevention measures. It was hoped that “epidemic prevention” was integrated into life as a basic living habit of people (Xu et al., 2020).

In terms of personal protection, people need to pay attention to (1) strengthening personal resistance, (2) improving environmental factors, maintaining air circulation, and (3) avoiding going to crowded and poorly ventilated public places to reduce the chance of virus transmission. If Flu-like symptoms occur, one must seek medical attention immediately and inform the doctor of the place visited so that the doctor can diagnose the condition and provide antiviral drugs immediately (Department of Health, Executive Yuan, 2006). While people are starting a new life with epidemic prevention, children-related epidemic prevention products are rarely provided. It is believed that young children have weak immunity and need to learn to implement personal hygiene habits such as cleaning their hands often and wearing masks to avoid the spread of viruses and bacteria. As a healthy diet, it is recommended to eat more vegetables, fruits, and high-protein foods rich in vitamin C and chlorophyll such as beans, fish, meat, and eggs, to promote nutritional balance in the body. Regular exercise can promote the body's metabolic function, improve the body's immune system function, produce antibodies to prevent viruses from invading our body, and reduce the chance of being exposed to viruses.

Zhan (2012) promoted knowledge about enteroviruses and related skills on how to prevent them through health promotion teaching so that children developed good hygiene habits. Su (2016) discussed the study of the museum learning and playing together, and found that giving children a special experience and identity helps to convey the core concept of the exhibition. When

observing kindergarten children during the epidemic, masks were not worn appropriately. Therefore, the situation led to making a “children’s mask carry-on bag” with which children can carry them to prevent masks from being lost. In addition, “creative masks with creative shapes” with stickers of small eyes, mouths, and ears in different animal shapes were designed to be attached to the masks to increase children’s interest and willingness to wear them. With self-made small stickers, the masks were decorated with different animal shapes. Children could be creative to make wearing a mask more fun. In addition, through situational picture books and teaching aids, children were guided to correct new concepts of epidemic prevention to enhance children’s epidemic prevention.

2. Teaching Aids

2.1. Anti-epidemic Magic Castle

Instructions for attaching accessories to masks are as follows. The following decorations were given to children first.

Food traffic lights: 1 game mat, 12 food boards, 5 scoring boxes, 40 red and green scoring balls, 24 food clay, 12 mask stickers, and 5 trains (with the epidemic prevention magic castle train shared). Anti-epidemic vanguard: 1 game mat, 1 forehead thermometer, 1 alcohol bottle, 1 goggle, 44 epidemic prevention boards, 10 task boards, 1 turntable, 3 card packs, mask storage bag 7. Anti-epidemic Magic Castle: 1 game mat, 2 dice, 10 cat figures, 10 task cards (red, orange, yellow, green, blue, indigo, and purple) each, 5 chance and destiny cards (pink), 6 decorative types of grass, and 2 decorative flower beds.

Then, the instruction was given as follows.

- Level 1 (Diet traffic lights): See Figs. 1 and 2

- (1) Place the player’s train according to the train icon on the game mat;
- (2) Determine the player order and start the game in a clockwise direction;
- (3) Players can turn over a food board at will. If the food is the same as the previous one, they can move forward one square and take the scoring ball of the corresponding color of the traffic light food, for example, Chocolate (red light food), take the red scoring ball;
- (4) One player completes a circle and returns to the starting point. All players count the scoring balls in the scoring box, and the player with the highest score wins;
- (5) Players who complete the task can get a mask Miao Miao sticker, and children can paste interesting shapes on the mask.



Fig. 1. Diet traffic lights accessories.



Fig. 2. Diet traffic lights set up.

- Level 2 (Epidemic prevention soldiers): See Figs. 3 and 4

- (1) Determine the player order, the player selects a task board;
- (2) Turn the turntable, find the corresponding pattern on the gamepad with the pattern pointed by the arrow, complete the command task, and get the epidemic prevention, drawing board;

- (3) The player who collects and completes the task board wins. If the epidemic prevention board of the task board is set aside;
- (4) Players who complete the task can get a mask storage bag to store masks.



Fig. 3. Anti-epidemic vanguard accessories.



Fig. 4. Anti-epidemic vanguard set up.

- Level 3 (Anti-epidemic Magic Castle): See Figs. 5 and 6
- (1) Decide on the order of players and discuss how many dice to use? The players' trains are placed in the color squares on the game mat;
 - (2) The player rolls the dice to determine the number of steps forward, takes the corresponding color task card from the color square they reach, and completes the command task to get the task card;
 - (3) If you stay in the cat square and pick up a cat doll in the castle storage area, you can add 5 points;
 - (4) If you stay in the question mark square and get the pink chance and destiny card in the castle card area, follow the instructions on the card to complete the task;
 - (5) One player returns to the starting point after completing a circle. All players count the number of task cards in their hands, and the one with the most cards wins.



