



Gender difference in undergraduates' micro-teaching performance using Telegram and WhatsApp platforms in collaborative learning settings

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ABSTRACT

Gender difference has continued to influence achievement and retention of students due to inconsistencies in performance, which troubles researchers. This therefore calls for different approaches to ameliorate this problem by deploying the use of Telegram and WhatsApp in collaborative learning settings in order to bridge those gender gaps since technology serves as a leveler. This study examined gender difference on achievement and retention of students in microteaching using Telegram and WhatsApp platforms in collaborative learning settings. A sample of 282 students enrolled on Telegram and WhatsApp from two universities in Gombe State, Nigeria, was purposively selected for the study, where the two sampled groups were assigned into two experimental groups. The instrument used in this study is the micro-teaching achievement test validated by experts in the field of educational technology and curriculum studies, where a split-half method of reliability was used to obtain a figure of 0.91 using Pearson product moment correlation. Descriptive statistics of mean and standard deviation was used to answer the research questions while inferential statistics involving an independent sample t-test was used to test the null hypotheses at 0.05 level of significance. Findings revealed that there is no significant difference in the mean achievement scores of male and female students taught using Telegram platform ($t=2.571, p>0.05$); there is no significant difference in the mean achievement scores of male and female students taught using WhatsApp platform ($t=3.671, p>0.05$); there is no significant difference in the mean retention scores of male and female students taught using Telegram platform ($t=5.274, p>0.05$). However, there is a significant difference in the mean retention scores of male and female students taught using WhatsApp platform in favor of the female students ($t=4.071, p<0.05$). It is hereby recommended that lecturers should deploy the use of Telegram and WhatsApp platforms in collaborative learning settings during micro-teaching in order to bridge the individual differences occasioned by gender since technology has the potential to serve as a leveler and also be able to bridge gender differences.

Keywords: achievement, collaborative learning, gender, micro-teaching, retention, social media, Telegram, WhatsApp

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INTRODUCTION

Micro-teaching is a minor, replicated and controlled form of teaching aimed at perfecting the skills of student-teachers who are trained in the teacher-education program. Students, in this case, are closely scrutinized and observed by their tutors who, in most cases, video them for some few minutes and they are being shown their lapses in order to make amendments in areas of weakness. Micro-teaching is an important aspect of teacher-education program because quality teachers are very vital when it comes to the implementation of any curriculum into practice (Ajilaye, 2013). One of the major aims of Micro-teaching or training program as noted by Garba (2018) is to

change teachers' conduct according to the specific objectives. It is a process of subjecting human behavior to 5Rs of video tape recording, reviewing, responding, refining and re-joining. It is a well-ordered training that makes it possible to concentrate on teaching behavior in the student-teacher training. Though the Nigerian policy on education recognizes the incorporation of technology at all levels, most lecturers do not often deploy the use of technology to cover for large classroom sizes, lack of micro-teaching laboratory and to accommodate individual differences occasioned by gender. One of the ways of ameliorating this problem is the incorporation of technology in teaching and learning.

Technology has brought about substantial improvement in several sectors of human endeavors and due to this developmental trend, so

many unparalleled changes in education institutions have been persistently uncovered to reinforce teaching and learning (Khoo et al., 2020). In light of this development, different methods of teaching and learning have emerged, which are making invaluable progress in the education sector worldwide. Technology is being positioned to make learning interesting, flexible, learner-centered, simple and interactive. Thus, in order to simplify learning and make it student-centered in the realms of 21st century pedagogy, it becomes important to incorporate technology into teaching and learning (Falode & Mohammed, 2023; Mohammed & Ogar, 2023). Given the flexibilities brought about by technological progression, educators now appropriately design virtual learning environments, and the problem of distance and time has been eliminated (Exposito et al., 2020). Foster et al. (2022) posited that the integration of technology could be a promising approach to arouse regular and active instructional process while meeting students' need of making learning flexible in terms of time and place. Technology can be used to microteaching through the incorporation of Telegram and WhatsApp.

Telegram is one of the most common user friendly social media platforms that allows users to create groups of up to 200,000 members and channels for transmission to infinite audiences. Telegram has the capacity of sending files of up to two gigabyte in size. Telegram has become one of the major tools for education especially in the aspect of social media learning. The rapid development and enormous advancement in computer technologies have been affecting all aspects of life for more than three decades. Moreover, studies found a positive association between the use of internet and social media and academic performance of the students. Students using internet frequently, scored higher grades (Hakim, 2019; Mohammed & Kuta, 2021). Integrating Telegram channels into existing learning practices can provide an interactive, flexible learning, where students can learn new things and perfect some skills especially in micro-teaching. Denysiuk et al. (2018) labelled instruction on Telegram to be a learner-centered method, where learners have unlimited access to information. By learning on Telegram, the interactions with peers and teachers can be maximized and this promotes better learning compared to a traditional classroom situation. Another platform used in making learning flexible and to accommodate large classroom sizes is the WhatsApp platform.

