Assessment of Instructional Efficacy of Social Media on Students’ Achievement in Measurement and Units

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Abstract:
The study ascertains the instructional efficacy of social media on students’ achievement in measurement and units. Two research questions and hypotheses guided the study. Quasi-experimental design of non-equivalent control group design was adopted. The study was carried out in Nsukka Local Government Area (LGA) of Enugu State. The population of the study is two thousand, eight hundred and eight-five (2885) (1392 males and 1493 female ) senior secondary class one (SS1) students in the 30 public senior secondary schools in Nsukka LGA. Fifty-nine (59) (26 males and 33 females) SS1 students were selected from two intact classes sampled for the study formed the sample. Purposive sampling technique was first used to select two schools with similar characteristics. Measurement and Unit Achievement Test (MUAT) was used for data collection. Two reliability estimates were employed; they are estimate of temporal stability and estimate of internal consistency using Pearson Product Moment Correlation and Cronbach Alpha formulae with the following reliability indices, 0.72 and 0.75 gotten. The experimental group was taught using lecture method lesson note built on Whatsapp social media platform while the control group was taught using lecture method only. Before the treatment, the two groups were pretested using MUAT. After the treatment, MUAT was reshuffled and administered as post-test to the two groups and their scores collated. Mean and standard deviation were used to answer all the research questions while the hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA). Findings revealed a significant difference in the academic achievement of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only in favor of group taught using lecture method built on social media (Whatsapp) and that gender has no influence on students’ academic achievement in measurement and units when taught using lecture method built on social media (Whatsapp). Based on the findings the researchers recommended among others that lecture method built on social media platform like WhatsApp should be adopted by science teachers because it enhances the
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academic achievement of the students, save instructional time when managed properly, and reduces the limitations of lecture method of being teacher dominated.

**Key words:** Social Media, measurement and units and gender

**Introduction:**

Globalization enabled tools have bridged the boundaries of the world to the extent that every part of the world can be seen and reached at a glance. Consequent upon this boundless world is social media. Social media is a web-based application groups that are shaped by the technological and ideological characteristics of Web which provide users an opportunity to create and modify the content (Kaplan & Haenlein, 2010). It is an online-base chatting tools that connects people with common interest. Social media has changed the visual narrative of how people communicate and share information. Through social media information and messages fly like birds within shortest time possible. To this end, it has become an online platform for advertisement, shopping, political campaign, information dissemination, and educational content sharing.

Regrettably, despite the advantages of social media, it has not been sufficiently deployed into teaching and learning. Based on this, Camila, İbrahim and Dalhatu (2013) aver that social media has become one of the most influential communication tool which could be effectively used on teaching process. This assertion was corroborated by Bedir and Gülçü (2016) who posit that teachers and students could effectively discuss and exchange their course related ideas via social media. The youth are full of energy; some have channeled this energy to online chatting and gaming and other unwholesome activities. But if teachers can redirect their teaching by employing social media tools in the process of teaching, learning outcome could be enhanced and energies of the youth will be rechanneled into useful academic venture. Teachers can build their lessons into social media cites like Facebook, Whatsapp, 2go, twitter, Myspace, Instagram, and Blogging Cites among others and use that platform in teaching the students especially during free periods like during weekend, evening time and holiday. This could help teachers to save instructional time and manage well the nonflexible time table regime inherent in the curriculum.

Also, lecture method being a teacher dominated method of teaching has received wider condemnation by scholars (Agommuoh & Nzewi, 2002; Osemwinyen, 2009; Ikeh, Ugwuanyi, & Orji, 2016). The criticism notwithstanding, lecture method could be improved upon by building the teacher’s lesson note into social media platform, and use the medium in teaching students. It is hoped that the visual interactiveness of social media platform in which the teacher’s lesson note has been built upon could help increase students interest and in turn their achievement. Therefore there is need to establish whether or not social media in which the teacher’s lesson note is built upon could help in promoting students ‘academic achievement especially in measurement and units.