Fig. 5. Anti-epidemic magic castle accessories.



Fig. 6. Anti-epidemic magic castle set up.

2.2. Picture Books on Epidemic Prevention (See Figs. 7 and 8)

Generally, teaching aids are accompanied by “instructions”, but the instructions are only simple text descriptions, which are not practical for young children. Therefore, with their tutors’ help, we developed an “epidemic prevention picture book”. Starting with interesting stories, children were guided to correct handwashing steps, wear masks, and diet and epidemic prevention knowledge to improve their immunity. Children could learn knowledge from picture books and play games with teaching aids as learning and teaching complement each other.



Fig. 7. Picture book cover: Anti-epidemic Magic Castle.

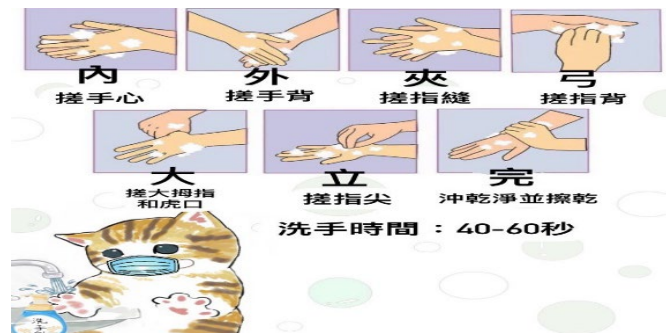


Fig. 8. Inside page of the picture book: Teach seven steps of correct handwashing. Inside page of the picture book: Qiuqiu: "Why do you have to wash your hands?" Cat: "There are often many invisible viruses and bacteria on your hands. Now let's practice the seven steps of correct handwashing to drive away viruses and bacteria together".

2.3. Anti-epidemic Objects

We developed anti-epidemic objects, namely “creative mask stickers” (see Fig. 9) and “mask portable storage bag” (See Fig. 10). “Creative Mask Stickers” was composed of small animal-shaped stickers such as small eyes, mouths, and ears which could be attached to masks to increase children’s interest and willingness to wear them. The “Mask Carrying Bag” allowed children to store masks and avoid losing them after use.



Fig. 9. Creative mask stickers.



Fig. 10. Mask portable storage bag.

3. Research Methods

We developed “epidemic prevention picture books, related teaching aids, and epidemic prevention small objects” in this research and used them for a phase-dependent sample experiment. The research subjects were invited to use traditional epidemic prevention teaching aids (warning slogans and posters) to fill out a questionnaire that was created for this research. Then, they were explained about “picture books, related teaching aids, and small objects for epidemic prevention”. A demonstration was given to children and parents, and they were asked to use them and fill out the questionnaire. The independent variable of the research was the use of commercially available traditional teaching aids and homemade teaching aids. In this research, the subjects’ scores on the “epidemic prevention scale” were used as indicators. The subjects used two anti-epidemic products at the same time, so there was no subject bias problem.

The research compiled the “epidemic prevention product scale”. After the scale was compiled, the homogeneity test and the independent sample T-test of high and low scores were carried out. Next, factor analysis and reliability analysis, and quantitative research were conducted after testing the reliability and validity of the scale. SPSS software was used for the analyses. Differences in the means of the dependent variables were compared at a significance level of 0.05. We invited 100 adult women over age 20 to conduct a pilot test. After the pre-test, item analysis was carried out, and the Pearson correlation analysis between each item and the total score was carried out. The criteria of 0.3 at the significance level of 0.05 was used for deleting insignificant variables. Then, 27% of the highest and lowest total scores were taken from the data to group the subjects into two with high and low scores respectively for an independent sample t-test.

To understand the appropriateness of the items, we conducted the KMO sampling appropriateness test. The closer the value is to 1, the higher the correlation of the variables, and the more suitable for factor analysis (Wang, 1999). The KMO value for this scale was 0.90 to meet the decision criteria. The result indicated common factors among the parent population correlation matrix which were suitable for factor analysis (Wang, 1999). Then, factor analysis was carried out, and factor loading was extracted by principal component analysis. The factor load greater than 0.30 and the eigenvalue greater than 1 were selected as the criterion for selecting the topic (Wang, 1999). The result was used for the scale analysis. The eigenvalue of factor 1 was 7.71, and the loading value was between 0.77 and 0.91. Factor 1 was named “the overall characteristics of teaching aids”, and the total variance explained by factor 1 accounted for 70.11%. The internal consistency and the reliability of the full scale and subscales were tested using Cronbach α coefficient. The reliability of the full scale was 0.96.