WhatsApp is a free application, which works on various platforms like iPhone and android systems, and it is largely used to send multimedia contents like photos, videos, audio, and other instant messages in the form of text. WhatsApp can therefore be used for teaching and learning through the creation of online groups aimed at fostering communication with students, creating dialogue and encourage students to exchange ideas and information among themselves (Sonia & Rawekar, 2017). Cetinkaya (2017) observed that WhatsApp is now an effective way of increasing the success of teaching and learning because it makes students to develop a positive attitude towards their various courses. Given its abilities to accommodate groups and communities, WhatsApp can be effectively used for instructional purposes, which can facilitate interaction between tutors and colleagues. The active interaction and engagement of students on Telegram and WhatsApp also has the potential to foster collaborative learning.

Collaborative learning is defined by Dillenbourg (1999) as a situation in which two or more people learn or attempt to learn something together. This can occur in the form of groups or as

individuals. When students work together in a structural, collaborative group, they tend to discuss and gain valuable experience in cognitive development as compared to those students who work alone. Assigning students in groups has become a key factor to enhance social and teamwork skills. Thus, strong teamwork skill can be developed and incorporated during collaborative learning (Khoo et al., 2020). Julius (2018) identified some principles of collaborative learning to include: the learner is the central focus of any instruction; interaction and participation are of primary importance when it comes to collaboration; working in groups is an important mode of learning; structured approaches to developing solutions to real-world problems should be incorporated in learning. Srinivas (2014) revealed that collaborative learning is based on the idea that learning is a naturally social act in which the participants talk among themselves. It therefore means that learners need a social environment, where they will interact, communicate, share and construct knowledge with peers for effective learning to take place. Under the collaborative learning environment, students are challenged to participate because they listen to different perspectives and are required to articulate and defend their ideas. Collaborative learning, which is embedded from primary schools to tertiary institutions is among the most explored learning method in the 21st century (Mahbib et al., 2017). In spite of the excellent collaborative features provided by Telegram and WhatsApp to enhance learning, gender difference still continues to influence the performance of students.

Gender is a characteristic that separates male and female in the classroom. These characteristics distinguish social duties, everyday tasks, attitude and values between males and females (Gambari et al., 2017). Investigation shows that men are more likely to use social media to link with people while women use it to seek information (Haferkamp et al., 2012). Haq and Chand (2012) studied social media practice and its impact on performance of university students based on a gender comparison and the study discovered that social media use badly affect the performance of male students compared to female students. Many studies have shown that gender is a huge factor that influences academic achievement and retention of students during social media learning even though some of these studies are not consistent in terms of general conclusion and are mostly not carried out in collaborative learning settings. For example, Ofoka (2019) found no significant difference in the achievement and retention of male and female students exposed to instruction using WhatsApp, Facebook and Blog. Studies by Naderi and Akrami (2018) found no significant gender difference in achievement of students exposed to instruction on Telegram. Jimoh et al. (2018); Kareem et al. (2018) and Dambo and Kayii (2018) found no significant difference in the achievement of male and female students exposed to mobile blended learning. Ilobeneke et al. (2018a); Bawa and Ibrahim (2016) and Omar (2021) reported no significant gender difference in achievement when exposed to WhatsApp. Bataineh et al. (2018) discovered a significant difference in favor of female when WhatsApp was used to teach English in Iran while Safitri (2021) discovered a significant difference in favor of male students when exposed to WhatsApp. On the other hand, Owodunmi and Ogundola (2013) discovered a significant gender difference in the retention of students in favor of female. Studies by Achor et al. (2013) and Gambari et al. (2014) revealed no significant difference in the retention of male and female students. Studies by Ajai and Imoke (2015) and Eze et al. (2016) discovered no significant difference in students' retention scores. Ceylan and Elitok Kesici (2017) also discovered a significant difference

Table 1. Research design layout

Groups	Pre-test	Treatment	Post-test	Retention
Experimental group I	Pre-test for experimental group I	Telegram learning platform	Post-test for experimental group I	O ₃
Experimental group II	Pre-test for experimental group II	WhatsApp learning platform	Post-test for experimental group II	O ₃

Note. O₃: Retention for experimental group I & II

in achievement and retention of male and female students exposed to blended learning while Bupo (2019) discovered no significant difference in achievement and retention of male and female students exposed to blended learning. In view of the foregoing, more studies are therefore required to fill these gaps due to the inconsistencies found in the results.

