

Article

Research on the Development and Application of Gender Equality Picture Books and Teaching Aids

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Abstract: We developed gender equality picture books and teaching aids to allow children to learn the concept of gender equality and strengthen the development of fine motor skills. This teaching aid and picture book was patented and won the golden prize in the international invent competition. We analyzed the advantages and disadvantages of commercially available teaching aids related to gender equality and improved the content by establishing the main direction of the design. To validate the usefulness of teaching aids, we created a questionnaire tested for reliability and validity. Then, 32 education and protection personnel were invited to compare traditional gender equality teaching aids and the developed teaching aids. Then, a questionnaire survey was carried out to understand the effectiveness of the developed teaching aids.

Keywords: Traffic safety teaching aids, Symbols, Picture books

1. Introduction

Gender stereotypes have resulted in gender inequalities in many societies (Nguyen and Tarp, 2022). Education is critical to the promotion, and cultivation of gender equality (Unterhalter and North, 2011). In recent years, countries have attached great importance to the issue of gender equality, and both the government and educational institutions have vigorously promoted it. Nowadays, we are in the 3C generation. Most children use 3C products at home. Using them, they can see content about gender equality. However, few parents teach their children about gender equality. In kindergartens, children also exhibited behaviors such as discrimination and ridicule towards their peers because they did not understand gender equality. Therefore, This triggered the creative motivation of the research team, through a variety of self-made teaching aids and situational picture books. By replacing traditional toy instructions with interactive situational picture books, children can learn how to operate the teaching aids from picture books. In learning, children can understand gender and begin to have appropriate mutual respect for people of the same or different genders. Children's gender equality abilities are cultivated through gender equality education, which includes three abilities: "awareness and identification", "communication and adjustment", and "care and respect". In gender education, sensory exploration is used to experience, observe, and perceive gender and physical characteristics. Children communicate with others of the same or different genders and interact with others. When interacting with others, they learn how to be tolerant and respectful. Children need to omit gender stereotypes and grow up in an equal environment.

Children over 3 years old practice fine motor development from simple handicrafts and painting activities. These activities stimulate children's brain development and hand-eye coordination. Actions such as patting, grasping, holding, tearing, pinching, and pinching hands stimulate children's brain development and improve their ability (Guo, 2013). In the 3C generation, many parents allow their children to use 3C products so that parents do housework. With this teaching aid, children improve their fine motor development while playing games. The teaching aid can be played alone or with elders and siblings to promote the bond between children and their families.

In this study, we explored how children understood gender equality when playing with teaching aids. We collected theories related to gender equality issues, and related children's games and picture books to determine the direction of product development. Then, we designed the teaching aids and picture books according to the gender equality scenario. We carried out reliability and

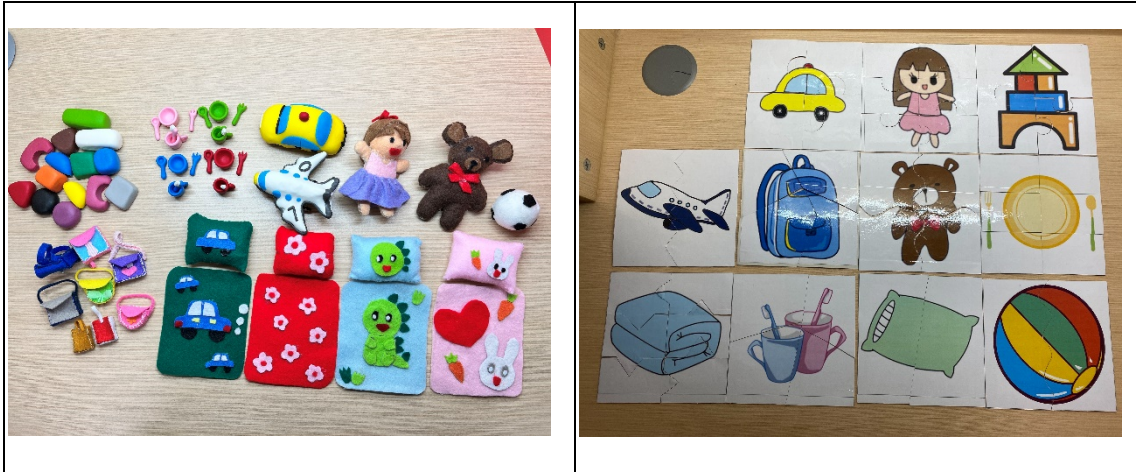
validity analysis through a questionnaire survey for 100 childcare workers. We recruited 32 children and education and childcare personnel to compare and test the effectiveness of the teaching aids using the dependent sample t-test.

