Training Software Effectiveness Applied by the Mothers to Their Autistic Children at Home Remotely to Develop Their Self-Care Skills Under the Supervision of the Specialist

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Abstract: This study represented a Training software applied by mothers to their autistic children at home remotely to develop their self-care skills through computer activities such as toothbrushing, hand washing, toilet use skills, wearing and taking off clothes skills Under the supervision of the specialist, the Course-lab program will introduce the software & flowchart to define the flow of the software. The main objective of the study here is twofold, one of which is to develop the capacity of the mother in training her autistic child in self-care skills and to recognize the effectiveness of the software in developing the capacity of the autistic child. This study is based on an experimental approach. Researchers prepared a questionnaire consisting of 60 phrases to measure a child's performance on these skills before and after the use and practical application of the software. The participants consist of 11 children and 11 mothers in a six-month period, and a sample was collected from mothers and children of rehabilitation centers in the Eastern Province of Saudi Arabia. Data were analyzed by statistical methods using the SPSS program, version No. 24. The descriptive statistics were used to process data and the percentage of gains of Black's Modifies adjustments. Among the most important findings of the study was the improved performance of children in acquiring self-care skills, as well as the improved performance of mothers in applying self-care skills to their children this is reflected in Blake's modified gains to detect the effectiveness of the application 1.42, indicating acceptable and highly effective categories, and average pre-training scores calculated. (Before the introduction of the self-care skills development program for children with autism) where the average in tribal measurement was 40.13 by contrast, the corresponding average in dimensional measurement was 88.43 in favor of dimensional measurement and the calculated Z value exceeded the scheduled test value of Z (0.05 and 0.01, respectively; $p \leq 0.000$) indicating the effectiveness of the software used.

Keywords: Training Program, distance education, Self-Care skills, autistic child's mothers.

1 Introduction

Autism is a developmental disorder that infects the brain that causes the child to not mature and to be unable to perform some skills such as self-care skill. So far, small computers with unifying students have been relatively limited, such as computer-based education for children with autism by [1] and the sample consists of 13 out of 17 non-speaking, autism-infected children and attempted to use modern social networking after the opportunity has been opened to play and interact with icons on the computer, and while procedural details are incomplete, the basic principle of treatment is that self-initiated keyboard-based surveillance and video-viewing can enhance learning.

Some researchers [2] believe that the training and development of the self-care skills of autistic children are important as it enables their integration with and acceptance of ordinary peers, and in some extreme cases have been considered more important than the training of academic skills, as parents avoid the embarrassment that the son may cause them in front of others on the one hand, and a child can autism from self-reliance in the future of his next life, on the other hand.

The overall objective of training in the field of self-care is to help the child to pay independent attention to his or her basic daily needs. These tasks allow the child to achieve autonomy in his or her family life. In addition, acquiring the ability to perform tasks provides the child with the necessary capabilities to perform properly in school settings. Some school programs require the child to be self-reliant in meeting his or her personal needs.

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Some mothers of children with disabilities often deal with their children with disabilities in the areas of self-care at a level that does not lead to the development of their skills. Therefore, these mothers need help, from specialists in different fields who adapt, twist, and improve the areas of self-care, including food, drink, dressing, taking off, and using the bathroom, personal hygiene, and self-care, and the application of each of these areas for each child depends on his or her age and capacity level, [3].

There are studies on the use of computer activities with autistic children study [4,5,6] where they used computer language from drawings and logos as storytelling. These studies report that autistic children using computer-based exploratory learning systems can further attract the attention of these children, but there is a need for further experimentation to obtain concrete results.

A study [7] noted the positive impact of computer use on improving children's condition performance compared to other forms of education. Also, both [8,2] demonstrated that computer-based education promotes verbal interaction between students with autism. It also improves those social skills [9,4]. Now there has become a shift in focus from language-based education to increased visual educational support as an incentive for learning for individuals with multiple disabilities and autism, [9,4]. Comprehensive reports support this trend that autistic individuals perform better in tasks where visual skills are used [10,11]. For example, autistic individuals generally perform well in the Wechsler Intelligence Scale (WISC) Block Design test, embedded number test, and visual research, Copying impossible numbers as well as on raven matrices. Visual support is often used to teach children with autism disorder where photographs, activity tables, visual tables, or videos are particularly appropriate and stimulating for these individuals, and this is confirmed by both [10,12]. Progress in information technology has helped to integrate much of the aforementioned visual support, formulating the design of technology-based interventions for this population group [13]. These tools may help stimulate autistic children including the use of the Internet, robots, helpers, stimuli, iPods, computer-aided instructions, video, and modeling. [6,14].

Technology-based interventions have been widely used for recreational and educational purposes that enable autistic individuals to meaningfully participate in the life of the wider community by facilitating new communication, socialization, learning, and recreation and providing employment opportunities for these children. [15]

The use of technology-based interventions as effective tools helps to reduce the cost, thereby alleviating the burden on parents [16]. This technology-based intervention, especially about bringing relevant signals together that can help autistic people follow the relevant signals and discrimination, is important for developing skills and technological interventions can efficiently utilize the attention skills of individuals with autism that tend to be more sensitive to presentations that in turn help activate visual stimuli and response varieties. Technology can be used as an effective means of delivering optimal and adaptable learning contexts while supporting the option of slowly and systematically increasing complexity [15,17].