In the light of these inconsistencies noticed in the aforementioned studies reviewed, studies on the effect of gender have continued to yield no general conclusions with each gender outperforming the other in achievement and retention. These gaps have proven to be a huge source of concern to most education stakeholders. It therefore becomes important to try different approaches to ameliorate the difference. To ameliorate this problem, technology has come up with different approaches like leveraging on the collaborative features provided by Telegram and WhatsApp platforms to fill various research gaps and challenges encountered during teacher-education programs especially in microteaching, but most lecturers do not incorporate technology in the course of teaching microteaching in order to cater for individual differences occasioned by gender. This has continued to affect the performance of students for years. This study is therefore an attempt to see whether the collaborative features provided by Telegram and WhatsApp platforms can be used to cater for individual difference occasioned by gender since social media is considered to be a leveler in today's realities.

Purpose of the Study

The purpose of the study is to examine the gender difference on academic achievement and retention of undergraduates exposed to microteaching using Telegram and WhatsApp platforms in collaborative learning settings. Specifically, the study seeks to:

1. Examine the influence of gender on the achievement of undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.
2. Find out the influence of gender on the achievement of undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.
3. Examine the influence of gender on the retention of undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.
4. Find out the influence of gender on the retention of undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.

Research Questions

The following research questions were answered in this study.

1. What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching

using Telegram-enhanced instruction in collaborative learning settings?

2. What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings?
3. What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings?
4. What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings?

Research Hypotheses

1. **HO₁**. There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.
2. **HO₂**. There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.
3. **HO₃**. There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.
4. **HO₄**. There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.

METHODOLOGY

Research Design

The study adopted a quasi-experimental study involving pre-/post-test control group design (Table 1). This design does not give room for randomization, therefore intact classes were used.

Participants

A sample of 282 faculty of education students enrolled on Telegram and WhatsApp platforms from Federal University Kashere and Gombe State University, Nigeria, respectively was selected using a purposive sampling technique to be used for the study. The schools were purposively sampled because they were the only two universities in Gombe State offering micro-teaching as a course. Faculty of education was selected because micro-teaching is taught as a course in the faculty. The two sampled groups were assigned into experimental group I and experimental group II using a simple random sampling technique.

Table 2. Mean & standard deviation of pre- & post-test scores of male & female students exposed to Telegram learning platform

Group	n	Pre-test		Post-test		Mean difference
		Mean	Standard deviation	Mean	Standard deviation	
Male	61	36.87	3.48	73.89	8.11	37.02
Female	56	34.56	4.61	71.29	9.44	36.73

Table 3. Mean & standard deviation of pre- & post-test scores of male & female students exposed to WhatsApp learning platform

Group	n	Pre-test		Post-test		Mean difference
		Mean	Standard deviation	Mean	Standard deviation	
Male	86	28.49	5.02	67.08	10.65	38.59
Female	79	30.39	3.95	70.76	8.04	40.37

Instrument

The research instrument used in this study is the micro-teaching achievement test (MTAT), which comprised of 30-item multiple choice questions designed based on Bloom's taxonomy table of specifications that cuts across the cognitive domain of educational objectives. The table of specification was used as a guide in order to show the spread of the questions across all the objectives. The achievement test had two sections: A and B. Section A solicited information about the students' personal data, while section B comprised of 30 objective questions drawn from the departmental handbook with options A-D, containing one correct answer and three distracters. The multiple-choice questions were administered as a pre-test, post-test, and retention test to experimental group I and experimental group II. MTAT was validated by experts in the field of educational technology and curriculum studies whereby split-half method of reliability was used to obtain a value of 0.91 using Pearson product moment correlation.

Data Collection and Analysis

The students were added into Telegram and WhatsApp virtual platforms for active engagement during the first week of the experiment. A pre-test was administered in order to determine the entry level of the students in the second week. The online interaction took place in the third, fourth and fifth weeks whereby various micro-teaching contents in the form of online texts and instant messages were dropped by the researcher at least twice a week. In order to create an online collaborative learning environment, the students were grouped into various sub-groups based on their teaching subjects, where they worked together in groups. The researcher also dropped assignments that required the students to work in groups and to discuss online in order to provide solutions. By the sixth week, a post test was administered. Another test was administered after two weeks in order to determine the level of retention. The data collected were analyzed using descriptive statistics involving mean and standard deviation while inferential statistics involving an independent sample t-test was used to test the null hypothesis using SPSS package version.

