Efficacy of Digital Storytelling Intervention on Social Skills Acquisition among Primary School Children

Adaorah R. Onuorah

Department of Educational Foundations, University of Nigeria, Nsukka, Enugu State, Nigeria

Key words: Digital storytelling, children, intervention, social skills acquisition, primary school

Corresponding Author:
Adaorah R. Onuorah
Department of Educational Foundations, University of Nigeria, Nsukka, Enugu State, Nigeria

Abstract: Studies show the need for improvement of social skills among school children. Therefore, the present study aimed to examine the effect of digital storytelling intervention on social skill acquisition among children in Nigerian primary school setting. A total of one hundred and twenty pupils (n = 120) with social skill impairment participated in the study. The Social Skills Rating System Child version (SSRS-C) was used in collecting data. The method of data analysis used in the study was the t-test statistic. The digital storytelling intervention significantly improved the social skills of primary school children who had social skill impairment after they were exposed to the treatment compared with their peers in the no-intervention control group. The improvement in social skills was also sustained at follow-up evaluation. Therefore, the researcher recommended that childhood educators involved in the treatment and care of children with social skills impairment be trained on the use and application of digital storytelling approach.

INTRODUCTION

Social skills deal with the children's ability to synchronize behaviours and cognitions into an integrated line of action aimed at culturally allowed interpersonal or social goals. Attached to this description also is the tendency to regularly appraise and adjust goal-directed behavior in order to optimize the chances of attaining one's goals. Lack of social skill among children can be devastating, since, children who lack social skills are neglected or unaccepted by peers and stand the risk of maladjustment later in life[1]. To buttress this point, a lot of studies[2-7] have discovered a disproportionate degree of a propensity toward mental health problems, bad conduct, school dropout, low academic performance, complicated school problems and subsequent delinquency later in life among isolated, withdrawn and unpopular children.

While Cobb[8] established that certain social skills were associated with academic success, the lack of social skill among pupils is a matter of increasing concern. The extent of this problem is echoed in an early study by Gronlund who discovered that close to 6% of third to sixth-grade pupils did not have any friends in their classrooms. Another 12% had only one friend. Similar findings were reported by Hymel and Asher[9] who found that 11% of the children in their sample had no friends. The problem of social withdrawal in children cuts across both gender proportionately[10, 11]. This has sparked the interest of many researchers who have

investigated the situation in view of finding a lasting solution through the application of some approaches.

Allen et al.[12] among other researchers[13, 14] examined the effects of social reinforcement approach in dealing with social skill deficiency among children. Whitman et al.[15] applied a similar approach using praise and food as positive reinforcers on two socially withdrawn children. In other studies[7, 16], exploration of the therapeutic utility of positive initiations approach in which socially isolated children's peers were used in initiating play was carried out. Patterson[17] employed time-out and assertion training approach. Goodwin and Mahoney[18] among other researchers[10, 11, 19, 20] have tried the use of modelling approach in helping socially isolated children. Bornstein et al.[21] among other researchers[22, 23] applied the social skills training approach. In a continuation of this line of research, Whitehill[24] investigated the efficacy of conversational skills training approach in four social isolates.

Only a few data have been published on the use of digital stories to improve social skills in children and work to date has used inadequate sample size[25] as well as the Child Behavior Checklist[26, 27] in assessing social skill impairment among children. The Child Behavior Checklist is a broadband questionnaire organized as an assessor for psychopathology in children. It has only 11 items included in its Social Skills scale, some of which can be biased by a neurological illness such as clumsiness. Correspondingly, its competence scales are not designed primarily to measure social skills. Rather, they measure the number of structured activities away from school, the time spent in activities with peers and the number of friends and other variables that may be affected by neurological issues instead of social deficits[28]. These have limited the clinical usage as well as the generalizability of the outcomes of these studies.

The goal of the current study was to investigate the efficacy of digital storytelling intervention on social skills acquisition among primary school children. The researcher compared the social skills of children in the intervention group with the social skills of their peers in the non-intervention control group before and after the intervention delivery as well as during a follow-up assessment period. We employed a standardized measure of social skills, the "Social Skills Rating System" which provides a comprehensive assessment of social skills, specifically assessing core behaviours including cooperation, assertion, responsibility, self-control and empathy and is based on research on social competence in children[29]. Thus, it was hypothesized in this study that digital storytelling intervention will have a significant positive effect on social skills acquisition of primary schoolchildren.