Finally, the use of technology can enhance the internal consistency and reliability of research evidence and access to reliable data, and many augmented reality tools have been used in current research as useful tools to attract children's attention such as video modeling, motivational images and instant auditory improvement as an effective and technologically advanced way to develop a variety of skills in autistic individuals [18, 19,20, 21, 16, 22,14,23]. The study of both [24,25] agreed with that trend, which indicates that video modeling helps to acquire social skills such as general procurement skills and daily life skills. That result was used in the current study, where researchers employed video modeling technology in the design of the current software. In the current research, the video was used and seen by the autistic child and then imitated what was seen by following the same steps in the order of images and training in the development of those steps sequentially and then emphasizing these steps through practical training with the help of the mother.

Computer-based training for individuals with ASD

Previous literature has indicated that using a task analysis method when designing any computer software or training is one of the important methods that can be used with individuals where the complex sequence of behaviors (tasks) in any given scenario is divided into constituent elements to adapt mission requirements to the individual needs of each child. This systematic manipulation of functions will follow the rules of the scientifically validated task analysis strategy [26,27]. That is, the scenario will be facilitated from difficult to easy and educated by allowing children to experience parts that are gradually difficult using enhancement and stimulation methods and this is mentioned in the software scenario. (Figure 1.2.3.4.5). In this sense, computer-based software and devices can be integrated into comprehensive therapeutic programs, especially when they meet the following requirements:

1. Providing multiple opportunities for children with autism to mimic typical behaviors is a key element of any treatment program.

2. To be effective, the program must not require the acquisition of advanced technical skills from professionals or treatment providers.

3. To facilitate the learning of children with autism when working with computers, these programs must include activities that differentiate multi-sensory interactions (audiovisual information) controlled environments, the use of interactive multi-level functions, individual use and autonomy, and directing surveillance to highlights.

4. When designing any program, an account must be taken of individual differences in the steps (task analysis) and progress at a rate tailored to each child's needs and incorporate immediate and consistent consequences (such as positive reinforcement) of the response.

5. Integrated data collection is necessary to assess and monitor children's progress.

Last but not least, the use of technologies has become more widespread because they are widely available, effective, and easy to use to help autistic people.

Research Problem,

The tremendous technological advances of the twenty-first century can be used and employed in the area of private education by helping individuals with autism. Particularly about the development of self-care skills.

Given the effects of the coronavirus pandemic, which has prevented most children with disabilities from attending skills development courses in integration schools or rehabilitation centers. The skills gained during the past years have sometimes deteriorated. [23] A study found that all mothers of children with autism disorder spend most of their time caring for children and less time developing self-care skills. This drew the attention of researchers to the need to prepare mothers to do so as participants in developing and improving the self-care skills of their autistic children. This has led us to develop a computerized mothers' training program that they can offer to children to train them in everyday life skills under the supervision of specialists who can watch mothers during remote training, thereby reducing public reliance on rehabilitation centers integration schools.

Research Questions

1-How effective is the training software applied by the mother to her autistic child inside the home to develop his self-care skills under the supervision of remote teachers through zoom sessions?

2-What is the level of skills of mothers of autistic children before and after applying software to develop the self-care skills of their autistic children?

Rationale

In this study, we are trying to design training software that mothers apply at home to their autistic children to develop their self-care skills under the supervision of a specialized remote follow-up to support individuals with autism and improve their performance by increasing their motivation [17,28,29]. In light of this, a computer program was designed to develop care skills to maximize learning opportunities using visual support through motivational activities, images, and the use of video modeling methods. Some research has shown that video modeling is an effective and promising way to teach everyday life skills and laundry skills [30,2,31]. The current research also aims to identify mothers' views on the ease and difficulty of applying for the program with suggestions for improvement.

2 Methodologies

Participants

The participant consists of 11 children and 11 mothers over a period of six months, and sample was collected from mothers and children of rehabilitation centers in the Eastern Province of Saudi Arabia.

Tools

This study used an *experimental approach* to choose one group of autistic children (Pre-training and post-training) The impact of the independent variable (computer software) on the approved variable (Daily Life Skills) Five skills were identified: *toothbrushing, hand washing, toilet use skills, wearing and taking off clothes skills.*

A questionnaire has been developed for tribal and remote measurement of these skills. The questionnaire consists of 60 phrases divided into 5 dimensions and relied on the Lycert trimeter for the development of alternatives to responses as

multiple-choice (Applies -Valid to some extent – Does not apply). In its final form, the tool consisted of (60) paragraphs, spread over five skills: The first skill was tooth brushing and included (17) paragraphs, the second skill was hand washing, and included (9) paragraphs, the third dimension was perseverance which, included (10) paragraphs, third skill toilet method and included (18) Paragraph, the fourth skill of dressing included (8) paragraphs and the fifth skill of dressing and included (6) paragraphs and then an open question for mothers' observations on software and suggestions for improvement and the response levels were (2) Degrees, they are (applies - applies somewhat). The following table shows the breakdown of the identification paragraphs by dimension distribution and paragraph numbers.

