

Impact of Computer-Assisted Instructional Strategy on Schoolchildren's Social Skills

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Abstract

This paper examined the effects of computer-assisted instructional strategy on schoolchildren's social skills. The study participants were 28 male and 36 female schoolchildren randomly assigned to experimental and control groups in four schools located in some rural ecologies of southern Nigeria. The research was conducted using the pretest-posttest control group quasi experimental design and underpinned by the constructivist learning theory which provided the theoretical support for the evaluated computer-assisted instructional strategy. The study discovered that there was no significant effect of computer-assisted instructional strategy on schoolchildren's social skills. However, male schoolchildren benefitted more from the computer-assisted instructional strategy than female schoolchildren. The study recommended the use of computers to complement traditional lecture methods in fostering the social skills of schoolchildren in developing countries. Future research could focus on blending computer-based instructional strategies with traditional teaching methods.

Keywords: *Computers, Computer-assisted instructional strategy, Schoolchildren, Social skills.*

Introduction

The use of computer and other devices that provide support for teaching and learning of school children has gained widespread support in many schools across the world. The escalation in the use of computer to support teaching could be linked to globalization especially with the evolution of Internet. These devices enabled teachers in different nations to communicate spontaneously, without leaving their school locations, on best practices for teaching skills that would equip school-children to function effectively in the economy-based environment created by the fourth industrial revolution. There are various technological tools that are available to teachers to foster school children learning outcomes. Tomesko, Touger-Decker, Dreker, Zelig, and Parrott (2017) maintained that a method which has proved convenient and inexpensive is computer-assisted instruction. Similarly, Mckissick, Davis, Spooner, Fisher, Graves (2018)

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attested to the veracity of Tomesko's et al (2017) claim of how an instructional intervention that has proved effective in delivering grade-aligned scientific instruction to students has been aided by computer-assisted instruction. In this paper, computer-assisted instructional strategy aligns with Odom, Thompson, Hedges, Boyd, Dykstra, Duda, Szidon, Smith, and Bord's (2014) definition as an electronic apparatus that is used to give an intervention to foster the social or competence skills of learners. Grabowska (2018) states that a social skill has complexities that make it difficult to be related only with classifications such as age, gender, educational status and career position. In this paper, social skill is operationally defined as a product of learners' diversity attitudes, social justice and leadership skills (Moely, Mercer, Illustre, Miron & Mcfarland, 2002). This research reviewed the social constructivist theory propounded by Lev Vygotsky to explain the model of learning that describes how students' skills are developed in a computer-aided learning environment and presented the questions that were answered. Finally, the intricacies that were used to ensure data discipline and results of the research are discussed to enable researchers and teachers understand how computer-assisted instruction was used to cultivate schoolchildren's social skills.

Computer-Related Strategies and Students' Social Skills

The drive to improve schoolchildren's learning outcomes has led researchers and teachers to develop diverse teaching strategies in all nations of the world. The teaching field became more interesting with the advent of modern computers in the nineteenth century because of the added value they brought to the teaching-learning process. The need to foster schoolchildren's social skills became expedient because the inculcation of these skills is deemed extra-curricular by most schools across the world. Womack, Marchant, and Borders (2011) emphasize the importance of social skills instruction but decry the non-provision of the teaching of these skills in the curricular framework of most education systems. It is consequent on this shortcoming that this study drew on the opportunities presented by the computer-assisted instructional strategy to develop the social skills of schoolchildren (Baez Zarabanda, 2019; Tadeu et al., 2019). In a recent study, Leach (2018) affirms that technological, cognitive and social skill subsets are at the heart of post-industrial skills. The identification of crucial skills that are central to making learners functional according to Leach (2018) could not come at a better time than now when discussions are underway on the fourth industrial revolution.

Leach (2018) further asserted that communication, collaboration, and interpersonal social skills are the most popular skills that are relevant in the current global economy. Despite the benefits inherent in fostering schoolchildren's skills, Goodwin (1999) cautions that teachers should premise the inculcation of students' social skills on those skills in which students have no mastery. In this study, the social skills identified in schoolchildren are leadership, social justice, and diversity attitudes which were taken from the research of Moely, Mercer, Ilustre, Miron, and McFarland (2002).