MATERIALS AND METHODS

Ethical considerations: This study was conducted on the approval of the author's institution's departmental research ethics committee. Parents of the participants gave their written approval by filling the informed consent form. The researcher also adhered to the ethical requirements for research with human participants as stated in the World Medical Association's Declaration of Helsinki. To begin the study, written permission was obtained from the participating schools.

Study setting: Location of the study was Awka Educational Zone, Anambra State, Nigeria. Anambra State is a mainland South-Eastern state of Nigeria, occupied and populated majorly by the Igbo ethnic group. Anambra is one of the 36 states of Nigeria and one of the 5 states in the South-East geopolitical zone of the country. The Awka Educational Zone has five Local Government Areas (LGA) under it, including Awka South LGA, Awka North LGA, Anaocha LGA, Njikoka LGA and Dunukofia LGA. Awka Educational Zone has up to 43 public primary schools according to the Anambra State Universal Basic Education Board (ASUBEB) 2014 statistics.

Participants: The participants were primary school pupils with social skill impairment. Four public primary schools were selected from each of the five local government areas in Awka Educational Zone making a total of 20 selected primary schools. The 1500 pupils were screened for eligibility. The first six pupils who met the inclusion criteria from each of the 20 selected primary schools were selected making a total number of 120 respondents. Power calculation was done using G*Power software[30, 31] to obtain the required sample size for two-tailed independent samples t-test[15]. The required sample size was 114 and the size of our sample exceeded this figure. This was done to accommodate any dropout in the course of the study. To prevent selection bias, a random allocation sequence was generated using Random Allocation Software[16]. With the aid of this software, participants were randomly assigned to either the intervention group (n = 60) or the no-intervention control group (n = 60). Based on what has been recommended for concealing allocations until the participants were assigned to the two groups, the sequence was implemented using sequentially numbered, opaque, sealed envelopes and pressure-sensitive paper[32]. The study flowchart presented in Fig. 1 depicts the inclusion and exclusion of participants based on their eligibility.

Eligibility criteria: Participants who met the following criteria were considered for the study: must be a primary school pupil at the time of this study has been clinically confirmed to have social skill deficit, must not have any

Enrolment

Accessed for eligibility (N = 1.500)

Excluded = (1380)
Not meeting inclusion criteria (n = 952)
Declined to participate (n = 271)
Other reasons (n = 157)

Randomized (n=120)

Allocation

Allocated to NC intervention (n = 60)
Received allocation intervention (n = 60)
Did received allocation intervention
(give reasons) (n = 0)

Allocated to control intervention (n = 60)
Received allocation intervention (n = 60)
Did not receive allocation intervention
(give reason) (n = 0)

Follow-up

Lost to follow up (give reason) (n = 0)
Discontinued intervention
(give reasons) (n = 0)

Lost to follow up (give reason) (n = 0)
Discontinued intervention
(give reasons) (n = 0)

Analysis

Analysed (give reason) (n = 60)
Excluded from analysis (give reasons) (n = 0)

Analysed (give reason) (n = 60)
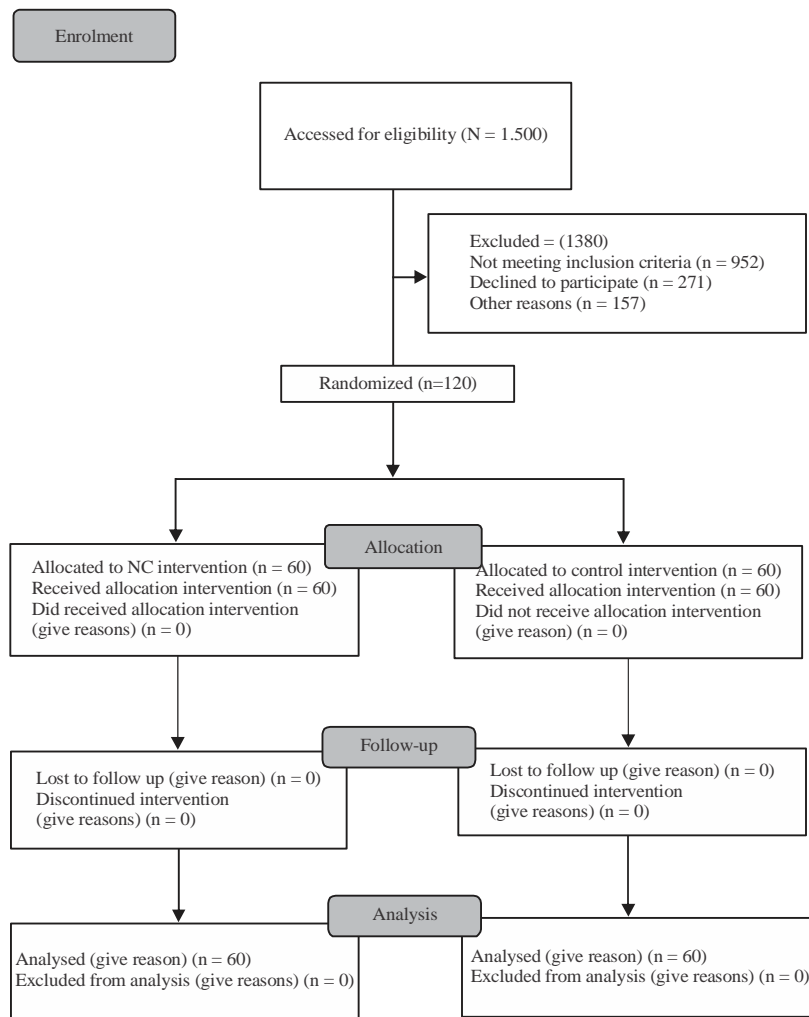Excluded from analysis (give reasons) (n = 0)