Table 1: The breakdown of identification paragraphs by skills and paragraph numbers for each skill indicates

N	Skills	Total Number of items in each skill	Number of items
1	brushing teeth skill	17	Q1, Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q9, Q10, Q11, Q12, Q13, Q14, Q15, Q16, Q17
2	Hand washing skill	10	Q18, Q19, Q20, Q21, Q22, Q23, Q24, Q25, Q26, Q27
3	Toilet use skill	18	Q28, Q29, Q30, Q31, Q32, Q33, Q34, Q35, Q36, Q37, Q38, Q39, Q40, Q41, Q42, Q43, Q44, Q45
4	Wear clothes skill	8	Q46, Q47, Q48, Q49, Q50, Q51, Q52, Q53
5	Taking off clothing	6	Q54, Q55, Q56, Q57, Q58, Q59
6	Open question	1	Q60
	Total	60	

validity and reliability

The study scale was sent to eight academics specializing in psychology, private education, and teaching techniques. Initially, the table consisted of 75 elements. Through arbitration some paragraphs were added or deleted, Finally, the test included 60 items. The scale is used before and after the use of the software. The mothers' application of the scale and software experimented with the supervision of (2) teachers specializing in the field to train the mothers and guide them during the application of the software and answer the questionnaire before and after the training in the software. This was done with 3 mothers of the unitary children randomly selected, to verify its clarity for both examiners and participants. Pearson's binding coefficient was used to ensure that each dimension was consistent with the overall result of the scale.

Table 2: Person's Correlation Coefficients for Autistic child's self-care skills and Total Scores

skills	Scale correlation coefficient
Toothbrushing skill	****0.899**
Hand washing skill	****0.876**
Toilet use skill	**0.783****
Wear clothes skill	**0.922
Taking off clothing	**0.812

**p ≤ 0.01

Table 2 shows that the coefficient values for each skill were positive as the coefficient came on toothbrushing (0.899), on the second skill hand washing (0.876) and third skill toilet use equal (0.783), fourth skill dressing equal (0.922), fifth skill dressing (0.812) and all correlation values are very positive and strong and significant. This demonstrates the strong relationship between the instrument's dimensions and its overall degree; It can therefore be said that all paragraphs of the questionnaire on each skill measure what they are designed for; Thus, the tool can be sincerely trusted and valid for field application of the study.

Table 3: Cronbach's Alpha and the Gettman Equation for Half-Segmentation, Measuring the self-care skills Scale's Reliability

Skills	Number of items	Cronbach's alpha	Gettman equation for half-segmentation
Toothbrushing skill	17	0.922	0.902
Hand washing skill	10	0.881	0.862
Toilet use skill	18	0.898	0.907
Wear clothes skill	8	0.912	0.874
Take off clothing	6	0.870	0.899
Scale's total reliability	59	0.966	0.845

As Table 3 From the results presented in Table 3, it is clear that the value of the constant coefficients of the instrument's

dimensions was the initial skill of tooth brushing equal to (0.922 - 0.902), the second skill of hand washing was equal to (0.881 - 0.862), the third skill toilet use was equal to (0.898) - 0.907), the fourth skill was equal to (0.912 - 0.874), the fifth skill was dressing and the general constant factor for all dimensions of the instrument is equal to (0.870 - 0.899); This is in Cronbach's alpha and Gettman equation for half-segmentation in order. The scale's total reliability was (0.966-0.845). It was clear from the foregoing that the stability value of all dimensions of the instrument is very high than the minimum acceptance; This demonstrates and emphasizes the consistency of the instrument's axes; They can therefore be relied upon in the field application of research.

Training Computer Program. The current study's researchers designed a training computer program to develop Autistic child's self-care skills across five main stages, which are outlined in the following subsections across five main stages, which are outlined in the following subsections.

First Stage: Analysis. The analysis stage targeted Autistic children (training in self-care skills using software activities), as well as mothers, who retargeted to train them in the application of their children's self-care development software under the supervision of remote teachers using Zoom sessions during the application of mothers' software.

Table 4: Educational objectives

Educational objectives	Short-Term Objective	Skill
1. The child stands in front of the laundromat. 2. The child grabs toothpaste from the designated place using his hand 3. That the child opens the toothpaste cover using the index finger and thumb 4. The child should place the paste cover next to the water tap 5. The child takes the toothbrush from the designated place using his or her hand 6. Put the toothpaste nozzle on the toothbrush surface 7. The child presses the toothpaste packaging until the paste comes out on the surface of the brush 8. The child will put the paste cover on the nozzle of the paste and close it 9. Put toothpaste in the designated place 10. That the child opens the water faucet 11. The child brushes his front teeth in a circular manner 12. The child brushes his upper teeth 13. The child brushes his or her lower teeth 14. The child brushes his upper teeth 15. That the child cleans the brush after finishing cleaning his teeth 16. The child should return the brush to her designated place 17. The child cleans his mouth with water 18. The child should dry his mouth and hands 19. The child should return the brush to its designated place.	Developing personal hygiene skills)tooth brushing(Developing dressing skills	Toothbrushing skill
1. That the child opens the water faucet 2. Wet the baby's hands with water 3. Put the soap on the baby's hands 4. The child's hands should be rubbed with soap 5. The child washes soap from his hands	Developing personal hygiene skills (hand washing)	Hand washing skill

6. The child should close the water faucet 7. The baby throws the tissue with a trash basket		
1. The child opens the bathroom door. 2. The baby locks the bathroom door 3. Take off his clothes (slightly downward) 4. The child sits on the toilet chair 5. The child should use bathroom paper or rinsing 6. The child presses the rinse toward the place of need 7. Put the rinse in place after the cleaning is completed 8. The child's place of need should be dried with a tissue 9. The child presses the toilet chair water drainage switch 10. The child is dressed 11. The child opens the bathroom door 12. The baby wet his hands with water 13. Put the soap on the baby's hands 14. The child washes his hands with water 15. The child should dry his or her hands	Developing personal hygiene skills)Toilet use skill(	Toilet use skill
1. The child is wearing underwear 2. The kid wears the shirt 3. The child should wear trousers/trousers 4. The kid wears socks 5. The child wears the shoes 6. The child wears a wool/jacket	Developing clothing skills (Wear clothes skill)	Wear clothes skill
1. The baby takes off the jacket 2. The child takes off the shoes 3. The child takes off the trousers/trousers 4. The baby takes off the shirt 5. Take off the baby socks 6. That the child takes off the underwear	Developing clothing skills (Taking off clothes skill)	Taking off clothing

Educational means to achieve the goals: a computer to "produce the entire software", educational images

Software used in the application: use of software "Photoshop, Lystra Ter, WikiNote, audio recording, and automatic optimization scheme flowchart" to produce the software in full form

Period: * Software application period be calculated*

by applying an electronic questionnaire prepared by female researchers for autistic mothers to determine the level of performance of autistic children in self-care skills from the mother's perspective.

