

# Integrating Whatsapp Application Into Learning Process: Effects On Preservice Teachers' Interest In Chemistry In Colleges Of Education

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*Abstract: The study focused the effect of integrating whatsapp application into the learning process on the interest of pre-service chemistry teachers. The purpose of the study was examine whether significant changes in pre-service teachers' interest in learning chemistry when whatsapp social-media application was integrated into their learning process. Two research questions and three hypotheses guided the study. The quasi-experimental design pretest posttest non-equivalent control group design was adopted for the study. 71 second year pre-service chemistry teachers from College of Education in Delta state were involved in the study. Chemistry Interest Scale (CIS) validated experts from the departments of science education and education foundations, Nnamdi Azikiwe University, Awka. The reliability of the instrument was established using cronbach's alpha which yielded coefficient of internal consistency of 0.68. Data obtained were analyzed using mean, standard deviation, and Analysis of Covariance (ANCOVA). The results showed that there was a significant difference between the mean interest scores of pre-service teachers in the experimental group and control group in favour of the experimental group. There was no significant interaction effect of gender and teaching methods on students' interest. The study recommended that higher education institutions should create social media blog sites and data-bases where pre-service teachers can share knowledge over concepts with all other people in the academic community*

*Keywords: interest, whatsapp, chemistry, pre-service, college*

## I. INTRODUCTION

Poor knowledge of the subject matter content of chemistry and the corresponding attributes of an effective teacher have been lacking among chemistry teachers especially in secondary schools. The root of the problem seems to be resident in the chemistry pre-service teacher training process. Worse still, their micro-teaching assessment and teaching practice exercises sometimes indicated poor skills in the knowledge and effective use of instructional strategies suitable for science teaching. It has been observed the researchers that the sometimes students taught by pre-service teachers in their final year teaching practice exercise had poor achievement in the term's examination. This connotes poor achievement level of pre-service teachers both

in knowledge and application skills. Lack of communication and feedback interaction among pre-service teachers with their students could also be a causal factor as well as the instructional strategies used in the training process. The use of social-media integrated instruction has been suggested to bear benefits that could help improve the achievement of pre-service teachers and their content knowledge of chemistry concepts.

Social media are computer mediated tools that allow people to create, share, or exchange information, career interests, ideas and pictures/videos in virtual communities and networks. Social Network Sites (SNSs) like, Facebook, Orkut, Linkedin and Twitter have involved millions of users, many of whom have hinged these social sites into their day-to-day lives (Zahid, Adnan, Naeem, Ehsan, & Maqsood, 2013). Social

media sites help strangers to connect on shared interests, religious, political views, or some other happenings. Social media therefore, is the collective of on-line communications channels dedicated to community-based input, interaction, content-sharing and collaboration.

Social media sites also differ in the extent to which they include new material and communication tools, such as mobile logging, blogging, video conferences, audio calls and photo/video-sharing. Social networking media were mostly designed to be globally accessible and reachable; with many enticing and homogeneous inhabitants. Prominent among the shared interests are education view. This makes social media networks and applications easily adaptable for educational purposes. Social media are the various medium of communication over an electronic platform through the use of internet enabled application such as Whatsapp.

Whatsapp was created in January, 2010. It is an online tool that is a proprietary cross-platform instant messaging client for smartphone. Ishfaq and Forste (2011) noted that it uses internet to send text messages, images, videos, user location and audio messages to other users using standard cellular mobile numbers. Thus, it becomes a good avenue for teaching and learning. Through the use of whatsapp, students can exchange idea about concepts learnt with text messages, images and videos. Whatsapp is a social media application that enables users to create user identity modules with their phone numbers for sharing information in the form of voice, graphic, video, text and Hyper Text Markup language (HTML) files (Ishfaq & Forste, 2011).

Social media integrated learning has to do with student learning through the use of social media networks (Hayem, 2014). Such kind of learning involves sharing lectures notes, getting information from blog sites, wikis, and sharing them with students. Social media integrated learning may also involve the creation of chat fora, blog sites and communication groups, where students can interact with other students, within the school or outside the school, or with the teacher over subject contents learnt (Junco, 2013). Tutorial videos, simulations and other multimedia files relating to what are learnt can be shared over social networks, enabling learning to learn more. The students in this instance can feel free to ask questions and learn either from their fellow students or teachers. Social media integrated learning can be carried out using any social media application such as whatsapp, facebook, blog sites, and other messenger applications. In this study, whatsapp was used.