Fig. 1: Participant flowchart

record of previous participation in any clinical intervention aimed at improving social skill and his/her parents must have granted full consent to permit him/her to participate in the study. One becomes in eligible for the study if he/she did not meet any of the criteria.

Intervention procedure and treatment package: The story was developed in digital format with texts, still digital images and audio components. The researcher adopted a 'lean forward'' story mode, since, it is interactive and requires actions of the reader beyond simply observing or watching. This was done because children are accustomed to interactivity and multimedia animations. Consequently, such interactivity increases the chances of learning than simply presenting the story to the children. In order to avoid children becoming, so, consumed with manipulating objects and being entertained with the visual elements such that the story and message become invisible, the researcher adopted a

method whereby elements of the story and interface are tested and well-screened during its development instead of testing the story at its completion. The researcher further made use of electronic presentation applications precisely Microsoft Power Point, since, it supports digital stories that use text, images and audio clips. The digital story targeted behaviours such as assertion, self-control, cooperation and empathy. In developing the story, the researcher used characters that the children can relate to as well as admire such as animals and inanimate objects personified. The researcher also used older children as some of the characters bearing in mind that children often emulate and mimic the actions of older children.

The intervention consisted of four sessions with each session targeting a specific behaviour. Each session lasted for 15 min with 7 min break at every interval. Pupils were assessed at baseline using the SSRS-C. The 1 week after baseline evaluation, the treatment took place. Immediately after the treatment session ended, the researcher

distributed the SSRS-C to collect post-treatment data from the participants. Two months after the intervention, 30 min follow-up session was conducted. Immediately after the follow-up session ended, the researcher distributed the SSRS-C to collect follow-up data from the participants. The intervention focused on participants in the intervention group while participants in the no-intervention control group maintained their usual daily activities. However, participants in the no-intervention control group were equally assessed at baseline (Time 1), immediately after the intervention (Time 2) and during follow up evaluation (Time 3).

Social Skills Rating System (SSRS-C)[29]: The social skills rating system, child version (SSRS-C) is composed of 39 items. Sample items include: ''I follow the teacher's direction'', ''I feel sorry for others when bad things happen to them'', ''I start talks with class members'' and ''I ignore other children when they tease me or call me names''. Pupils rate how often they engage in a variety of behaviours on a 3 point scale ranging from never to very often. Items are scored from 0-2 with higher scores associated with more socially adaptive behaviours while the total scale score has a possible range between 0 and 80. The SSRS-C is a valid and reliable measure of the social skill assessment of primary school pupils (Cronbach's α = 0.80-0.86)[29, 33, 34].

Data analysis: In analyzing data from this study, the researcher employed the independent t-test statistic. The researcher tested for data normality and assumption violations. Data were normally distributed and statistical assumptions were adhered to. The researcher also screened for missing data and there was no missing data. Statistical analyses were all done using IBM SPSS, version 20. Results were adjudged significant at p = 0.05.