Measured after 5 sessions per week at a daily session rate ranging from 90-120 minutes with a break of 1 to 2 minutes after 15 -20 minutes and separated as follows:

 (20-15)A minute for the first skill "tooth brushing".

Two m break when the child breaks or plays a game

(20-15)min for the r second skill "hand washing**"**

Two minutes break when the child breaks or plays a game

 (20-15)min for the third skill "bathroom use**."**

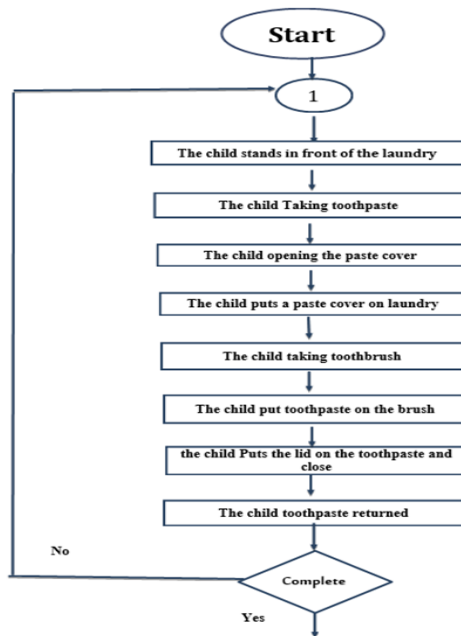Two minutes break when the child breaks or plays a game

 (20-15)minutes for the fourth skill "dressing**."**

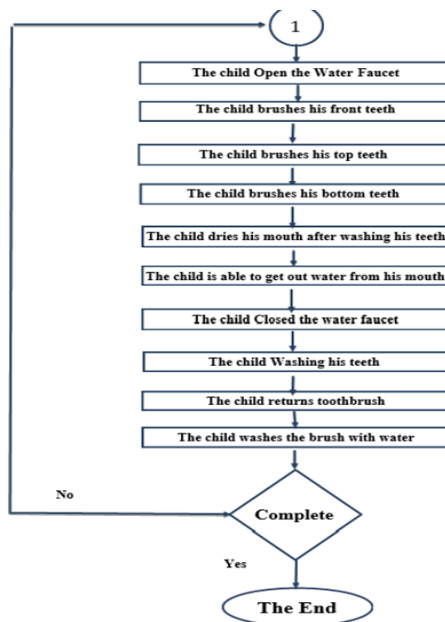Two minutes break when the child breaks or plays a game

 20-15minutes for the fifth skill "dressing**."**

Total number of hours 120 hours within 3 months and without rest time calculation

Second Stage: Design (Program Flowchart).