RESULTS

Research Questions Analysis

Research question 1. What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings?

Table 2 shows the pre- and post-test scores of male and female students in experimental group I (Telegram). From **Table 2**, male students had a mean score of 36.87 and a standard deviation of 3.48 in the pre-test; and a mean of 73.89 and a standard deviation of 8.11 in the

post-test. The mean difference between the pre- and post-test scores of male students in experimental group I was 37.02. Also, from **Table 2**, female students had a mean of 34.56 and a standard deviation of 4.61 in the pre-test; and a mean of 71.29 and a standard deviation of 9.44 in the post-test. The mean difference in the pre- and post-test scores of female students in the experimental group I was 36.73. It can therefore be concluded that the male students had a slightly higher achievement than their female counterpart.

Research question 2. What is the difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings?

Table 3 shows the pre- and post-test scores of male and female students in experimental group II (WhatsApp). From **Table 3**, male students had a mean score of 28.49 and a standard deviation of 5.02 in the pre-test and a mean of 67.08 and a standard deviation of 10.65 in the post-test. The mean difference between the pre- and post-test scores of male students in experimental group II was 38.59. Also, from **Table 3**, female students had a mean of 30.39 and a standard deviation of 3.95 in the pre-test and a mean of 70.76 and a standard deviation of 8.04 in the post-test. The mean difference in the pre- and post-test scores of female students in the experimental group II was 40.37. It can therefore be concluded that the female students had a slightly higher achievement than their male counterpart.

Research question 3. What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings?

Table 4 shows the post-test and retention scores of male and female students in experimental group I (Telegram). From **Table 4**, male students had a mean score of 73.89 and a standard deviation of 8.11 in the post-test and a mean of 72.34 and a standard deviation of 2.94 in the retention test. The mean difference in the post-test and retention scores of male students in experimental group I was 1.55. Also, from **Table 4**, female students had a mean of 71.29 and a standard deviation of 9.44 in the post-test and a mean of 70.76 and a standard deviation of 5.88 in the retention test. The mean difference in the post-test and retention scores of female students in the experimental group I was 0.62. It can therefore be concluded that the male students had a slightly higher retention.

Research question 4. What is the difference in the mean retention scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings?

Table 5 shows the post-test and retention scores of male and female students in experimental group II (WhatsApp). From **Table 5**, male students had a mean score of 67.08 and a standard deviation of 10.65 in the post-test and a mean of 65.75 and a standard deviation of 10.08 in

Table 4. Mean & standard deviation of post-test & retention scores of male & female students exposed to Telegram learning platform

Group	n	Pre-test		Post-test		Mean difference
		Mean	Standard deviation	Mean	Standard deviation	
Male	61	73.89	8.11	72.34	2.94	1.55
Female	56	71.29	9.44	70.67	5.88	0.62

Table 5. Mean & standard deviation of post-test & retention scores of male & female students exposed to WhatsApp learning platform

Group	n	Pre-test		Post-test		Mean difference
		Mean	Standard deviation	Mean	Standard deviation	
Male	86	67.08	10.65	65.75	10.08	1.33
Female	79	70.76	8.04	68.84	8.79	1.92

Table 6. Independent sample t-test result of mean achievement scores of male & female students taught micro-teaching using Telegram

Group	n	Mean	Standard deviation	df	t-value	p-value	Decision
Male	61	73.89	8.11	115	2.571	.297	Accepted
Female	56	71.29	9.44				

Note. Not significant at 0.05 ($p > 0.05$)

Table 7. Independent sample t-test result of mean achievement scores of male & female students taught micro-teaching using WhatsApp

Group	n	Mean	Standard deviation	df	t-value	p-value	Decision
Male	86	67.08	10.65	163	3.671	.195	Accepted
Female	79	70.76	8.04				

Note. Not significant at 0.05 ($p > 0.05$)

the retention test. The mean difference in the post-test and retention scores of male students in experimental group II was 1.33.

Also, from **Table 5**, female students had a mean of 70.76 and a standard deviation of 8.04 in the post-test and a mean of 68.84 and a standard deviation of 8.79 in the retention test. The mean difference in the post-test and retention scores of female students in the experimental group II was 1.92. It can therefore be concluded that the female students had a slightly higher retention.