Measurement and units is a term that finds application in various field of learning. Physics, Chemistry and Biology students for instance are expected to acquire skills on how to measure length, breadth, and height of an object using metre rule; volume of substance using cylinder, pipette, and flask; diameter of an object using vernier caliper and micrometer screw gauge; time using stop watches and clock; and mass of a regular and irregular shaped objects. Students are equally expected to know the units of the measured quantities. The knowledge and skills acquired by students can help them become self reliant and entrepreneurs in the area of carpentry work, upholstery, electronics workshops, laboratory work, and cloth industries to mention but few. It is against this backdrop, that the researchers sought to determine the instructional efficacy of lecture method built on social media (whatapp) on
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students’ academic achievement in measurement and units; and the influence of gender on students ‘achievement when taught using lecture method built upon social media network (whatapp).

Purpose of the Study:
The general purpose of the study is to determine the instructional efficacy of lecture method built on social media (Whatsapp) on students' academic achievement in measurement and units. Specifically the study intends to determine the:

1. Efficacy of lecture method built on social media (whatsapp) on students' academic achievement in measurement and units.
2. Influence of gender on students academic achievement in measurement and units.

Research Questions:
1. What are the mean achievement scores of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only?
2. What are the mean achievement scores of male and female students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only?

Hypotheses:

Ho₁: There is no significant difference between the mean achievement scores of students taught measurement and units using lecture method built on Whatsapp and those taught using lecture method only.

Ho₂: There is no significant difference between the mean achievement scores of male and female students taught measurement and units using lecture method built on whatsapp and those taught using lecture method only.

Methodology:
Design adopted for this study is quasi- experimental research design. Specifically, non-equivalent control group design. According to Nworgu (2015), quasi- experimental research design is the most powerful and valid design for establishing the cause of any given effect and it thus suits the present study. The study was carried out inNsukka Local Government Area (LGA) of Enugu State. Nsukka LGA was chosen by the researcher for the fact that the schools within the LGA have the necessary attributes such as the existence of the first indigenous higher institution where teachers are trained and informed of innovative teaching methods which may in turn influence their students on the usage of modern technology in teaching. The population of the study is two thousand, eight hundred and eight-five (2885)(1392 males and 1493 female ) senior secondary class one (SS1) students in all the public senior secondary schools in Nsukka LGA. The sample for the study is fifty-nine (59) SS1 students selected from two intact classes sampled for the study. This is made up of twenty-six (26) males and thirty-three (33) females. Purposive sampling technique was first used to select two schools with similar characteristics (in terms of level of achievement in physics). Simple random sampling techniques was used to select one intact SS1 class from each of the two schools, and the intact classes were randomly assigned to experimental and control group.

The instrument used for the data collection on this study was titled "Measurement and Unit Achievement Test (MUAT)". MUAT was developed by the researcher. Measurement and Unit Achievement Test (MUAT) was used for both pretest and posttest. The instruments was made up of thirty (30) multiple choice questions with four (4) options lettered from A-D. The Measurement and Unit Achievement Test instrument with the marking scheme was validated by two lecturers from the department of Science Education, University of Nigeria, Nsukka. In order to determine the reliability of the instrument, the instrument was administered to a group of twenty (20) students in a school that is not part of the sampled schools, after about two weeks gap, MUAT was re-administered to the same group of students and their two scores were subjected to Pearson Product Moment Correlation formula . The correlation coefficient of
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0.72 calculated showed that the instrument is stable over two weeks. Thereafter, MUAT was administered to the same group of students and their scores then subjected to Kuder-Richardson formula 20 (KR-20) to establish the reliability of the instrument. A reliability coefficient of 0.75 was obtained which indicates that MUAT is reliable for the study.

Experimental Procedure:
The Measurements and Units Achievement Test (MUAT) was administered to the students and their initial responses were taken as the pre-test. The students were then exposed to the Measurements and Units lesson by their teacher using the already prepared lesson plans. The experimental group was taught using lecture method lesson note built on Whatsapp social media platform while the control group was taught using lecture method only. After the treatment, the same instrument was reshuffled and administered as post-test to the two groups and their scores collated.