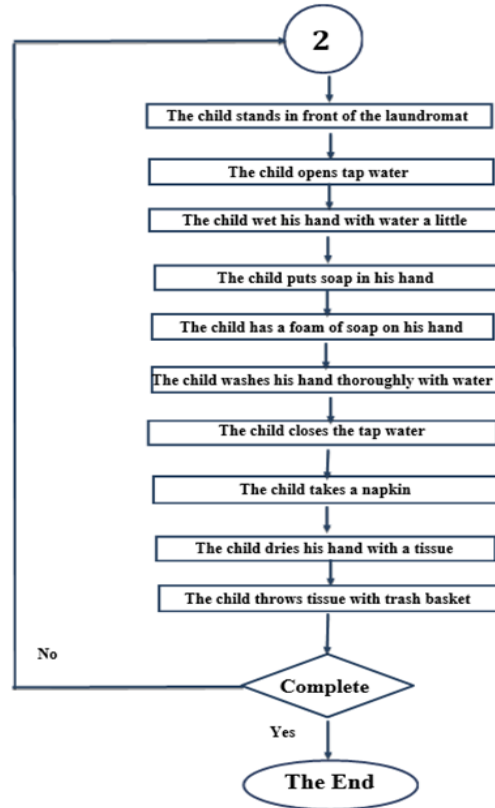**Fig. 1.1** Brushing teeth skill

Fig. 1.2 Brushing teeth skill

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                    ( 2 )
                      │
                      ▼
        ┌─────────────────────────────────────┐
        │ The child stands in front of the laundromat │
        └─────────────────────────────────────┘
                      │
                      ▼
          ┌───────────────────────────┐
          │ The child opens tap water │
          └───────────────────────────┘
                      │
                      ▼
      ┌───────────────────────────────────┐
      │ The child wet his hand with water a little │
      └───────────────────────────────────┘
                      │
                      ▼
        ┌─────────────────────────────┐
        │ The child puts soap in his hand │
        └─────────────────────────────┘
                      │
                      ▼
      ┌─────────────────────────────────┐
      │ The child has a foam of soap on his hand │
      └─────────────────────────────────┘
                      │
                      ▼
    ┌──────────────────────────────────────┐
    │ The child washes his hand thoroughly with water │
    └──────────────────────────────────────┘
                      │
                      ▼
        ┌──────────────────────────────┐
        │ The child closes the tap water │
        └──────────────────────────────┘
                      │
                      ▼
          ┌──────────────────────────┐
          │ The child takes a napkin │
          └──────────────────────────┘
                      │
                      ▼
      ┌──────────────────────────────────┐
      │ The child dries his hand with a tissue │
      └──────────────────────────────────┘
                      │
                      ▼
    ┌───────────────────────────────────────┐
    │ The child throws tissue with trash basket │
    └───────────────────────────────────────┘
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                      ▼
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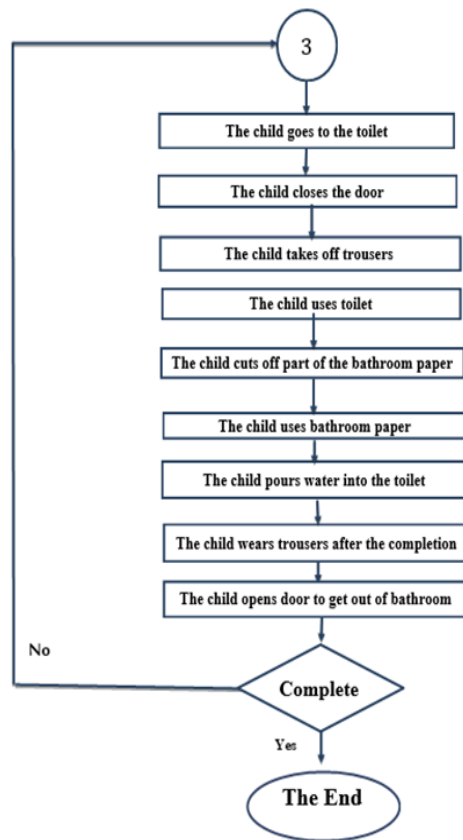
Fig. 2. Hand washing skill

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                    ( 3 )
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          ┌──────────────────────────┐
          │ The child goes to the toilet │
          └──────────────────────────┘
                      │
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          ┌──────────────────────────┐
          │ The child closes the door │
          └──────────────────────────┘
                      │
                      ▼
          ┌───────────────────────────┐
          │ The child takes off trousers │
          └───────────────────────────┘
                      │
                      ▼
            ┌────────────────────┐
            │ The child uses toilet │
            └────────────────────┘
                      │
                      ▼
      ┌────────────────────────────────────────┐
      │ The child cuts off part of the bathroom paper │
      └────────────────────────────────────────┘
                      │
                      ▼
        ┌──────────────────────────────┐
        │ The child uses bathroom paper │
        └──────────────────────────────┘
                      │
                      ▼
        ┌──────────────────────────────────┐
        │ The child pours water into the toilet │
        └──────────────────────────────────┘
                      │
                      ▼
    ┌───────────────────────────────────────────┐
    │ The child wears trousers after the completion │
    └───────────────────────────────────────────┘
                      │
                      ▼
    ┌────────────────────────────────────────────┐
    │ The child opens door to get out of bathroom │
    └────────────────────────────────────────────┘
                      │
    No                ▼
 ◄─────────────  < Complete >
                      │ Yes
                      ▼
                ( The End )
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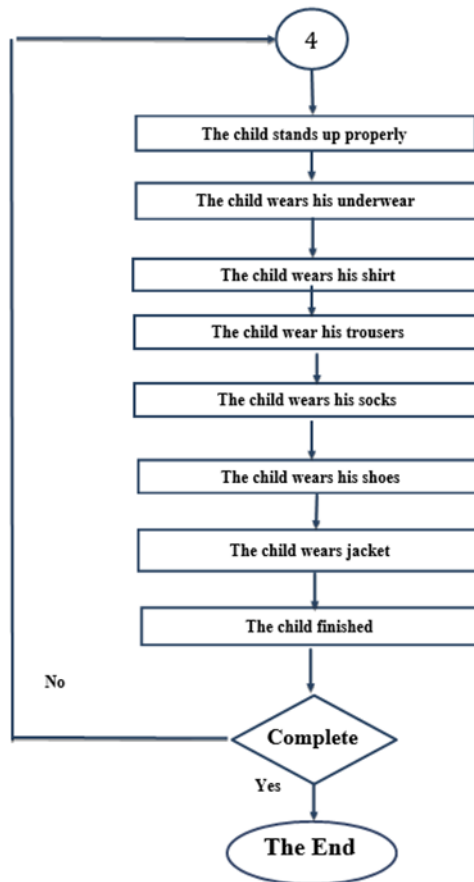
Fig. 3. Toilet use skill
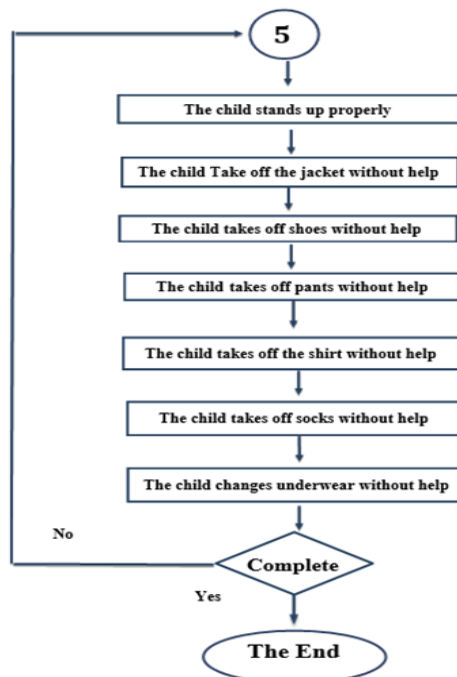
Fig. 4. Wear clothes skill

Fig. 5. Taking off clothing

Third Stage: Development. The following software was used to develop the study's program: Photoshop, Illustrator, Keynote, an audio recording and automatic optimization, a flowchart, and

a free pie chart (Figures 6–7).