RESULTS AND DISCUSSION

The mean age of the pupils in the treatment group was 9.85±0.73 years while that of the children in the control group was 9.90±0.73 years, t(118) = -0.375, p = 0.709. Furthermore, 29 (24.17%) males and 31 (25.83%) female participants comprised the treatment group while the control group consisted of 24 (20%) males and 36 (30%) female participants. The treatment group comprised 43 (35.83%) participants from urban area, 10 (8.33%) from semi-urban area and 7 (5.83%) from rural area whereas control group consisted 39 (32.5%) participants from urban area, 13 (0.83%) from semi-urban area and 8 (6.67%) from rural area. Table 1 shows the descriptive statistics of the study results.

Table 1 shows that treatment at pretest, the mean social skills of pupils were 16.97±0.01 and 16.99±1.77 for the treatment group and no-intervention control group,

Table 1: Descriptive statistics before and after treatment intervention

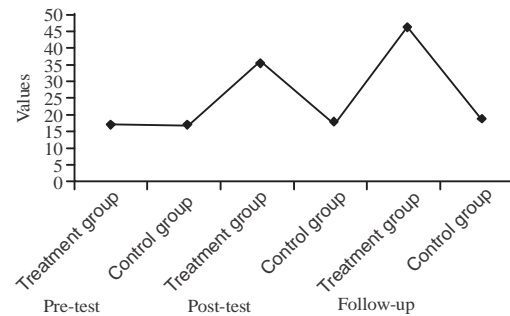| Assessments	Groups	n	Mean	SD	SEM
Pre-test	Treatment	60	16.97	0.01	0.00119
	Control	60	16.99	1.77	0.22801
Post-test	Treatment	60	36.18	0.06	0.00753
	Control	60	17.79	0.09	0.01235
Follow-up	Treatment	60	45.89	0.16	0.02015
	Control	60	18.94	0.15	0.01867

SD = Standard Deviation; SEM = Standard Error Mean

Fig. 2: Mean changes across group and assessment period

respectively. A positive mean increase in social skills of pupils in the treatment group was observed at post-test (36.18±0.06) and follow-up (45.89±0.16) but not among pupils in the no-intervention group.

Table 2 shows the results on pupil's social skill as assessed by SSRS-C. Table 2 indicates that there was no significant difference between the treatment and no-intervention control groups in initial social skill measured at Time 1 using SSRS-C, t(118) = -0.079, p = 0.937. The post-treatment measure revealed that the digital storytelling intervention resulted in a significant improvement in the social skills among pupils in the treatment group in comparison to those in the no-intervention control group, t(118) = 1270.919, p = 0.000. Likewise, the follow-up measure showed that the improvement in the social skill among pupils in the treatment group acquired was sustained at follow-up period in comparison to those in the no-treatment control group as was measured by the SSRS-C, t(118) = 981.398, p = 0.000. This, therefore, means that digital storytelling intervention was therapeutically helpful in raising the level of social skill among pupils who benefited from it. Figure 2 further demonstrates the mean changes across group and assessment period.

The current study sought to investigate the efficacy of digital storytelling intervention in social skills acquisition among primary school children. The outcome of this study showed significant improvement observed in the social skills of participants in the treatment group as measured using the SSRS-C. Thus, the intervention including digital storytelling showed positive effects in increasing specific social skills of primary school children who participated in the treatment. Computer-based interventions demonstrated adequate treatment integrity

Table 2: Independent samples t-test analysis of differences in social skills of pupils by group before and after treatment intervention as measured by SSRS-C

Tests	t-values	df	Significance	MD	SED	95% CI
Pre-test	-.079	118	0.937	-0.018	0.228	-0.469, 0.434
Post-test	1270.919	118	0.000	18.377	0.015	18.349, 18.406
Follow-up	981.398	118	0.000	26.955	0.027	26.900, 27.009

df = degree of freedom; MD = Mean Difference; SED = Standard Error Difference

and were rated as highly acceptable by teachers[25]. The findings of this research further strengthen previous assertions on the clinical efficacy of digital storytelling intervention in helping children with social skill impairment[25, 35-37]. Evidence abounds that digital social storytelling therapy can be effective even in the clinical treatment of children[25, 35-41]. Asides contributing to the body of knowledge of this area of study, there are some implications from the present outcomes. The outcomes have an implication for research collaborations across disciplines. Although, not many researchers think that the conventional knowledge practices of disciplines are the primary obstacles to common perception between academic professionals[42] disciplines could work together effectively in a study of this kind. Thus, the researcher recommends more research collaborations between academic experts in childhood education and educational technology. This is because studies about the social behaviour of children require knowledge sharing among different academic experts for effectiveness. The results imply that experts in childhood education and other related disciplines need to conduct large-scale trials targeted at enhancing the social skills of children with social skills impairment. It will be of great benefit if future studies probe how digital storytelling intervention can be applied for the treatment of other aspects of social behaviour problems other than social skills deficit. Seemingly, digital storytelling intervention might be significant in the treatment of other aspects of social behaviour problems but future investigations should test this notion.