Englander, Terregrossa, and Wang (2010) proclaimed that social media usage is negatively associated with academic performance of student users and destructive impact of internet usage is far more momentous than its advantages. Social media addiction has come forth as a result of striking boost in internet usage over the past few decades. Nalwa and Anand (2003) reported that addicted users using internet set back their personal and professional responsibilities and this ultimately leads to poor academic performance. Karpinski (2009) stated that Facebook users devoted lesser time to their studies than the nonusers did and subsequently had lower GPAs. Karpinski (2009) also noted that among various unique distractions of every generation, Facebook has been proved as the major distraction of current

generation. Kubey, Lavin and Barrows (2001) reported that impairment of academic achievement and internet dependency are correlated with the use of synchronous communication applications including social networking sites and chat rooms. American Educational Research Association conducted a research and it was declared on its annual conference in San Diego, California that Social Network sites (SNS) users study less and generated lower grades eventually.

There are benefits and risks associated with using any social network. There have been reports regarding its effect on students' academic performance. Researchers (Wang, Cheng & Liang, 2011) investigated the end result of social networking usability among College students and with their academic performance. They found a poor effect and influence when the media is overused in such a way that does not academically improve learning or its process. Other researchers (Ahmed & Quzi, 2011) examined this same problem but found either no significant relationship between using social networking and student academic performance, or a positive relationship between social media and students' academic performance (Pasek & Hargittai, 2009).

Researchers however found a positive association between use of internet and SMs and academic achievement of the student users (Lam, 2012; Theodora, 2011; Tuan & Tu, 2013). Students, using internet and social media more, scored higher on reading skills test and had higher grades as well. Also it has been found that Facebook usage is helpful for cure in case of some psychological problems including low life-satisfaction and low self-esteem (Ellison et al., 2007). SM also provides a rich mean of interaction between teachers and students as stated by Roblyer, McDaniel, Webb, Herman and Witty (2010). Roblyer et al. posited that informational use of internet is positively correlated with civic indicators of social capital such as civic engagement, interpersonal trust, and life contentment. Pasek and Hargittai (2009) stated that a site-specific culture can both positive and negatively affect the building of social capital. Pasek and Hargittai (2009) also found that Facebook usage is not positively associated with lower grades of the students rather found Facebook users scoring higher grades. No association was found between GPAs of student users and Facebook usage in a study conducted by Kolek and Saunders (2008). SMs promote interactivity among students and teachers. In a research Lovitts and Nelson (2000) found that strong integration of students into their professional and social life is sturdily correlated to the successful completion of their degree. These findings on the influence of social-media on students' achievement are inconclusive and raises the need to further examine the effect on students' interest in learning.

#### PURPOSE OF THE STUDY

The purpose of the study was to investigate the effect of integrating whatsapp application into the learning process on the interest of pre-service chemistry teachers.. Specifically, the study sought to determine the:

- ✓ Difference in the mean interest scores of pre-service teachers taught chemistry using whatsapp application in the learning process and those not exposed to it.

- ✓ Influence of gender on the pre-service teachers' interest in chemistry.
- ✓ Interaction effect of teaching strategies and gender on pre-service teachers' interest.

## RESEARCH QUESTIONS

- The following research questions guided the study.
- ✓ What is the difference between the mean interest scores of mean interest scores of pre-service teachers taught chemistry using whatsapp application in the learning process and those not exposed to it?
  - ✓ What is the difference between the mean interest scores of male and female pre-service teachers taught chemistry using whatsapp application in the learning process?

## HYPOTHESES

The following hypotheses were tested at 0.05 level of significance:

- ✓ There is no significant difference between the mean interest scores of pre-service teachers taught chemistry using whatsapp application in the learning process and those not exposed to it.
- ✓ There is no significant difference between the mean interest scores of male and female pre-service teachers taught chemistry.
- ✓ There is no significant interaction effect of teaching strategies and gender on pre-service chemistry teachers' interest in chemistry.

## II. METHOD

The design for the study was quasi-experimental design. The design for the study is elaborated in Figure 1.