Fig. 6. Story board

Fig. 7. Screen design

Fourth Stage: Implementation

Table 5: The Software's Screen Layout

Item	Description
Text properties	Font type: Helvetica, Normal Font size: 44 Font color: Black Text alignment: Center
Still pictures	Cartoon images showing skills sequences
Motion pictures	Each skill contains a set of animated images describing the chronology of the occurrence of the skill
Videos	Applied video for every skill of female researchers
Sounds	If the answer was correct: "Well done," "great answer," and "good start" If the answer was wrong: "Wrong answer" and "try again"

Mobility	Start-View Video-Next-Match Solution-Reinstatement in case of non-conformity - Enhance my voice in case of the correct answer

Fifth Stage: Evaluation.

1. Content criteria:

Table 6: Content Criteria for the Program

Criteria	0	**1**	2	3
1. Achieving general goals and objectives	No goals were achieved.	Only one goal was achieved.	Some goals were achieved.	All goals and objectives were achieved.
2. The appropriate use of pictures, videos, and sounds	All media items were used inappropriately	Two media items were used inappropriately	One media item was used inappropriately	All media items were used appropriately
3. Dividing information purposefully	Information was scattered and difficult to understand.	The information was somewhat organized but difficult to understand.	It is somewhat organized and easy to understand.	The information was organized and easy to understand.
4. Control in displaying information	Users were not allowed to control the display	Users had limited control over the display	Some screens did not allow users to control the display	Users could control the display on all screens
5. Correct spelling, grammar, and punctuation	More than four grammatical, spelling, or punctuation errors	Three or four grammatical, spelling, or punctuation errors	One or two grammatical, spelling, or punctuation errors	No errors

2. Technical criteria:

Table 7: Technical Criteria for the Program

Criteria	0	1	2	3
1. Navigation links	More than two links did not work properly	Two links did not work properly	One link did not work properly	All links worked properly
2. Pages or tabs	More than two pages did not work properly	Two pages did not work properly	One page did not work properly	All pages worked properly
3. Media items	More than two media items did not work properly	Two media items did not work properly	One media item did not work properly	All media items worked properly
4. Ease of opening the blog or running the program	Not at all easy to run	Not generally easy to run	Fairly easy to run but required a manual	Easy to run
5. Using the resources identified in the decision-making stage	The program lacked more than two resources	The program lacked two resources	The program lacked one resource	The program used all resources

Table 8: Design criteria for the Program

Criteria	**0**	**1**	**2**	**3**

1. Compatibility	The program was incompatible with the storyboards or flowcharts	The program was compatible with some of the storyboards and flowcharts	The program was compatible with all of the storyboards but not all of the flowcharts	The program was compatible with all the storyboards and flowcharts
2. Background	The background was unclear and inappropriate	The background was clear but inappropriate	The background was appropriate but unclear	The background was appropriate and clear
3. Clarity of the text	The text was difficult to read and did not contrast with the background	The text was difficult to read but contrasted against the background	The text was easy to read but did not contrast with the background	The text was easy to read and contrasted against the background
4. Navigation buttons	No navigation buttons were easy to understand	Some navigation buttons were easy to understand	Most navigation buttons were easy to understand	All navigation buttons were easy to understand
5. Reverse feedback	The reverse feedback was unstable and inappropriate	The reverse feedback was stable but inappropriate	The reverse feedback was unstable but appropriate	The reverse feedback was stable and appropriate

Statistical Methods. The SPSS Statistical Package for Social Sciences (Version 24) was used in this study with the following methods:

- Descriptive statistics of the study's variables and results.

- Blake's modified gain ratio (Blake, 1966).

- A Wilcoxon test (NPar Test) to determine the difference value (Z) for a paired sample for each math skill, determined before and after using the computer program.

3. Results

The use of this study's educational software yielded statistically significant differences ($p = 0.05$) between the mean degree ranks of participants' pre- and post-training scores, showing a post-training improvement.

Table 9: Differences between autistic children " pre- and post-training degrees in self-care skills as a whole.

Pre- and post-training scores	Mean	SD	SE	V	df	Z	Asymp. Sig.	Correlation	Deduction
Pre-	70.64	8.93	2.23	65.33	11	-9.871	0.000	**0.387**	Statistically significant difference
Post-	98.00	4.78	0.99	21.74					

Table 9 indicates that the average pre-training scores calculated for participants (before the program was used to develop the self-care skills of children with autism) through five skills (dental cleaning, hand washing, toilet use, and decorating and decorating clothes) were 70.64. By contrast, this corresponding average after training was 98.00, and the calculated Z value exceeded the scheduled Z test value (0.05 and 0.01, respectively; p ≤ 0.000). This result indicates a significant statistical difference between the average grades of children with autism before and after training, indicating post-training improvement. Thus, the results of this study demonstrated the positive impact of the program on the improvement of self-care skills and this result answers the first question of research, namely the effectiveness of a training software applied by the mother to her autistic child in the home remotely to develop his self-care skills with the help of the teacher, where she showed the effectiveness of the training software. The study [32,23] has agreed in terms of the impact of the use of

modern technology with the images, videos, and audio & visual activity in improving educational skills that researchers use in this research to improve the capabilities of autistic children in some self-care skills.

