Impact of Social Media on communication of scientific concepts of first generation graduate learners in Kurinjipadi Village

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Abstract- *The present study aims to find the impact of Social Media in effective communication of scientific concepts of first generation under graduate learners in kurinjipadi village. The investigator has used pretest-posttest control group experimental group design in the present study. The experimentation is conducted to the 1st year first students of Thiruvalluvar Arts and science college, Kurinjipadi. These students are coming from the nearby rural places and are learners who are aspiring to be 1st graduates in their family. Students who have the access to smart phones are only selected for the present study. The students are selected on the basis of their performance in pre-test. The students are divided into 2 groups viz control and treatment group. The groups are matched for mean and standard deviation. Both groups consist of 30 students each. Scientific Concepts test designed by the investigator is used assess the scientific concepts of 1st generation graduate learners. The tool consists of 25 multiple choice questions covering the topics including Waste management, pollution & climate change, Non-renewable energy resources, Information security education, Effect of plastic use and health and nutrition. Results revealed that subjects in the experimental group who are communicated using social media for two months have performed better on the scientific concepts test than the subjects of the control group. It may be said that Social Media has enabled them to improve their understanding of scientific concepts.*

Keywords*:* Social Media, Communication, Scientific Concepts and first generation graduates

Introduction

We are living in an era of knowledge and communication revolution. Social media has revolutionized the way people interact, discuss, communicate and socialize with one another. Social media like Facebook, Twitter, LinkedIn, Instagram, Youtube etc. help the adolescents who live a sheltered life under their parents in their rural village to get the exposure about the society and the world at large. Many science research organizations have made science communication as an essential part of public outreach and education. In 80's and 90's, radio and television documentaries and public exhibitions and seminars were used as a means to science communication. However with the advent of high speed internet, social media

platforms have become an effective means for the scientists and science communicators to interact and share their ideas with common public.

NASA uses more than ten social media platforms including facebook, Flickr, Twitter, Youtube and Instagram to share various science photos and videos among genral public. Social media platforms are largely used by science communicators and scientists to connect with their peers for discussing their ideas. They share journal articles, circulate professional development opportunities, upcoming events and references. Current generation are more digital natives unlike our generation, when they take up science research, social media platforms will definitely transform and renovate the culture of science communication.

Puustinen and Edwards (2012) have found that twitter played an effective role in disseminating their research. They found that by tweeting about their research, their research paper was downloaded over 861 times in 24 hours. Nature (2011) published an article titled "Trial by Twitter" which tells about the concept of immediate reaction to published science research. Based on a social research report conducted on a sample of 80,000 internet users worldwide, it is found that 41% of the people use social media to stay connected on the current science news or events. Nature survey (2014) has found that around 50% of science scholars uses social media for following discussions, 30% uses to comment on their science research, 40% uses to posts their research content, 22% uses to contact their peers and 40% uses to discover recommended papers. (Nature, 2014)

Scientist Stephen Hawking was very active in twitter. He interacts with worldwide public to discuss both science and otherwise. Similarly Richard Dawkins' facebook pages are great fertile grounds in which great amount of fruitful scientific discussions takes place.

Craig-Hare, J et al (2017) investigated the types of argumentation discourse in social media on scientific topics. The study reveals that the experimental group students shows significantly higher use of social media to share scientific claims, discuss scientific phenomena, post counter arguments, demonstrate their scientific contents, convince other to see their point of view and opinions about science and to follow scientist and researchers on social media.

Social networking platforms results in communication patterns being more complex and leads to active students' engagement and achievement. (Schroeder and Greenbowe, 2009; Junco, Heiberger and Loken, 2011) Social media was used effectively in improving science attitudes and engagement and more in the case of developing ecological and environmental awareness. (Wilson and Boldeman, 2012; Karahan and roehrig, 2015 and Robelia, Greenhow and burton, 2011). Developing Youtube video by undergraduate chemistry students to communicate their understanding of organic chemistry results in development of divergent thinking (creativity) skills, critical thinking skills and communication skills. (Smith, 2014).

Students when playing physics focused digital games chatted with their fellow students and teachers actively than before. (Van Eaton, Clark and Smith, 2015)

Methodology

Research Method

The researcher is intended to find the impact of Social Media in effective communication of scientific concepts of first generation under graduate learners in kurinjipadi village. So the experimental method is used in the present study. The investigator has used pretest-posttest control group experimental group design in the present study.

O_1	C	O_2	X – Experimental Group
O_1	X	O_2	C – Controlled Group

O_1 – Pre Test O_2- Post Test

Research participants

The experimentation is conducted to the 1st year first students of Thiruvalluvar Arts and science college, Kurinjipadi. These students are coming from the nearby rural places and are learners who are aspiring to be 1st graduates in their family. Students who have the access to smart phones are only selected for the present study. The students are selected on the basis of their performance in pre-test. The students are divided into 2 groups viz control and treatment group. The groups are matched for mean and standard deviation. Both groups consist of 30 students each.

Research Tool

Scientific Concepts test designed by the investigator is used assess the scientific concepts of 1st generation graduate learners. The tool consists of 25 multiple choice questions covering the topics including Waste management, pollution and climate change, Non-renewable energy resources, Information security education, Effect of plastic use and health and nutrition. Validity of the tool is established by giving to tool to experts in science education and thereby making necessary changes. Tool reliability established by test-retest method is found to be 0.74.

Procedure in Phases

Phase I: Pretest is conducted to the students on the basis of their previous knowledge.

Phase II: Students are divided into two groups such that one group forms experimental group (Social media) and another groups forms control (No exposure to social media) Group. The groups are matched for mean and standard deviation.