4. Results

34 teachers related to early childhood education were invited as research objects. The traditional anti-epidemic slogan was explained, displayed, and tried for a questionnaire survey. Then, they learned about and used picture books on epidemic prevention, related teaching aids, and anti-epidemic objects, and a questionnaire survey was conducted.

Table 1 presents the preliminary analysis result of the data including the average scores and standard deviations of each item for traditional epidemic prevention teaching aids (warning slogans and posters), and the developed picture books of epidemic prevention situations, related teaching aids, and anti-epidemic objects.

Table 1. Mean scores and standard deviations of the overall characteristic subscales.

Overall Characteristic Subscale				
Group	Traditional epidemic prevention teaching aids (Warning slogans, promotional posters)		Epidemic prevention picture books, related teaching aids, and anti-epidemic objects	
	Average	Standard Deviation	Average	Standard Deviation
1. Teaching aids stimulate children’s interest in operation and use	2.97	0.63	4.56	0.50
2. Teaching aids have educational significance	3.12	0.64	4.71	0.46
3. Teaching aids can improve children’s hand-eye coordination	2.91	0.71	4.50	0.51
4. The design of teaching aids promotes interpersonal interaction among young children	2.94	0.69	4.59	0.50
5. Teaching aids have the function of complete storage	2.82	0.76	4.65	0.49
6. Teaching aids can improve children’s ability to identify and solve problems	2.91	0.67	4.53	0.51
7. Teaching aids allow children to disassemble and combine by themselves to enhance the concept of space	2.94	0.74	4.47	0.56
8. The design of teaching aids allows children to understand the concept of a balanced diet (traffic light food) common in life	2.97	0.67	4.68	0.47
9. The design of teaching aids allows children to understand the common concepts of epidemic prevention in life (washing hands, wearing masks, elevators)	3.00	0.89	4.76	0.43
10. The picture book is rich in color and storytelling	3.06	0.60	4.79	0.41
11. Picture books can improve children’s language expression ability by observing the situation in picture books	2.88	0.69	4.71	0.46
12. Picture books can guide children to use their imagination to replace traditional teaching aids	2.94	0.74	4.74	0.45

The overall average of the subscales of “overall characteristics” was used for the dependent sample T-test. The results show that the *p*-values reached the significant level of 0.05 (Table 2). The practicability, uniqueness, operability, storytelling, and diversification of picture books, related teaching aids, and anti-epidemic objects were significantly better than those of traditional anti-epidemic slogans.

Table 2. Dependent sample T-test for subscales.

Subscale	Average number of traditional epidemic prevention teaching aids (warning signs, posters)	Average number of picture books, related teaching aids, and anti-epidemic objects	Standard deviation of traditional epidemic prevention teaching aids (warning signs, posters)	Standard deviation of picture books, related teaching aids, and anti-epidemic objects	T value
Overall characteristics	2.96	4.63	0.64	0.38	11.57 *

* *p* < 0.05

5. Conclusions

In this research, children’s epidemic prevention picture books, anti-epidemic objects, and teaching aids were developed. The 100 research subjects were invited to test the effect of the developed teaching aids. They participated in the questionnaire survey for testing its reliability and validity. 34 teachers of preschool education were invited as the research objects to use the traditional aids and the developed teaching aids to see the effect of the new teaching method. The results showed that situational picture books, related teaching aids, and anti-epidemic objects were significantly better than traditional epidemic prevention teaching aids (warning slogans, cultural posters) in enhancing children’s hand-eye coordination, promoting children’s interpersonal interaction,

functions of complete storage, promoting parent-child interaction, and practicality. The self-made epidemic prevention magic castle allowed children to disassemble or combine them by themselves to improve the concept of space and understand the concept of a balanced diet that was common in life. The function of epidemic prevention concepts was significantly better than traditional epidemic prevention teaching aids (warning slogans and cultural posters).

6. Patents

This product was patented for invention and design, which shows that the research and development content of this research is original and novel.

Chaung, Y.-J. (2022). Interactive teaching aid system. Republic of China, Invention No. I765802, May 21, 2022.

Chaung, Y.-J., & Chu, C.-I. (2022). Teaching aids. Republic of China, Design No. D219782, July 1, 2022.

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