Leadership, Social Justice and Diversity Attitudes

Researchers have emphasized the roles that inculcation of skills for leadership could play in helping schoolchildren become competent citizens. The inculcation of leadership skills by teachers has great potentials to improve students' civic competence and transform them into great leaders in the future. Collins (2003) describes leadership as the provision of direction for one or more persons who share common goals. The definition of Collins (2003) shows that leaders require skills that would enable them to determine a course of action that is appropriate to give direction to their followers. In this vein, this research aims to foster social skills in schoolchildren that would enable them give direction to their colleagues.

Furman (2012) observed that social justice has become a consternation for numerous educational researchers with factors such as diversity, achievement gaps, and deficit thinking being the sources of these concerns. These concerns are deepened by the myriads of factors relating to globalization and these differ from one country to the other. Goodman, Liang, Helms, Latta, Sparks, and Weintraub (2004) while reflecting on the definitions of different philosophers and scholars, conceptualized social justice as the scholarship and professional activities directed to transform societal values, structures, and policy-related practices that grant self-determination to marginalized groups (students). It is evident from the definition of Goodman et al. (2004) that a study of this type aims at helping schoolchildren control their social activities and lives in a dynamic society. Goodman et al. (2004) further identified six primary features of global social justice research: ongoing self-examination, sharing power, giving voice, promoting consciousness-raising, building on strengths, and clients with the tools for social change (Rea et al., 2017). It is appropriate to clarify that the 'clients' specified by Goodman et al. (2004) in these primary features could be taken to mean 'schoolchildren' that were used in this current

research. These ‘schoolchildren’ were the primary beneficiaries of this study, and as such, they could be ‘clients’ in the context of Goodman et al. (2004).

Regarding diversity attitudes, Sobottka (2010) affirms that the recognition of challenges with formal diversity experiences has increased the attention given to diversity attitudes by educational researchers. Middelkoop, Ballafkih, and Meerman (2017) caution that diversity matters because the outcomes of learning vary between groups of learners. Pieces of evidence from research confirm that diversity is not an indifferent term (See Middelkoop, Ballafkih, & Meerman, 2017). Strauss (2007) affirmed the prejudicial nature of diversity by stating that people who regard themselves as minority would have positive attitudes toward diversity than those in majority. It is consequent on these facts from previous studies that this current research fostered schoolchildren’s social skills to enable them adapt to diversities inherent in their schools.

Theoretical Framework

The computer-assisted instructional intervention evaluated in this study is premised on social constructivism, propounded by Lev Vygotsky. Duelen (2013) opined that social constructivism is not only a social but a cultural model of learning. Duelen (2013) hence highlights Vygotsky's (1978) core concepts of social constructivism as the zone of actual development, potential development, and proximal development.

The zone of actual development was originally called ‘the actual development level’ by Vygotsky. It describes the developmental level at which a learners’ mental function was established as a result of specifically completed developmental cycles (Vygotsky 1978). Deulen (2013) observed that the potential development level is the point where the learner could be or potentially should be. From the explanations of Vygotsky (1978) and Deulen (2013), the difference between the zones of actual development and potential development is the learners’ ability to utilize skills that are not inherent in the current developmental state without receiving the support of the school or other agents of socialization. Regarding the zone of proximal development, Vygotsky (1978) uses the analogy of the difference between twelve and eight or between nine and eight to demonstrate it. Vygotsky (1978) demonstrated the distance between the actual developmental level and the zone of potential development in the learners’ ability to

utilize skills that are not inherent in their current developmental state through the support of an adult or in collaboration with more capable peers. From the assertion of Vygotsky (1978), independent problem solving is constant in the zone of proximal development. The technicalities of social constructivism expounded by Vygotsky (1978) might have propelled scholars such as Walker and Shore (2015) to remark that constructivism is an understanding that emanates from learners' mental activities. Consequent on the knowledge established by Vygotsky (1978), Cole, John-Steiner, Scribner, and Souberman (1979) emphasize that the learning experiences that are in the zone of proximal development in schoolchildren at present could change to developmental level because they might not need any support to carry out such tasks.

In this research, the computer-assisted instructional strategy is designed to provide the support required for learners to transit what Deulen (2013) and Vygotsky (1978) described as the zone of actual development to the zone of potential development. Based on these dynamics, this research raised the following hypotheses.

Hypotheses

- There is no significant main effect of computer-assisted instructional strategy on schoolchildren's social skills.
- There is no significant main effect of gender on schoolchildren's social skills.
- There is no significant main effect of cognitive ability on schoolchildren's social skills.
- There is no significant interaction effect of computer-assisted instructional strategy and gender on schoolchildren's social skills.