2. Picture Book

The developed teaching aids and situational picture books for the education of gender equality for young children were divided into two parts. The first part was “situational picture books” which contained valuable stories and ‘teaching tools’ (McKeough et al., 2008). Being different from general picture books, situational picture books were integrated into the teaching aids. The picture book was matched with the teaching aids so that children could be more familiar with the content of the picture book and learn from the teaching aids. Picture books enhanced the parent-child interaction between parents and young children (Jones, 2022). The second part was “Gender Equality Teaching Aids”. The teaching aids allowed children to deepen the concept of gender equality. In playing, children were also trained for their motor development. They might encounter difficulties that needed help, which also enhanced the interaction between parents and children (Table 1).

Table 1. Finished picture and gameplay introduction of “Teaching Aids and Situational Picture Books for Gender Equality for Young Children”.

	<p>Situational Picture Book: Not Surprising at All Protagonists: Xiaoshuo (the male protagonist with gender stereotypes), Feifei (the heroine with short hair), Xiaofen (the coordinator who breaks the stereotype of Xiaoshuo) General idea: There are three major conflicts in picture books. One is the way you wear your hair and your hair. The second is the conflict between colors and toys. The third is family conflicts. After an adventure in the fantasy town, Xiaoshuo broke gender stereotypes and decided to apologize to Feifei. From then on, they became good friends and shared toys.</p>
	
<p>The first level: Let’s dress up together. Teaching aid content: all kinds of hairstyles, all kinds of clothes, pants, skirts, hats, glasses, bracelets, necklaces. How to play: Answer the questions on the question card, and if you answer correctly, you can choose an accessory to dress up the doll. There is no restriction that boys can only wear boys’ clothes, and girls can only wear girls’ clothes. Through wearing and undressing trousers, you can train The development of children’s putting on and taking off abilities and movements.</p>	



Level 2: Toys are fun.

Teaching aids: puzzle cards, puzzle pieces, building blocks, quilts, pillows, dolls, teddy bears, toy cars, balls, model airplanes, tableware, and bags.



How to play: First draw a picture card that you want to help the doll get, then find the correct puzzle in the puzzle pile and complete it. If you can't find the puzzle piece or can't put it together, use the picture card you drew at the beginning as the puzzle piece. On the base, follow the colors and lines on the picture card to find clues to complete the puzzle. Once completed, you can help the doll get its items.



The third hurdle: Occupation changes.

Teaching aids content: doctor accessories, nurse accessories, police accessories, firefighter accessories, postman accessories, chef accessories.

How to play: First choose a profession, answer the questions on the question card, and if you answer correctly, you can choose the accessories of a profession and dress the doll into its profession. After all the accessories are obtained, you can help the doll get a car exclusive to its profession.

<p>Monopoly</p> 	<p>Contents of teaching aids: four professional chess pieces (policeman, fireman, postman, chef), a monopoly board, and a dice.</p> <p>How to play:</p> <ol style="list-style-type: none"> 1. Players first choose the professional chess pieces they want. 2. Take turns to roll the dice. If you come to an accessory related to your profession, you can get it. 3. If there are other players on the grid of your accessories, you cannot collect your accessories in this round. 4. If you get a chance and your destiny regresses to your accessory grid, you cannot collect your accessories. 5. The first player to collect the accessories wins. 6. Other players can continue to play the game until their professional accessories are collected.
	<p>The entire teaching aid and situational picture book are finished products.</p>