Phase III: One group of students (Treatment group) is added as a group in Facebook and WhatsApp. Every day at least two messages (images/ texts/ videos/ presentation etc.) related to science concepts including Informative security education, pollution, plastics and its effects are shared. The other groups of students (Control group) are not given any specific instruction.

Phase IV: The post test is conducted to the two groups after the 2 months.

Phase V: The groups mean and standard deviation of pre-test and post test scores of experimental and control group are test for significance using 't' test.

Results and Discussion

1. Equating the Groups: The mean and Standard deviation of the pre test scores of experimental and control group on the achievement test that was administered on subjects in both groups were presented in table 1.

Table 1- Mean, standard deviation of pre test scores of control group and experimental groups

Category	Mean	SD	N	't'	Significance
Control Group	14.20	2.48	30	0.07	Not Significant
Exp., Group	14.50	3.56	30		

The groups are matched for mean and standard deviation. The difference between the groups is very small and insignificant as the calculated 't' value 0.07 is less than the table value at both levels.

2. Comparison of Post –Test Scores of Control and Experimental Group in Scientific concepts Test - The mean and standard deviation of experimental and control group of posttest scores on scientific concepts test that was administered on subjects in both groups were presented on table two.

Table 2- Mean, standard deviation and 't' value of post test scores of Control group and Experimental group

Category	Mean	SD	N	't'	Significance
Control Group	15.14	4.20	30	3.99	P<0.01
Exp. Group	21.60	2.86	30		

The subjects in the control groups have scored a mean of 15.14 in the scientific concepts test with a standard deviation of 4.20. The mean score of the subjects in the experimental group who used social media for two months were found to be 21.60 with a standard deviation of 2.86. The 't' value is found to be 3.99 which is found to be significant at table value of significance.

3. Comparison of pre and post–test Scores of Control Group in Scientific concepts test

Table 3- Mean, standard deviation and 't' value of pre test and post test scores of control group

Category	Mean	SD	N	't'	Significance
Pre test	14.20	2.48	30	0.25	Not Significant
Post test	15.14	4.20	30		

The Mean, Standards deviation and 't' value of pretest and posttest scores of control group is given in table-3. The mean and standard deviation of pre test and post scores of control groups are 14.20 and 2.48; 15.14 and 4.20 respectively. The calculated 't' value 0.25 is not significant at both levels.

4. Comparison of pre and post –test Scores of Experimental Group in Scientific concepts Test

Table 4- Mean, standard deviation and 't' value of pre-test and post test scores of Experimental groups

Category	Mean	SD	N	't'	Significance
Pre test	14.50	3.56	30	2.06	P<0.05
Post test	21.60	2.86	30		

On analysis of the Pretest and Posttest scores of Experimental group, the mean difference is found to be significant at table value of significance as the calculated 't value 2.06 is significant (Table-4)

Conclusion

This shows that the subjects in the experimental group who are communicated using social media for two months have performed better on the scientific concepts test than the subjects of the control group. It may be said that Social Media has enabled them to improve their understanding of scientific concepts.

Reference

Craig-Hare, J., Ault, M., and Rowland, A. (2017). The effect of socioscientific topics on discourse within an online game designed to engage middle school students in scientific argumentation. Journal of Education in Science, Environment and Health (JESEH), 3(2), 110-125.

Junco, R., Heiberger, G., and Loken, E. (2011). The effect of Twitter on college student engagement and grades. *Journal of Computer Assisted Learning*, *27*, 119–132. doi: 10.1111/j.1365-2729.2010.00387.x

Karahan, E., and Roehrig, G. (2015). Constructing media artifacts in a social constructivist environment to enhance students' environmental awareness and activism. *Journal of Science Education and Technology*, *24*, 103–118. doi: 10.1007/s10956-014-9525-5

Nature (2011) Trail by Twitter. Nature 469, 286 – 287. Doi: 10.1038/ 469286a

Nature (2014) Online Collaboration: Scientists and the social network. Retrieved from https://www.nature.com/news/online-collaboration-scientists-and-the-social-network-1.15711

Puustinen, K. and Edwards, R., (2012) Who gives a tweet? After 24 hours and 860 downloads, we think quite a few actually do. The Impact Blog, London School of Economics and Political Science [online].

Robelia, B. A., Greenhow, C., and Burton, L. (2011). Environmental learning in online social networks: Adopting environmentally responsible behaviors. *Environmental Education Research*, *17*, 553–575.doi: 10.1080/13504622.2011.565118

Schroeder, J., and Greenbowe, T. (2009). The chemistry of Facebook: Using social networking to create an online community for the organic chemistry laboratory. *Innovate: Journal of Online Education*, *5*(4), 9. Retrieved from http://nsuworks.nova.edu/innovate/vol5/iss4/3/

Sekhon, N and Krause, S (2018). Social Media Changing the Science Communication Landscape. Retrieved from http://www.jsg.utexas.edu/ science-yall/social-media-landscape/

Smith, D. K. (2014). iTube, YouTube, WeTube: Social media videos in chemistry education and outreach. *Journal of Chemical Education*, *91*, 1594–1599. doi: 10.1021/ed400715s

Van Eaton, G., Clark, D. B., and Smith, B. E. (2015). Patterns of physics reasoning in face-to-face and online forum collaboration around a digital game. *International Journal of Education in Mathematics, Science and Technology*, *3*(1), 1–13. doi: 10.18404/ijemst.10740

Wilson, K. L., and Boldeman, S. U. (2012). Exploring ICT integration as a tool to engage young people at a flexible learning centre. *Journal of Science Education and Technology*, *21*, 661–668. doi: 10.1007/s10956-011-9355-7