Method

Research Design

The pretest-posttest control group quasi-experimental design that used a 2x2x3 factorial matrix was adopted for this research. The independent variable was manipulated at two levels, namely, computer-assisted instructional strategy and conventional lecture method while the confounding variable of gender was varied at two levels: male and female. Also, the cognitive ability was at low, average and high levels. The data collected before and after the commencement of treatment, were subjected to Analysis of Covariance (ANCOVA), while the Estimated Marginal

Means aspect of ANCOVA was used to calculate the magnitude of performance across the experimental and control groups.

Participants

The sample comprised sixty-four students who were selected from intact classes in four secondary schools in rural areas in southern Nigeria. The experimental group comprised twenty-six students, while thirty-eight were in the control group. Twenty-six schoolchildren were in the experimental group, while thirty-eight schoolchildren were in the control group. Twenty-eight of the selected schoolchildren were male, while thirty-eight were female. Eleven students were of low academic ability, seventeen were of average ability, while thirty-six were of high academic ability.

Data Collection Tools

1. Computer-assisted Instructional Guide
2. Lecture Method Guide (LMG)
3. Social Skills Scale (SSS)
4. Academic Ability Test (AAT)

Data Collection

Computer-assisted Instructional Guide

The Computer-assisted instructional guide was developed by the researcher and featured concepts on information and communication technology, citizenship, values, and social issues. The guide was given to two academics at a state university in southern Nigeria to ascertain the appropriateness of the guide for the selected students. The suggestions of these academics were used to improve the instructional guide before the commencement of the treatments.

Lecture Method Guide (LMG)

The lecture method guide was used to teach the selected concepts for participants in the control group.

The lecture method guides comprised steps such as:

Introduction → discussion of facts in steps-taking/giving note → questioning (i.e evaluation) → handing out assignments (see Ige & Hlalele, 2017; Amosun, Ige & Choo, 2015; Ige, 2012, Ige, 2013).

Social Skills Scale (SSS)

The social skills were tapped with the civic attributes and skills questionnaire designed by Moely, Mercer, Ilustre, Miron and Mc Farland (2002). The sections of the questionnaire on skills of leadership, social justice, and diversity attitudes were used to evaluate students' social skills. The reliability co-efficient of the social skills scale that was pilot tested on a sample of students that were not part of this research was 0.76. The section of the questionnaire on leadership has items such as 'I am a good leader', 'I am a better follower than a leader', 'I would rather have someone else take the lead in formulating a decision'. The social justice section has items such as 'It is important that equal opportunity be available to everyone', 'people are poor because they choose to be poor'; while diversity attitudes scale has statements such as 'I find it difficult to relate to people from a different race or culture', and 'cultural diversity within a group makes the group more interesting and effective'. This instrument was administered on the selected schoolchildren before the treatment commenced and after the treatment ended.

Academic Ability Test (AAT)

This instrument was a modified form of the Sigels cognitive style test used by Ige (2001). The AAT comprised 20 cards with different pictorial representations. Each student selected two pictures that have shared characteristics from three, selected two pictures that have complementary characteristics, and gave reasons for making such choices. The reliability co-efficient using person product moment correlation was 0.72.

Data Analysis

The Analysis of Covariance (ANCOVA) and Estimated Marginal Means aspect of ANCOVA programs on International Business Machines Corporation's Statistical Package for Social Sciences (SPSS) 25.0 was used to analyse the data collected from the participants in this research

using the pretests as a covariate. Ting (2018) stated that ANCOVA is a popularly trusted data analytical program with a treatment effect, stratification factor, and uninterrupted baseline as a covariate. ANCOVA is an appropriate program to analyse the data in this research because it partials out the initial incongruities in the pre-social skills scores (Ige, 2018; Ige, 2019). The Estimated Marginal Means aspect of ANCOVA was used to indicate the magnitude of social skills in the experimental and control groups.

Findings

Hypothesis One: There is no significant main effect of computer-assisted instructional strategy on schoolchildren's social skills.

Table 1

Characteristics of the schoolchildren in experimental and control groups

Treatment	Variable	N
1.00	Experimental Group (Computer-Assisted Instructional Strategy)	26
2.00	Control Group (Traditional Lecture Method)	38
Gender		
1.00	Male	28
2.00	Female	36
Academic Ability		
1.00	Low	11
2.00	Average	17
3.00	High	36

Table 1 shows that twenty-six schoolchildren were in the experimental group, while thirty-eight schoolchildren were in the control group. Twenty-eight were male schoolchildren, while thirty-six were female schoolchildren. Regarding the academic ability of the schoolchildren, eleven had low academic ability, seventeen were of average academic ability, while thirty-six were of high academic ability.