3. Evaluation of Teaching Aids and Picture Books

3.1. Survey for Evaluation

We created a questionnaire by analyzing the characteristics of previous teaching aids and situational picture books about gender equality. Three experts were invited to provide opinions as a reference for the structure of the questionnaire. There were 11 questions in the questionnaire on a five-point Likert scale. Among 100 childcare workers who participated in the survey, 7 were younger than 20 years old, 40 were 21–30 years old, 26 were 31–40 years old, 20 were 41–50 years old, and 7 were over 50 years old. 85 worked for kindergartens, 10 for public childcare centers, and 5 for private childcare centers. After the pre-test with the participants, we conducted item analysis and the Pearson correlation analysis between the scores of the questions. We set the criteria as the correlation coefficient of 0.3 at a significant level of 0.05. If the correlation between the scores of questions was lower than 0.3, those were deleted. 27% of the highest and lowest total scores were taken and an independent sample t-test was conducted for the scores.

For the appropriateness of the questions, the KMO sampling appropriateness test was carried out. When the value was close to 1, the correlation between the variables was high, indicating that it was suitable for factor analysis (Wang, 1999). The KMO value of the questionnaire survey was 0.90, which meets the decision-making standard. The Bartlett spherical test results indicated that there were common factors among the correlation matrices for factor analysis (Wang, 1999). Factor analysis was carried out, and the factor loading was extracted using principal component analysis. The factor loading greater than 0.30 and the eigenvalue greater than 1 were used as the selection criteria (Wang, 1999). The results of the scale analysis are shown in Table 2. The eigenvalue of factor one was 4.61, explaining 41.91% of the total variation. The loading value of factor one ranges from 0.69 to 0.88. Factor one was “Learning concepts of gender equality teaching aids and picture books.” The eigenvalue of factor two was 3.57, explaining 32.48% of the total variation, and the loading value of factor two was between 0.65 and 0.84. Factor two was “the overall characteristics of gender equality teaching aids and picture books”. The total variation explained by the two factors accounted for

74.4%. The internal consistency test with Cronbach α coefficient was used to examine the reliability of the survey result. The reliability of “Learning Concepts of Gender Equality Teaching Aids and Picture Books” was estimated to be 0.95.

Table 2. Summary table of factor analysis of the children’s gender equality teaching aids and picture book scale.

Question Number	Content	Factor 1	Factor 2
5	Teaching aids allow young children to learn the concept of gender equality in toys	0.88	
7	Teaching aids allow young children to learn the concept of gender equality in color	0.86	
4	Teaching aids enable young children to learn the concept of gender equality in hair and wear	0.86	
8	The task cards in the teaching aids can improve children’s understanding of the concept of gender equality	0.82	
6	Teaching aids enable young children to learn gender equality concepts in occupations	0.80	
2	Picture books and teaching aids can enhance children’s understanding of the concept of gender equality	0.69	
11	This teaching aid is practical and easy to operate		0.84
9	Through the operation of teaching aids, children’s fine motor development can be improved		0.80
10	Teaching aids can be easily stored by children		0.72
1	The colors and content of picture books can attract children’s attention		0.68
3	Picture books with teaching aids can enhance children’s interest in learning		0.65
Eigenvalues		4.61	3.57
Explainable variance (%)		41.91	32.49
Cumulative Explained Variation (%)		41.91	74.40

After validating the questionnaire in terms of reliability and validity, we invited 32 childcare staff as research subjects. They used traditional teaching aids to teach gender equality and then conducted a questionnaire survey. Then, we explained and displayed how to use the developed teaching aids. After they used the developed teaching aids, a questionnaire survey was conducted again.

Table 3 presents the average scores and standard deviations of scores of questions related to the “Learning Concept” for traditional and developed teaching aids and picture books to teach gender equality.

Table 3. The average scores and standard deviations of scores for two different teaching aids on gender equality for “learning concepts of gender equality teaching aids and picture books”.