The instrument was administered to all the students that are part of the sample for the study by the researcher and the two researcher assistants. The students in the control group were subjected to a print out copy of MUAT while those in the experimental group took their test online in the same whatapp platform. However, the experimental group students were gathered in one class and supervised in order to curtail malpractice. The researcher and the assistants coordinated the administration of the instrument.

Mean and standard deviation were used to answer all the research questions while the hypotheses were tested at 0.05 level of significance using Analysis of Covariance (ANCOVA).

Results:
Research Question 1: What are the mean achievement scores of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only?

Table 1: Mean and Standard deviation of students taught measurement and units using lecture method built upon Whatsapp and those taught using lecture method only

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Pre-test Mean</th>
<th>SD</th>
<th>Post-test Mean</th>
<th>SD</th>
<th>Mean Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>20</td>
<td>11.70</td>
<td>2.68</td>
<td>29.20</td>
<td>3.83</td>
<td>17.50</td>
</tr>
<tr>
<td>Control</td>
<td>39</td>
<td>12.62</td>
<td>2.95</td>
<td>23.17</td>
<td>2.68</td>
<td>10.55</td>
</tr>
</tbody>
</table>

The results in Table 1 showed that the pre-test scores for the experimental and control group are 11.70 and 12.62 respectively. This indicates a slight difference between the scores of the experimental and control group. The post-test scores indicate that the post-test mean achievement score for the experimental group is 29.20 with standard deviation of 3.83 while the post-test mean achievement score for the control group is 23.17 with a standard deviation of 2.68. Therefore the students’ taught using lecture method built on Whatsapp performed slightly better than those taught using lecture method only.

Hypothesis 1: There is no significant difference between the mean achievement scores of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only.
Table 2: Result of Analysis of Covariance (ANCOVA) of students' academic achievement in measurement and units

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>131.709a</td>
<td>2</td>
<td>65.854</td>
<td>6.847</td>
<td>.002</td>
</tr>
<tr>
<td>Intercept</td>
<td>1141.609</td>
<td>1</td>
<td>1141.609</td>
<td>118.698</td>
<td>.000</td>
</tr>
<tr>
<td>Pretest</td>
<td>14.347</td>
<td>1</td>
<td>14.347</td>
<td>1.492</td>
<td>.227</td>
</tr>
<tr>
<td>Method</td>
<td>102.635</td>
<td>1</td>
<td>102.635</td>
<td>10.671</td>
<td>.002</td>
</tr>
<tr>
<td>Error</td>
<td>538.596</td>
<td>56</td>
<td>9.618</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29668.000</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>670.305</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .196 (Adjusted R Squared = .168)

Result in Table 2 shows that an F-ratio of 10.671 was obtained with associated probability value of .002. This observed level of significance is less than the probability level of 0.05 (F = 10.671, p < 0.05). Thus null hypothesis was rejected. The conclusion was that there was a significant difference in the mean achievement scores of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only.

Research Question 2: What is the influence of gender on students' achievement in measurement and units when taught lecture method built on social media (Whatsapp)

Table 3: mean and standard deviation scores of male and female students' achievement scores in experimental group

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Pre-test Mean</th>
<th>SD</th>
<th>Post-test Mean</th>
<th>SD</th>
<th>Mean Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26</td>
<td>12.65</td>
<td>3.11</td>
<td>22.53</td>
<td>2.89</td>
<td>9.88</td>
</tr>
<tr>
<td>Female</td>
<td>33</td>
<td>12.03</td>
<td>2.69</td>
<td>21.88</td>
<td>3.77</td>
<td>9.85</td>
</tr>
</tbody>
</table>

The result in Table 3 showed that the pre-test scores of male and female students are 12.65 and 12.03 with standard deviations of 3.11 and 2.69 respectively, whereas the post-test score for male and female students are 22.53 and 21.88 with standard deviations of 2.89 and 3.77 respectively. From this result, the male students taught using
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lecture method built on social media (Whatsapp) performed better than their female counterparts.

**Hypothesis 2:** There is no significant difference between the mean achievement scores of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only.