Table 2

Effect of computer-assisted instructional strategy on school children's social skills

Dependent Variable: Post_Schoolchildren_Skills

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	5950.311 ^a	12	495.859	4.370	.000	.507
Intercept	5446.857	1	5446.857	48.005	.000	.485
Pre_Social_Skills	2249.511	1	2249.511	19.826	.000	.280
Treatment	295.699	1	295.699	2.606	.113	.049

Gender	862.789	1	862.789	7.604	.008	.130
Academic_Ability	439.772	2	219.886	1.938	.154	.071
Treatment * Gender	493.408	1	493.408	4.349	.042	.079
Treatment *	424.265	2	212.132	1.870	.165	.068
Academic_Ability						
Gender *	175.077	2	87.539	.772	.468	.029
Academic_Ability						
Treatment * Gender *	323.130	2	161.565	1.424	.250	.053
Academic_Ability						
Error	5786.689	51	113.464			
Total	183962.000	64				
Corrected Total	11737.000	63				

a. R Squared = .507 (Adjusted R Squared = .391)

Table 2 shows the effect of the treatment on school children's social skills was not significant ($F_{1, 51} = 2.606$; $p > 0.05$; $\eta^2 = .049$). This result implies that there is no significant difference in the social skill scores of the schoolchildren in the experimental and control groups. Therefore, hypothesis one is not rejected. In order to ascertain the variations in the social skill attainment between the schoolchildren exposed to Computer-assisted instructional strategy and conventional teaching method, the estimated marginal means aspect of ANCOVA is used to evaluate the subgroup means. Table 3 is, therefore, presented.

Table 3

Magnitude of performance across groups

Treatment	N	Mean	Std.Error
INTERCEPT			
Pre_Social Skills	64	44.766	-
Post_Social Skills	64	52.291	1.716
TREATMENT			
Experimental (Computer-Assisted Instructional Strategy)	26	55.354 ^{a,b}	2.997
Control (Conventional Teaching Method)	38	49.227 ^a	2.027

a. Covariates appearing in the model are evaluated at the following values: Students_social_skills = 44.7656

b. Based on modified population marginal mean.

Table 3 shows that despite the non-significant influence of the treatment, students that were taught with the Computer-assisted instructional strategy still had a higher mean score (55.35) than students exposed to conventional teaching method (49.23). The output of the estimated marginal means aspect of ANCOVA affirms that despite the non-influence of the treatment on social skills of the selected schoolchildren, the schoolchildren that were exposed to Computer-assisted instructional strategy still had a better social skills development than schoolchildren in the control group.

Hypothesis two: There is no significant main effect of gender on schoolchildren's social skills.

Table 4

Magnitude of performance across gender

Dependent Variable: Post_Social_Skills

Treatment	N	Mean	Std.Error
Male 2.267	28	56.973	
Female 2.552	36	47.608	

- a. Covariates appearing in the model are evaluated at the following values: Pre_social_skills = 44.7656
 b. Based on modified population marginal mean.

Table 4 shows that gender had a significant effect on school children's social skills ($F_{(1,51)} = 7.604$; $p < 0.05$; $\eta^2 = .130$). Table 3 shows computer-assisted instructional strategy was effective in fostering male school children's social skills ($X = 56.973$) than female school children's social skills. Table 4 shows that the social skills of male schoolchildren were cultivated more than the female schoolchildren's social skills during the experimental activities. The implication of this finding is that the computer-assisted instructional strategy evaluated in this research is gender sensitive. The experimental instructional programme is more suitable to improve the social skills of male schoolchildren than female schoolchildren. Therefore, hypothesis two is rejected.

Hypothesis Three: There is no significant main effect of cognitive ability on schoolchildren's social skills.

Table 5

Magnitude of performance across academic ability

Dependent Variable: Post_Social_Skills

Treatment	N	Mean	Std.Error
Low 3.741	11	52.105	
Moderate 2.996	17	48.861	
High 1.924	36	55.905	

- a. Covariates appearing in the model are evaluated at the following values: Pre_social_skills = 44.7656
 b. Based on modified population marginal mean.