Gender equality teaching aids and picture book learning concept				
Group	Traditional gender equality teaching aids for young children		Gender equality teaching aids and situational picture books for young children	
	Average	Standard Deviation	Average	Standard Deviation
5. Teaching aids allow young children to learn the concept of gender equality in toys	2.91	0.99	4.72	0.52
7. Teaching aids allow young children to learn the concept of gender equality in color	3.00	0.95	4.72	0.46
4. Teaching aids enable young children to learn the concept of gender equality in hair and wear	2.97	0.93	4.72	0.52
8. The task cards in the teaching aids can improve children’s understanding of the concept of gender equality	2.97	0.93	4.69	0.54
6. Teaching aids enable young children to learn gender equality concepts in occupations	2.97	0.97	4.78	0.42
2. Picture books and teaching aids can enhance children’s understanding of the concept of gender equality	2.93	0.88	4.72	0.52

Table 4 presents the average scores and standard deviations of scores of questions related to “the overall characteristics of Gender Equality Teaching Aids and Picture Books” for traditional and developed teaching aids and picture books to teach gender equality.

Table 4. The average scores and standard deviations of scores for two different teaching aids on gender equality for “the overall characteristics of gender equality teaching aids and picture books”.

Group	The overall characteristic subscale of gender equality teaching aids and picture books			
	Traditional gender equality teaching aids for young children		Gender equality teaching aids and situational picture books for young children	
	Average	Standard Deviation	Average	Standard Deviation
11. This teaching aid is practical and easy to operate	3.13	0.83	4.69	0.54
9. Through the operation of teaching aids, children’s fine motor development can be improved	3.03	0.86	4.78	0.42
10. Teaching aids can be easily stored by children	3.13	0.83	4.72	0.52
1. The color and content of picture books can attract children’s attention	3.09	0.78	4.69	0.54
3. Picture books with teaching aids can enhance children’s interest in learning	3.09	0.89	4.78	0.42

The scores for “Learning Concepts of Gender Equality Teaching Aids and Picture Books” were analyzed using the dependent sample T-test (Table 5). The results showed that both the “Learning Concept” subscale and the “Overall Characteristics” showed a significant value of 0.05. The developed teaching aids for gender equality education were significantly better than traditional one in terms of “learning concept” and “overall characteristics”.







Table 5. Dependent sample T-test for subscales.

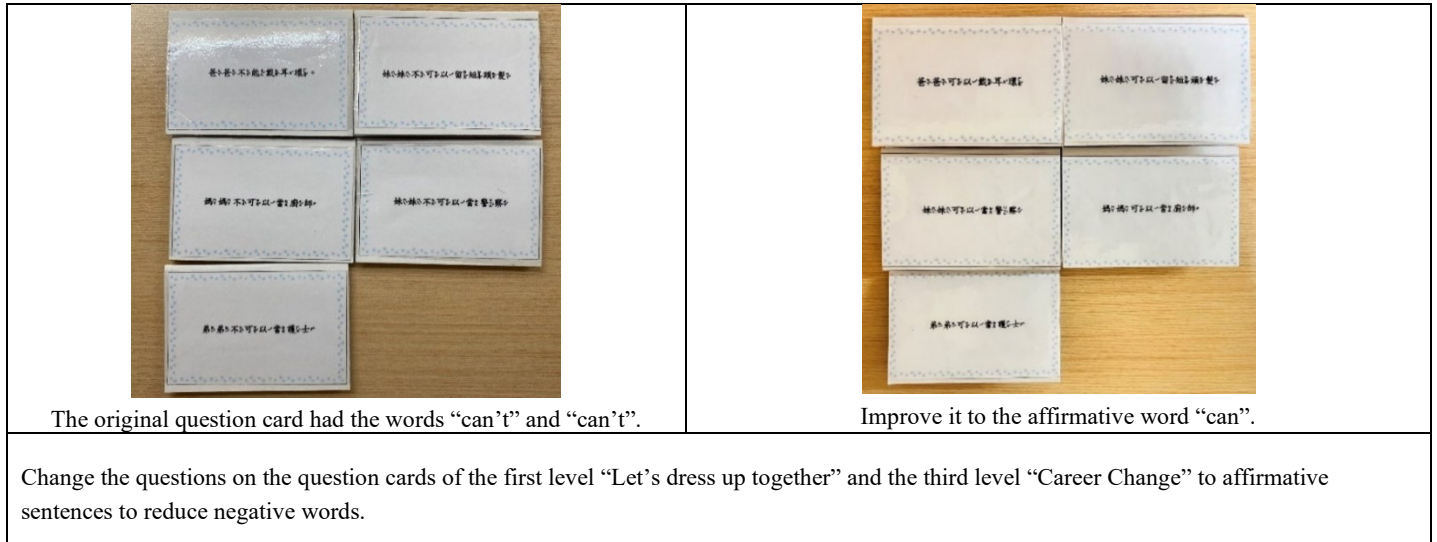
Subscale	An average number of traditional gender equality teaching aids for young children	An average number of gender equality teaching aids and situational picture books for young children	The standard deviation of traditional children’s gender equality teaching aids	Standard deviation of gender equality teaching aids and situational picture books for young children	T Value	p Value
Gender equality teaching aids and picture book learning concept	2.96	4.72	0.92	0.46	10.298*	0.000
The overall characteristics of gender equality teaching aids and picture books	3.09	4.73	0.79	0.46	10.869*	0.000