Testing of Hypotheses

HO₁. *There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.*

In order to test hypothesis three, independent sample t-test was used to analyze the scores of the two groups as presented in **Table 6**.

Table 6 shows the independent sample t-test of the mean achievement of male and female students exposed to Telegram platform. From **Table 6**, it can be observed that the male students had a mean of 73.89 and standard deviation of 8.11. Female students had a mean of 71.29 and a standard deviation of 9.44. Also, $t=2.571$, $df=115$ and $p\text{-value}=.297$. Therefore, since $p > 0.05$, the null hypothesis is hereby accepted. This means that there is no significant difference in the mean achievement scores of male and female students taught using Telegram platform.

HO₂. *There is no significant difference in the mean achievement scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.*

In order to test hypothesis four, independent sample t-test was used to analyze the scores of the two groups as presented on **Table 7**.

Table 7 shows the independent sample t-test result of the mean achievement scores of male and female students taught micro-teaching using WhatsApp learning platform. From **Table 7**, male students had a mean of 67.08 and a standard deviation of 10.65 while the female students had a mean of 70.76 and a standard deviation of 8.04. Also, it

can be observed that $t=3.671$, $df=163$ and $p\text{-value}=.195$. Since $p > 0.05$, therefore the null hypothesis is hereby accepted. This means that there is no significant difference in the mean achievement scores of male and female students taught using WhatsApp platform.

HO₃: *There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using Telegram-enhanced instruction in collaborative learning settings.*

In order to test hypothesis five, independent sample t-test was used to analyze the scores of the two groups as presented in **Table 8**.

Table 8 shows the independent sample t-test result of the mean retention scores of male and female students taught micro-teaching using Telegram learning platform. From **Table 8**, male students had a mean of 72.34 and a standard deviation of 2.94 while the female students had a mean of 70.67 and a standard deviation of 5.88. It can also be observed that $t=5.274$ and $p\text{-value}=.386$. Since $p > 0.05$, therefore the null hypothesis is hereby accepted. This means that there is no significant difference in the mean retention scores of male and female students taught using Telegram platform.

HO₄: *There is no significant difference in the mean retention scores of male and female undergraduate students taught micro-teaching using WhatsApp-enhanced instruction in collaborative learning settings.*

In order to test hypothesis six, independent sample t-test was used to analyze the scores of the two groups as presented in **Table 9**.

Table 9 shows the independent sample t-test result of the mean retention scores of male and female students taught micro-teaching using WhatsApp learning platform. From **Table 9**, it can be observed that male students had a mean of 65.75 and a standard deviation of 10.08 while female students had a mean of 68.84 and a standard deviation of 8.79. It can also be observed that $t=4.071$, $df=163$ and $p\text{-value}=.000$. Since $p < 0.05$, therefore the null hypothesis is hereby rejected. This means that there is a significant difference in the mean retention scores of male and female students taught using WhatsApp platform in favor of the female students.

Table 8. Independent sample t-test result of mean retention scores of male & female students taught micro-teaching using Telegram

Group	n	Mean	Standard deviation	df	t-value	p-value	Decision
Male	61	72.34	2.94	115	5.274	.386	Accepted
Female	56	70.67	5.88				

Note. Not significant at 0.05 ($p > 0.05$)

Table 9. Independent sample t-test result of mean retention scores of male & female students taught micro-teaching using WhatsApp

Group	n	Mean	Standard deviation	df	t-value	p-value	Decision
Male	86	65.75	10.08	163	4.071	.000	Rejected
Female	79	68.84	8.79				

Note. Not significant at 0.05 ($p > 0.05$)

DISCUSSION OF RESULTS

The result of hypothesis one was accepted, and this mean there was no significant difference in the mean scores of both male and female students on the Telegram platform. This result was due to the lack of prompt and frequent interaction as displayed by the students on the Telegram platform, which eventually influenced their final scores in the achievement test. Since interaction was generally low, it therefore resulted into both male and female performing at the same level. This shows the platform is gender friendly. This finding is in line with Naderi and Akrami (2018) whose study reported that there was no significant difference in the mean achievement of male and female students taught reading comprehension using Telegram platform. It is also in agreement with Dambo and Kayii whose study revealed no significant difference in the performance of male and female students exposed to blended learning strategy. Furthermore, the finding is in congruence with Jimoh et al. (2018) who reported no significant difference in the mean achievement of male and female students exposed to three modes of mobile instructional packages. Additionally, the finding equally aligns with that of Kareem et al. (2018) whose result revealed no significant difference in the mean achievement of male and female fine arts students taught sculpture using Facebook platform. Finally, this finding goes in concordant with Ofoka (2019) whose study revealed no significant difference in the performance of male and female students exposed to Facebook instruction.