Table 5 shows that cognitive ability had no significant effect on school children's social skills ($F_{(2,51)} = 1.938$; $p > 0.05$, $\eta^2 = .071$). This result implies the computer-assisted instructional strategy is friendly to schoolchildren of varied academic ability. Table 4 shows that there are marginal differences in sub-group means of schoolchildren with low, moderate, and high academic abilities. Therefore, hypothesis three is rejected.

Hypothesis four: There is no significant interaction effect of computer-assisted instructional strategy and gender on schoolchildren's social skills.

It could be seen in Table 1 that the interaction effect of the treatment and gender was significant ($F_{(1,51)} = 4.349$, $p < 0.05$; $\eta^2 = .079$). Therefore, hypothesis four is not rejected.

Discussion

Despite the non-influence of computer-assisted instructional strategy on school children's social skills in this research, the outputs of the estimated marginal means show a marginal difference in the means of students exposed to computer-assisted instructional strategy ($X = 55.354$), and traditional lecture method ($X = 49.227$). The outcome of computer-assisted instructional strategy on school children's social skills did not support earlier research by Hitchcock and Noonan (2000), who tried out computer-assisted instruction on early academic skills of pre-school children. The results of Hitchcock and Noonan (2000) suggest that computer-assisted instruction with constant time delay proved effectual in developing the foundational academic skills of preschool children with disabilities. The computer-assisted instruction used by Hitchcock and Noonan (2000) might have proved effective than the computer-assisted strategy in the current research because it was designed with an adapted alternating treatments design which was replicated in each of the skill areas targeted by Hitchcock and Noonan (2000).

The influence of gender on the social skills of the selected school children shows that the computer-assisted strategy used in this research was more beneficial to male schoolchildren. This finding contradicts the outcomes of earlier research by Ige and Hlalele (2017) which affirmed that gender had no influence on school children's attainment in citizenship education concepts. The findings of this research are comparable to Ige and Hlalele (2017) because both used the pretest-posttest quasi-experimental design. The insignificant influence of academic ability on the

social skills of the selected school children shows that the computer-assisted strategy used in this research was suitable for school children of varied academic abilities. This finding confirms the position of Ige (2019) that academic ability had no significant influence on students learning outcomes in social studies concepts. The non-influence of academic ability on school children's social skills presents opportunities for teaming teachers in schools across the world to draw on the potentials of the computer-assisted instructional strategy used in this research.

A high point in this research was the significant influence of computer-assisted instructional strategy and gender on school children's social skills. This finding concurs with the outcome of a research conducted by Ige (2018) on the effects of gender and technological fluency on learners' attitudes to cybercrime prevention in urban learning ecologies with documented implications for Swedish gymnasiums. Ige (2018) discovered that the two-way interaction effect of sex and technological fluency was substantial on learners' attitudes to crime prevention. Though, Ige's (2018) research focused on learners' attitude to cybercrime prevention, the current research focus is on school children's social skills. It should be noted that these variables are both students' learning outcomes.

Conclusion

The hypotheses tested in this research determined the impact of Computer-assisted instructional strategy on schoolchildren's social skills. The findings of data analysed with ANCOVA shows the importance inherent in using computers to nurture the social skills of schoolchildren in rural learning ecologies. It is, therefore, recommended that teachers in rural schools could make use of the computer-assisted strategy used in this research to develop the skills that are desirable in children where the use of other teaching strategies have not produced the desired results. It should be noted that the random assignment of school children into experimental and control groups could not be carried out to avoid the disruption of class arrangements in the schools selected for this research. Hence, intact classes were used. Due to this this limitation, future researchers should be cautioned not to generalize the outcome of this research.

Pedagogical Implications

The Computer-assisted instructional strategy used in this research is suitable for instructors in rural schools to develop the social skills of schoolchildren to enable them to compete favourably with other schoolchildren in urban schools. However, it should be noted that this Computer-

assisted instructional strategy seems more favourable to developing male schoolchildren than female schoolchildren social skills. This finding implies that instructors in schools with male schoolchildren social skills deficit would find this Computer-assisted instructional strategy invaluable. The friendly nature of the Computer-assisted instructional strategy to schoolchildren of different academic abilities shows that it can be used to develop the social skills of male schoolchildren irrespective of their academic abilities. Additionally, it is recommended that instructors in schools experiencing severe students' social skills deficit could blend the Computer-assisted instructional strategy and conventional teaching method to achieve optimum social skills change. This research is recommended for training teachers in rural learning ecologies in developing nations of the world for improving schoolchildren's social skills.

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