CONCLUSION

The present study showed that the use of digital storytelling could improve social skills in primary schoolchildren. Digital storytelling treatment effectively increased social skills of primary school children. It is recommended that childhood educators involved in the treatment and care of children with social skills impairment be trained on the use and application of digital storytelling approach.

REFERENCES

01. Parker, J.G. and S.R. Asher, 1987. Peer relations and later personal adjustment: Are low-accepted children at risk?. Psychol. Bull., 102: 357-389.

02. Roff, M., 1961. Childhood social interactions and young adult bad conduct. J. Abnormal Social Psychol., 63: 333-337.

03. Roff, M.F., S.B. Sells and M.M. Golden, 1972. Social adjustment and personality development in children. U of Minnesota Press, Minneapolis, Minnesota.

04. Gronlund, N.E. and L. Anderson, 1957. Personality characteristics of socially accepted, socially neglected and socially rejected junior high school pupils. Educ. Administration Supervision, 43: 329-338.

05. Ullmann, C.A., 1957. Identification of maladjusted school children: A comparison of three methods of screening (No. 211). US Department of Health, Education and Welfare, Public Health Service, Washington, USA.

06. Hartup, W.W., 1970. Peer interaction and social organization. Carmichael's Manual Child Psychol., 2: 361-456.

07. Strain, P.S., R.E. Shores and M.M. Kerr, 1976. An experimental analysis of Spillover effects on the social interaction of behaviorally handicapped preschool children. J. Applied Behav. Anal., 9: 31-40.

08. Cobb, J.A., 1972. Relationship of discrete classroom behaviors to fourth-grade academic achievement. J. Educ. Psychol., 63: 74-80.

09. Hymel, D. and S.R. Asher, 1977. Assessment and Training of isolated children's social skills. Proceedings of the Biennial Meeting of the Society for Research in Child Development, March 17-20, New Orleans, Louisiana, USA., pp: 1-34.

10. Gottman, J., 1997. The effects of a modeling film on social isolation in preschool children: A methodological investigation. J. Abnormal Child Psychol., 5: 69-78.

11. O'Connor, R.D., 1972. Relative efficacy of modeling, shaping and the combined procedures for modification of social withdrawal. J. Abnormal Psychol., 79: 327-334.

12. Allen, K.E., B. Hart, J.S. Buell, F.R. Harris and M.M. Wolf, 1964. Effects of social reinforcement on isolate behavior of a nursery school child. Child Dev., 35: 511-518.

13. Buell, J., P. Stoddard, F.R. Harris and D.M. Baer, 1968. Collateral social development accompanying reinforcement of outdoor play in a preschool child. J. Applied Behav. Anal., 1: 167-173.

14. Hart, B.M., N.J. Reynolds, D.M. Baer, E.R. Brawley and F.R. Harris, 1968. Effect of contingent and non-contingent social reinforcement on the cooperative play of a preschool child. J. Applied Behav. Anal., 1: 73-76.

15. Whitman, T.L., J.R. Mercurio and V. Caponigri, 1970. Development of social responses in two severely retarded children. J. Applied Behav. Anal., 3: 133-138.

16. Strain, P.S., 1977. An experimental analysis of peer social initiations on the behavior of withdrawn preschool children: Some training and generalization effects. J. Abnormal Child Psychol., 5: 445-455.

17. Patterson, R.L., 1972. Time-out and assertive training for a dependent child. Behav. Ther., 3: 466-468.

18. Goodwin, S.E. and M.J. Mahoney, 1975. Modification of aggression through modelling: An experimental probe. J. Behav. Ther. Exp. Psychiatry, 6: 200-202.

19. Keller, M.F. and P.M. Carlson, 1974. The use of symbolic modeling to promote social skills in preschool children with low levels of social responsiveness. Child Dev., 45: 912-919.

20. O'Connor, R.D., 1969. Modification of social withdrawal through symbolic modeling. J. Applied Behav. Anal., 2: 15-22.

21. Bornstein, M.R., A.S. Bellack and M. Hersen, 1977. Social-skills training for unassertive children: A multiple-baseline analysis. J. Applied Behav. Anal., 10: 183-195.