The result of hypothesis two was tested and it was subsequently accepted. This therefore means that there was no significant difference in the mean scores of both male and female students exposed to instruction on the WhatsApp platform. This was due to the fact that since the students on the WhatsApp platform generally performed better by displaying high engagement and interaction, male and female students performed at the same levels in the achievement test because they both demonstrated some high levels of interaction, discussion and prompt response to questions. This finding agrees with Bawa and Ibrahim (2016) whose study revealed no significant difference in the achievement of undergraduate students exposed to instruction using blended WhatsApp instruction. It also tallies with Jafari and Chalak (2016) who reported no significant difference in the performance of male and female students taught vocabulary using WhatsApp platform. Furthermore, the finding also goes in tandem with Ofoka (2019) whose study revealed that there is no significant difference in the achievement of male and female agricultural science students exposed to instruction using WhatsApp, Blog and Facebook platforms. Additionally, the finding concurs with Ilobenke et al. (2018a) whose study found no significant difference in the mean achievement of male and female educational technology students exposed to instruction using

WhatsApp and Facebook platform. However, the finding contradicts that of Omar (2021) whose study revealed the existence of a significant difference in the performance of male and female students taught writing and speaking skills using WhatsApp platform. Finally, it also goes in parallel with Safitri (2021) whose study found a significant difference in the performance of male and female staff in favour of the male when exposed to vocabulary test using WhatsApp platform.

The result of hypothesis three was tested and it was accepted. This therefore means that there was no significant difference in the mean retention scores of both male and female students exposed to instruction using Telegram platform. This result was possible because interaction and engagement by students was generally low on the Telegram platform, which therefore led to both male and female students performing at the same rate in the retention test because the difference in their retention scores was not significant. This finding agrees with that of Achor et al. (2013) whose study discovered no significant difference in the mean retention scores of male and female students exposed to instruction using a computer-based instructional strategy. More so, this finding is also in congruence with Gambari et al. (2014) whose study revealed that there is no significant difference in the mean retention scores of male and female students exposed to instruction using computer animation and geometry model instruction. Additionally, this finding agrees with that of Ofoka (2019) whose study found no significant difference in the mean retention scores of male and female students exposed to instruction using Facebook and blog instruction. However, this finding disagrees with Owodunmi and Ogundola (2013) whose study revealed that there is a significant difference in the mean retention scores of male and female students exposed to electronic instruction using reflective inquiry method in favor of the female.

The result of hypothesis four was tested, and it was rejected. This therefore means that there was a significant difference in the mean retention scores of both male and female students exposed to instruction using Telegram platform in favor of the female. This finding is in congruence with Ceylan and Elitok Kesici (2017) whose study found a significant difference in the mean retention scores of male and female students exposed to instruction using a blended learning strategy. However, this finding is not in agreement with Ajai and Amoke (2015) whose study revealed that male and female students did not differ in their retention scores when exposed to instruction using a problem-based learning approach. Going further, it is also not in tandem with Ofoka (2019) whose study revealed that there is no significant difference in the mean retention scores of male and female students exposed to instruction using WhatsApp platform. Moreover, this finding does not equally agree with Eze et al. (2016) whose study found no significant difference in the mean retention scores of male and

female students taught financial accounting using problem-based teaching method. Finally, the finding does not also fall in line with Bupo (2019) whose study found no significant difference in the mean retention scores of male and female accounting students exposed to instruction using MOODLE-based blended learning approach.

CONCLUSIONS

The findings on deployment of Telegram and WhatsApp platforms in collaborative learning settings in the teaching of microteaching to tackle individual differences occasioned by gender has proven to be effective and this means the two platforms when used in collaborative learning settings have what it takes to tackle individual differences resulting from gender. From most of the findings, both male and female students performed equally, and this further lays credence to the fact that social media have the potential to close gender gaps by bridging the individual differences that exist as a result gender.

Recommendations

Based on the findings of this study, the following recommendations are hereby made:

1. Lecturers should deploy the use of social media tools like Telegram and WhatsApp in collaborative learning settings to bridle the individual differences occasioned by gender.
2. Lecturers should adopt the use of social media tools like Telegram and WhatsApp in collaborative learning during classroom instruction because they are engaging, interesting, and flexible.

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