Table 4: Result of Analysis of Covariance of the influence of gender on students’ academic achievement in measurement and units

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Type III Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrected Model</td>
<td>159.698 a</td>
<td>4</td>
<td>39.925</td>
<td>4.222</td>
<td>.005</td>
</tr>
<tr>
<td>Intercept</td>
<td>1141.096</td>
<td>1</td>
<td>1141.096</td>
<td>120.678</td>
<td>.000</td>
</tr>
<tr>
<td>Pretest</td>
<td>13.415</td>
<td>1</td>
<td>13.415</td>
<td>1.419</td>
<td>.239</td>
</tr>
<tr>
<td>Gender</td>
<td>9.740</td>
<td>1</td>
<td>9.740</td>
<td>1.030</td>
<td>.315</td>
</tr>
<tr>
<td>Error</td>
<td>510.607</td>
<td>54</td>
<td>9.456</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>29668.000</td>
<td>59</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Corrected Total</td>
<td>670.305</td>
<td>58</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. R Squared = .238 (Adjusted R Squared = .182)

Result in Table 4 shows that an F-ratio of 1.030 was obtained with associated probability value of .315. This observed level of significance is greater than the probability level of 0.05 (F = 1.030, p > 0.05), implying that the null hypothesis was accepted. The conclusion was therefore reached by the researcher that there was no significant difference in the mean achievement scores of male and female students in measurement and units taught using lecture method built on social media (Whatsapp).

**Summary of Findings:**

From the analysis above, the following were found:

1. There is a significant difference in the academic achievement of students taught measurement and units using lecture method built on social media (Whatsapp) and those taught using lecture method only in favor of group taught using lecture method built on social media (Whatsapp).

2. Gender has no influence on students’ academic achievement in measurement and units when taught using lecture method built on social media (Whatsapp).

**Discussion of Findings:**

The result showed that the mean gain for experimental group was a little higher than that of the control group. Further analysis showed that the Whatsapp teaching aid brings about significant increase in the achievement of students in measurement and units than those taught with lecture method only. These findings are in agreement with those of Danjuma (2015) whose study also showed that Computer-Assisted Instruction (CAI) has the potential of enhancing students’ academic achievement in Mechanics and Properties of Matters concepts. This may be attributed to the fact that teaching with Whatsapp is interactive in nature unlike using lecture method only which could be boring. This can also be
because teaching with Whatsapp gives introvert students the freedom to express themselves. It also helps to enhance students' learning since it is learner-centered. This finding corroborated with finding of Sarsar, Basbay, and Basbay (2015) who found that Facebook helped students to meet their expectations during online course and promoted in them positive attitude towards the course. Also, the finding varies with the finding of Alwagant, Shahzad, and Alim (2015) who found that no linear relationship among students’ weekly social media use and their grade point average and that time management negatively influenced students’ achievement. Hence, it could be inferred that what affect achievement of students negatively is time management, not the social media itself. This then suggests that a student that manages his/her time well in social media cite especially for academic purpose may not have issues with his/her learning.

Research question two sought the influence of gender on students' achievement in measurement and units. The result showed that the mean gain for male student is higher than that of the female students. Further analysis showed that the gender does not significantly influence students' academic achievement in measurement and units. The findings is in line with that of Danjuma (2015) whose study also showed that gender has no significance influence on physics students. This may be attributed to the fact that social media bridge gender gap since it provides male and female students alike equal access to education.

Conclusion and Recommendation:

From the results obtained from this study on the effect of lecture method built on social media (Whatsapp) on students' academic achievement in measurement and units. It was concluded that using lecture method built in a social media platform like Whatsapp improves students learning and their achievement. It was equally concluded that lecture method built in a social media platform is gender friendly. Based on the findings of this study, the following recommendations were made:
1) The use of lecture method built on social media platform like WhatsApp should be adopted by science teachers because it enhances the academic achievement of the students, save instructional time when managed properly, and reduces the limitations of lecture method of being teacher dominated.
2) Professional organization like Science Teachers Association of Nigeria (STAN) and schools should aid in popularizing the use lecture method built on social media platform like Whatsapp through seminars, workshop, and conferences and in writing.

References:

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