The minimum acceptance level set by Blake (1966) for the effectiveness of any training program is 1.2. Therefore:

- The scale's score for reading numbers $1.16 \approx$ and 1.2 is acceptable.

- Its numerical comparison score of $1.39 > 1.2$ shows that it is acceptable and effective.

- Its score for rounding numbers of $1.48 > 1.2$ shows that it is acceptable and highly effective.

- Its score for adding and subtracting numbers of $1.42 < 1.2$ shows that it is acceptable and highly effective.

- Its probability description of $1.02 < 1.2$ shows that it is ineffective for this skill.

- Its total mathematical skills score of $1.29 < 1.2$ indicates that it is acceptable and effective.

Table 10: Blake's Modified Gain Ratio to determine the application effectiveness in developing autistic child self-care skills

Pre- and post-training scores	*n*	Min	Max	Mean	SD
Pre-training	11	53.00	81.00	70.64	8.93
Post-training	11	91.00	109.00	98.00	4.78
Blake	11	0.86	1.45	1.42	0.182
Valid *n* (listwise)	11				

Table 10 shows the program's effectiveness through the post-training score's mean of 98.00 and standard deviation of 4.78. Blake's modified gain to detect the application's effectiveness exceeded 1.42, suggesting the categories of acceptable and highly effective.

Table 11: Differences in mothers' pre-training and post-training grades on mothers' skills in the application of self-care software for autistic children as a whole.

Pre- and post-training scores	Mean	SD	SE	V	df	Z	Asymp. Sig.	Correlation	Deduction
Pre	40.13	9.33	3.54	59.32	11	-8.987	0.000	**0**.432	Statistically significant difference
Post	88.43	3.98	0.92	26.71					

Table 11 shows that the average pre-training scores calculated to measure mothers' skills (before the introduction of the self-care skills development prog for children with autism) through five skills (dental cleaning, hand washing, toilet use, clothing decorating, and decorating) were 40.13. By contrast, this corresponding average after training was 88.43, and the calculated Z value exceeded the scheduled Z test value (0.05 and 0.01, respectively; $p \leq 0.000$). This result indicates a significant statistical difference between the average grades of children with autism before and after training, indicating post-training improvement. Thus, the result indicates significant statistical differences between the average skill scores of mothers of children with autism before and after training, indicating post-training improvement. Thus, the results of this study showed the positive impact of the program on improving the level of skills of mothers applying the training program, which helped to improve the level of children in the self-care skills of autistic children. This result answers the second question of the research. How effective is the training software applied by the mother to her autistic child inside the home to develop his self-care skills under the supervision of remote teachers through zoom sessions, as the results showed a significant improvement in the level of skills of mothers, The study of [33,23] agreed on the importance of the role of the mother as an important partner in improving the self-care skills of the autistic child.

1. Toothbrushing skills:

Table 12: Differences between autistic children " pre- and post-training degrees in Toothbrushing skill.

Toothbrushing	Mean	SD	SE	V	df	Z	Asymp. Sig.	Correlation	Deduction
4. **Pre**	**10.25**	**9.59**	**3.12**	**64.44**	**9.00**	-2.10	3.11	2.0.000	1. Statistically significant difference
5. **Post**	**38.63**	**4.66**	**1.00**	**20.43**	**29.24**				

Table 12 shows the average scores of autistic children in the performance of toothbrushing skills. Results show statistically significant differences in favor of dimensional performance averaging 38,63 and a standard deviation of 4,66 in favor of post-training results (p. < 0,05). In addition, the calculated Z value exceeded the scheduled Z test value (0.05 and 0.01, respectively; $p \leq 0.000$) indicating the effectiveness of the software and the quality of the mother's performance

in the application.

2. Hand washing skills:

Table 13: Differences between autistic children Pre- and Post-Training in the Hand Washing Skills

Hand washing	Mean	SD	SE	V	df	Z	Asymp. Sig.	Correlation	Deduction
Pre-training	10.23	1.87	0.520	3.52	11.06	-5.62	11	0.000	Statistically significant difference
Post-training	16.92	0.97	0.264	0.910	29.54				

Table 13 Average scores show children with autism before and after training in hand washing skills. The results show statistically significant differences at 0.05 in favor of remote performance with an average calculation of 16.92 and a standard deviation of 0.97. This result demonstrates the effectiveness of the software in improving children's performance on hand washing skills as well as mothers' mastery of training skills and the results of the current study are consistent with the study [24,18] In terms of the effectiveness of computer activities in improving the performance of children with autism such as video activities and iPads and varied with the current study in the way these tools and activities are used. visual activity and were heard and employed in improving life skills, which were not previously linked.

3. Toilet-using skills

Table 14: Differences between autistic children Pre- and Post-Training in the Toilet using skill

Toilet using	Mean	SD	SE	V	Mean Rank	Z	df	Asymp. Sig.	Deduction
Pre	**8.56**	**1.87**	**0.420**	**2.62**	**10.06**	**-6.22**	**11**	**0.000**	**Statistically significant difference**
Post	**13.65**	**0.82**	**0.164**	**0.814**	**24.84**				

Table 14 shows the differences between the average pre-and post-training grades of children with autism in toilet skills for remote training are shown by an average calculation of 13.65 and a standard deviation of 0.82 by an indicative ratio (p. < 0.05). Furthermore, the calculated value of Z exceeded the scheduled test value of Z (0.05 and 0.01, respectively; p ≤ 0.000) - indicating the effectiveness of programming in improving the skill of using toilets by children with autism.