* $p < 0.05$.

Based on the result, we improved the “Gender Equality Teaching Aids and Situational Picture Books” according to the direction of improvement as shown in Table 6.

Table 6. Directions for improving works.

 <p>Puzzles added complete picture cards.</p>	 <p>Monopoly plus icon.</p>
<p>With a completed picture card, children not only refer to the clues on the picture card but also use the picture card as the base of the puzzle. This function achieved the effect of error correction.</p>	<p>In addition, there were icons of which accessories should be collected for each occupation, so that children knew which accessories needed to be collected for the occupation they chose, and they would not collect accessories that were not their own.</p>
 <p>The original pattern was less clear-cut in color.</p>	 <p>Improved to a clearer color pattern logo.</p>
<p>During the operation, it was easier to change the original color and pattern signs to colors and patterns that are more likely to have gender stereotypes, to break the gender stereotypes of children in colors and patterns.</p>	
 <p>The original apron is a Velcro felt fastening.</p>	 <p>Improved into straps for fixation.</p>
<p>Change the original Velcro felt into straps to increase the development of children's fine motor skills during the operation. In addition to sticking the Velcro felt, they can also practice tying cross knots.</p>	



4. Conclusion

We developed the “Gender Equality Situational Picture Book and Teaching Aids”. Using the teaching aids, children established the correct concept of gender equality and other cognitions by reading stories and playing with the aids. The teaching aids consisted of three parts: outfits, daily necessities and toys, and occupations. In the first level “Let’s Dress Up Together”, when children answered the questions on the question card correctly, they chose clothing or accessories to dress up. Using clothing and accessories, children established the concept of gender equality in dressing. In the second level “Toys are fun”, puzzles were used to spell out the drawn pictures. After the completion, the children obtained items. With the jigsaw puzzles, the concept of children’s space was established, and the concept of children’s gender equality was established through daily necessities and toys. In the third level “Career Change”, one of six professions (doctor, nurse, police, fireman, postman, and chef) was chosen to dress up. By playing this, children understood the concepts of different professions and genders in the same profession. Monopoly allowed children to collect career accessories to help children establish a correct concept of gender equality in careers. The quantitative research results indicated that the developed teaching aids were significantly better than traditional teaching aids for children to have “learning concepts” and “overall characteristics”.

5. Patents

Ya-Jane Chaung, Jia-Hui Wu, and Ting-Wen Huang (2023). The developed teaching aids were patented for invention and design under the patent numbers I765802 and D226086/2023.6.21-2037.11.23, respectively.

Author Contributions: Literature review, research design, questionnaire survey, the establishment of reliability and validity, statistical analysis: Y.-J. Chaung; Picture book illustration, picture and teaching aid ideas, questionnaire design, product production: J.-H. Wu and T.-W. Huang. The questionnaire survey, the establishment of reliability and validity: J.-H. Tseng. All authors have read and agreed to the published version of the manuscript.

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