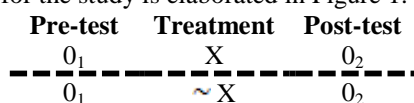


Figure 1: Design of the Experiment

Where,

E = Experimental Group

C = Control Group

$O_1$  = Pre-test

$O_2$  = Post-test

$X$  = Treatment using whatsapp

$\sim X$  = No experimental treatment

----- = non-equivalence of the two groups

The area of the study was Delta North senatorial district of Delta State. The population of the study was made up of 480 (245 males and 235 females) pre-service chemistry teachers in College of Education Technical, Asaba and College of Education Agbor (Source: Ministry of Higher Education, Asaba). Specifically, the study involved 200 level pre-service chemistry teachers. The sample size for the study was made up of 71 (38 females and 33 males) second year (200L) pre-service chemistry teachers obtained using a multi-stage sampling procedure.

The instrument for the collection of data was a Chemistry Interest Scale (CIS). CIS was a 20 items interest scale

developed by the researcher to determine the interest of students before and after treatment. The items were developed using a four-point scale of very much like VML, Like- L, Dislike D, very much dislike VMD. CIS was validated by three experts in the Departments of Science Education and Educational Foundations, Nnamdi Azikiwe University, Awka. The reliability of CIS was determined using Cronbach Alpha. The instrument was administered once on 40 pre-service chemistry teachers in College of Education, Warri. This was to determine the internal consistency of results across the test items (consistency of an individual's response from item to item and item homogeneity), to determine the degree to which all items measure a common characteristic of the individuals' interest. The computation reliability index of the instrument from the scores generated yielded a coefficient of 0.93.

The experimentation involved: first asking students who did not have whatsapp accounts to create same. This information was passed on by the course lecturer. The phone numbers used for the creation of the individual pre-service chemistry teachers' whatsapp accounts were gathered and submitted by the class captain to the researcher through the lecturer. The researcher used these numbers to group the pre-service chemistry teachers into five study groups. Thereafter, each number was added to one of the various study group whatsapp accounts with group page names: "Pservice teachers set 1", "Pservice teachers set 2", "Pservice teachers set 3", "Pservice teachers set 4", "Pservice teachers set 5". The pre-service chemistry teachers in the entire E-group were added to the general group page "PSERVICE TEACHERS SET". This was done in the first week and in the same week, the CAT pre-test was also administered without a feedback.

The second to the eight week involved the normal lectures of the experimental and control groups on the selected topics with the conventional methods of the lecture of both groups. After the lesson for each week, the pre-service chemistry teachers in the experimental group were exposed to more information on the topic on the general page, with all efforts to make the lesson clearer. This involves posting contents of the material discussion plan instrument, tutorial clips on the lesson contents on the general group page, with related questions that could incite the group members to ask questions. Specific group questions and assignments were pasted on the individual group pages with a request by the lecturer to paste the answers to their individual group questions on the general page. This was done by the page coordinator (a participant) who was assigned by the researcher through the course lecturer. Other group members did same, with each group asking questions about what they did not understand by posting their questions on the general group page. This exercise was facilitated by the researcher who was made known to the students by the lecturer as the social media assistant. The whole exercise lasted for eight (8) weeks.

The control group was exposed to the same lesson content without any involvement with social media using the convectional teaching method. Their usual chemistry lecturers taught the students in this group. In the eighth (8th) week, the CAT was administered as a post-test with the CAT items and answer options reshuffled. Each correctly answered question earned the individual two and half (2.5) marks.

The research questions were answered using mean and standard deviation while the hypotheses were tested with Analysis of Covariance (ANCOVA) at 0.05 level of significance. The choice of ANCOVA was predicated on the fact that such robust statistics can help take care of the initial group differences among the students. The decision rule was that whenever P-value was less than 0.05, the null hypotheses was rejected, otherwise the null hypotheses was not rejected.

### III. RESULT

**RESEARCH QUESTION 1:** What is the difference between the mean interest scores of mean interest scores of pre-service teachers taught chemistry using whatsapp application in the learning process and those not exposed to it?

Groups	N	Pre-test Mean	Post-test Mean	Gain in mean score	Pre-test SD	Post-test SD
Experimental	30	24.27	79.65	55.38	3.39	2.69
Control	41	20.68	49.55	28.87	4.08	4.55

Table 1: Mean and Standard Deviation Scores in Pretest and Posttest of Experimental and Control Group

Table 1 shows that the treatment group taught using whatsapp integrated learning has a gain in mean score of 55.38. The control group had a gain in mean score of 28.87.

**RESEARCH QUESTION 2:** What is the difference between the mean interest scores of male and female pre-service teachers taught chemistry using whatsapp application in the learning process?