4. Wearing clothes skills

Table 15: Differences between autistic children Pre- and Post-Training in the Wearing clothes skills.

Wearing clothes	Mean	SD	SE	V	Mean Rank	Z	df	Asymp. Sig.	Deduction
Pre-training	10.23	2.17	0.420	4.31	11.06	-4.62	11	0.000	Statistically significant difference
Post-training	15.95	0.81	0.164	0.820	21.54				

Table 15 shows the differences between the average grades of children with autism before and after training in clothing skills in favor of remote training with an average calculation of 15.95 and a standard deviation of 0.81 at an indicative ratio (p < 0.05). Furthermore, the calculated Z value exceeded the scheduled Z test value (0.05 and 0.01, respectively; p ≤ 0.000) - indicating a statistically significant difference in favor of post-training results. This result illustrates the effective impact of the software, which has improved the performance of children with autism in clothing skills and is consistent with the studies. [34,35,33,23] With the results of the current study in terms of the impact of computer applications to improve the performance of children with autism in social behaviors, emotions, and self-care skills.

5. Taking off clothing:

Table 16: Differences between autistic children Pre- and Post-Training in the Taking off clothing skills

Taking off clothing	Mean	SD	SE	V	Mean Rank	Z	df	Asymp. Sig.	Deduction
Pre	5.86	2.45	0.420	3.87	12.66	-7.22	11	0.000	Statistically significant difference
Post	14.65	0.65	0.064	0.614	23.84				

Table 16 shows the differences between the average grades of children with autism before and after training on dressing skills in favor of remote training with an average arithmetic of 14.65 and a standard deviation of 0.65 by an indicative ratio (p < 0.05). Furthermore, the calculated Z value exceeded the scheduled Z test value (0.05 and 0.01, respectively; p ≤ 0.000) - indicating a statistically significant difference in favor of post-training results. This result shows that the

software is effective in improving the performance of autistic children as well as the performance of mothers in applying the software.

4 Discussions

The findings of the first question indicated the effectiveness of training software to develop some self-care skills (Toothbrushing skills -Washing hands- Toilet using skills -Wearing clothes skills- Taking off clothing) have autistic children and improve the level of mothers applying this software that helps to develop those skills for their children under the supervision of specialized teachers remotely using the Zoom program to help these children and refine the skills of mothers, especially in the light of the spread of the coronavirus pandemic that has allowed researchers this idea to reduce the full reliance on centers, schools and to complement the role of mothers in these institutions, all of which are in the interest of the child with autism strike.

The results of the second question indicated that before designing a highly effective computer program, researchers found that there was a need to train mothers to improve their skills in dealing with children with autism and that this need increased in light of the spread of the coronavirus pandemic. Training mothers to apply these activities with their children under the supervision of specialists using Zoom software. In addition, the software provided questionnaires to measure the effectiveness of the program in developing my self-care skills for children with autism and measuring the level of mothers' application skills before and after the program. Accordingly, our study used illustrated electronic activities with 11 children with autism disorder and 11 mothers for children with autism. The software has proven to be effective, and this is consistent with what previous studies have referred to [36,33,37,38]. It is important to integrate computers into education.

The software has proven that computer use enhances and develops self-care skills, as noted in the studies [7,33,23]. However, the difference in this program it to empower each child's parents by learning the techniques for dealing with their children that motivate them to acquire skills more professionally, especially under the supervision of the specialists they follow during their application of the program. Interestingly, our program has achieved significant impacts in this area. This indicates that UNDP is achieving its intended objectives. Moreover, this positive result can be explained by the successful software integration of multimedia features, such as audio effects, images, graphics, and colors, this has been confirmed by previous studies [39,40].

Researchers also noted that the program helped solve one of the most important problems faced by teachers working with autistic children in their lack of concentration, attention deficit, or use of language as a barrier throughout the use of mothers and children, which helped to quickly acquire these skills. This is consistent with the findings of the study [30,2,31].

The positive results of the current study can be interpreted as evidence that the program helped children with autism disorder effectively learn targeted skills, according to their speed. Exercises and questions are provided gradually, from easy questions to difficult questions, by the task analysis strategy, where tasks have been segmented so that the child can master them, allowing children to progress between screens and exercises according to their interests and quickly suited to their training needs. The instant feedback was another important factor that may have also contributed to "developing self-care skills through the program.

5 Conclusions

The present study provided insights into the role computer software can play in developing self-care skills (Toothbrushing skills -Washing hands- Toilet using skills -Wearing clothes skills- Taking off clothing) among autistic children. Blake's modified gains (MGR) to discover the effectiveness of the program indicated that the program has effectively improved child self-care skills. In addition to upgrading mothers' training skills.

6 Recommendations

Based on these findings, researchers make several recommendations.

First: Mothers should be provided with training courses in developing self-care skills and adding other skills more easily using modern technology.

Second: Computer-based training programs should be designed using attractive and effective methods for children with autism disorder.

Third: Schools must be equipped with various types of attractive electronic programs, such as practice programs,

simulation programs, and educational games. Third, content must be presented in different ways and at different times, using a broader task analysis strategy, while providing mothers with training courses in the preparation of individual education plans to identify their children's life skills needs to be acquired.

Ethics Statement

Acknowledgment

Conflict of interest

The authors declare that there is no conflict regarding the publication of this paper.

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