22. Beck, A.T., R.A. Steer and G.K. Brown, 1996. Beck depression inventory-II. San Antonio, 78: 490-498.

23. Panepinto, R.A., 1978. Social skills training for verbally aggressive children. Ph.D. Thesis, West Virginia University, Morgantown, West Virginia.

24. Whitehill, M.B., 1978. A conversation skills training program for socially isolated children: An analysis of generalization. Ph.D. Thesis, University of Pittsburgh, Pittsburgh, Pennsylvania.

25. Sansosti, F.J. and K.A. Powell-Smith, 2008. Using computer-presented social stories and video models to increase the social communication skills of children with high-functioning autism spectrum disorders. J. Positive Behav. Interventions, 10: 162-178.

26. Caplan, R., J. Sagun, P. Siddarth, S. Gurbani, S. Koh, R. Gowrinathan and R. Sankar, 2005. Social competence in pediatric epilepsy: Insights into underlying mechanisms. Epilepsy Behav., 6: 218-228.

27. Hermann, B.P., S. Whitman, J.R. Hughes, M.M. Melyn and J. Dell, 1998. Multietiological determinants of psychopathology and social competence in children with epilepsy. Epilepsy Res., 2: 51-60.

28. Tse, E., L. Hamiwka, E.M. Sherman and E. Wirrell, 2007. Social skills problems in children with epilepsy: Prevalence, nature and predictors. Epilepsy Behav., 11: 499-505.

29. Gresham, F.M. and S.N. Elliot, 1990. Social Skills Rating System Manual. American Guidance Service, Cirele Pine, MN.

30. Faul, F., E. Erdfelder, A.G. Lang and A. Buchner, 2007. G*Power 3: A flexible statistical power analysis program for the social, behavioral and biomedical sciences. Behav. Res. Methods, 39: 175-191.

31. Faul, F., E. Erdfelder, A. Buchner and A.G. Lang, 2009. Statistical power analyses using G Power 3.1: Tests for correlation and regression analyses. Behav. Res. Meth., 41: 1149-1160.

32. Dettori, J., 2010. The random allocation process: two things you need to know. Evidence-Based Spine-Care J., 1: 7-9.

33. Diperna, J.C. and R.J. Volpe, 2005. Self-report on the social skills rating system: Analysis of reliability and validity for an elementary sample. Psychol. Sch., 42: 345-354.

34. Van der Oord, S., E.M. Van der Meulen, P.J. Prins, J. Oosterlaan, J.K. Buitelaar and P.M. Emmelkamp, 2005. A psychometric evaluation of the social skills rating system in children with attention deficit hyperactivity disorder. Behav. Res. Ther., 43: 733-746.

35. More, C., 2008. Digital stories targeting social skills for children with disabilities: Multidimensional learning. Intervention Sch. Clin., 43: 168-177.

36. Mancil, G.R., T. Haydon and P. Whitby, 2009. Differentiated effects of paper and computer-assisted social stories™ on inappropriate behavior in children with autism. Focus Autism Dev. Disabilities, 24: 205-215.

37. Delano, M. and M.E. Snell, 2006. The effects of social stories on the social engagement of children with autism. J. Positive Behav. Interventions, 8: 29-42.

38. Xin, J.F., 2014. Digital stories in writing instruction for middle school students with autism. Stud. Lit. Lang., 9: 1-10.

39. Wyatt, T.H. and E. Hauenstein, 2008. Enhancing children's health through digital story. CIN. Comput. Inf. Nurs., 26: 142-148.

40. Quirmbach, L.M., A.J. Lincoln, M.J. Feinberg-Gizzo, B.R. Ingersoll and S.M. Andrews, 2009. Social stories: Mechanisms of effectiveness in increasing game play skills in children diagnosed with autism spectrum disorder using a pretest posttest repeated measures randomized control group design. J. Autism Dev. Disord., 39: 299-321.

41. Chung, C.H. and C.H. Chen, 2017. Augmented Reality based Social Stories Training System for Promoting the Social Skills of Children with Autism. In: Advances in Ergonomics Modeling, Usability & Special Populations, Soares, M., C. Falcao and T. Ahram (Eds.). Springer, Cham, Switzerland, pp: 495-505.

42. Lowe, P. and J. Phillipson, 2009. Barriers to research collaboration across disciplines: Scientific paradigms and institutional practices. Environ. Plann. A., 41: 1171-1184.