Method	Gender	N	Mean pre-test	Mean post-test	Gain in mean score	SD pre-test	SD post-test
Experimental	Male	10	22.61	81.22	58.61	2.43	3.67
	Female	20	25.80	78.20	52.40	2.22	4.30
Control	Male	10	21.84	50.53	28.69	4.70	4.05
	Female	31	19.80	48.80	29.00	4.50	4.85

Table 2: Mean and Standard Deviation Scores in Pretest and Posttest of Male and Female Pre-service Chemistry Teachers

Table 2 shows that the males in the experimental group have a gain in mean score of 58.61 while the female has a gain in mean score of 52.40. The males in the control group have mean gain score of 28.69 with the females having 29.00.

**HYPOTHESIS 1:** There is no significant difference between the mean interest scores of pre-service teachers taught chemistry using whatsapp application in the learning process and those not exposed to it.

Source	SS	df	Mean Square	F	Sig.	Decision
Corrected Model	20940.631 <sup>a</sup>	4	5235.158	255.500	.000	
Intercept	74353.845	1	74353.845	3628.809	.000	
Pretest	.031	1	.031	.001	.969	
Gender	20031.754	1	20031.754	977.642	.314	NS
Method	127.794	1	127.794	6.237	.014	S
Method *						
Gender	9.461	1	9.461	.462	.499	NS
Error	1782.619	66	20.490			
Total	414419.000	71				
Corrected Total	22723.250	70				

Table 3: Summary of ANCOVA analysis on significance of treatment methods and influence of gender on pre-service teachers' interest in chemistry

Table 3 shows that there was a significant main effect of the treatment on interest scores of the pre-service teachers,  $F(1, 70) = 6.237, P(0.005) < 0.05$ . Thus, the null hypothesis was rejected. Therefore, there is a significant difference between the mean interest scores of pre-service teachers taught chemistry using whatsapp application in the learning process and those not exposed to it in favour of those exposed to whatsapp application.

**HYPOTHESIS 2:** There is no significant difference between the mean interest scores of male and female pre-service teachers taught chemistry.

Table 3 also shows that there was no significant difference in the mean interest scores of the male and female pre-service teachers,  $F(1, 70) = 977.642, P > 0.05$ . Thus the null hypothesis was not rejected. Therefore, there is no significant difference between the mean interest scores of male and female pre-service teachers taught chemistry.

**HYPOTHESIS 3:** There is no significant interaction effect of teaching strategies and gender on pre-service chemistry teachers' interest in chemistry.

Table 3 further shows that there was no significant interaction of teaching strategies and gender on pre-service teachers' interest in chemistry,  $F(1, 70) = .462, P > 0.05$ . Therefore, the null hypothesis was not rejected. Thus, there is no significant interaction effect of teaching strategies and gender on pre-service chemistry teachers' interest in chemistry.

### IV. DISCUSSION

The finding of the study revealed that the integration of whatsapp application in teaching and learning chemistry enhanced pre-service chemistry teachers' interest in chemistry. The observed result could be explained from the fact that social media provides the platform for greater interaction among students and between their teachers. The interaction on social media results in cooperative learning with each student learning from their mates. It also allows for sharing of media files and content information relating to the learning material thereby ensuring deeper understanding of the concepts. The strategy of integrating whatsapp in the teaching and learning process therefore made learning all the more interesting for the students.

The arousal of interest when social media is integrated in the learning process can be attributed to the idea that students are introduced to a new form of learning and provide richer learning experience as students interact with the learning materials in the media. Students can surf the internet and find other related materials that offer better explanation and post them on group pages. Learning through videos and motion pictures as well as animations that could be exchanged on whatsapp platforms may have significant influence on students' interest in the learning of the concepts and affect students irrespective of their gender.

The findings of the study is in line with the findings of Aminu (2011) that media instructions positively affects



students' interest. The findings of the study also lend credence to the findings of Giginna (2013) that the use of technology such as increased students' interest and attention towards the concepts taught.

## V. CONCLUSION

It can be concluded from the study the integration of whatsapp application in the teaching and learning of chemistry enhances the interest of pre-service chemistry teachers in the subject area. It arouses and sustains interest in science learning.

## VI. RECOMMENDATIONS

The following recommendations are made based on the findings of the study.

- ✓ Higher education institutions should create social media blog sites and data bases where pre-service teachers can share knowledge over concepts with all other people in the academic community.
- ✓ Government and education stakeholders should organize seminars for teachers and pre-service chemistry teachers on how to integrate social media in the teaching and learning process and how to use it as a means for group study.

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