EFFECTS OF WEB 2.0 TECHNOLOGY ASSISTED SLIDESHARE, YOUTUB AND WHATSAPP ON INDIVIDUAL AND COLLABORATIVE LEARNING PERFORMANCE AND RETENTION IN TISSUES SYSTEM

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ABSTRACT
Web 2.0 tools includes wikis, blogs, social networking sites, and web applications for community interaction, inputs, content sharing, and collaboration. The study aimed to assess the effects of Web 2.0 technology assisted Slideshare, YouTube, and WhatsApp on the individual and collaborative learning performance and retention in tissues system. In this quasi-experimental research, there are three groups assigned for treatment in tissue system. Experimental group1 was exposed to web2.0 technology assisted individual Slideshare, Wiki, YouTube and WhatsApp modes of learning whereas Experimental group2 was treated with web2.0 technology assisted collaborative Slideshare, Wiki, YouTube and WhatsApp modes of learning, but lecture cum discussion intervention was provided to participants of traditional group. It was resulted there was significant effect of collaborative and individual web2.0 technology on the learning performance and retention of secondary school students over traditional group.
Key words: Individual and collaborative learning; performance and retention in tissues system; Slide share, YouTube and WhatsApp; Web 2.0 technology

INTRODUCTION
The classroom lecture is no longer being the primary source of acquiring information rather World Wide Web (WWW) has huge space for getting information where many documents and several web-based learning recourses, we are getting. The Uniform Resource Locators (URL) in hypertext links accessed via internet (Jena & Barman, 2018) could identify the learning materials. In addition, WWW is becoming a primary tool using to interact with internet. However, in past few decades, teachers used constructivism approaches but now teaching learning process is going through various online teaching tools empowered by ICT in www is helping in acquisition of knowledge via individual and collaborative modes (Jena, 2012). Even, we all are realizing that the growth of social media and web 2.0 technologies is recently affecting the global communication system through which where peoples are sharing and constructing knowledge for long time retention (Okello-Obura & Sekitto, 2013). So, it's very urgent to get a clear understanding on web 2.0 technology that we could be apply in the field of education and communication system. Especially, these tools are offering pedagogical benefits in the smart classroom learning and in online mode of learning resulted maximum benefit over the face to face interaction (Jena, 2013). However, Web 2.0 is the second generation of the World Wide Web focuses mainly on sharing and collaborating information through online platforms (Jena, 2014), but in the earlier version and the first stage of World Wide Web evolution; Web 1.0 was a static page and that was a primitive and restricted type of content served from the servers file systems. Web 2.0 is the modern online technology characterized by greater user interactivity, invasive network connectivity, collaboration and improved communication processes (Jena, 2018). Not only is that but also, web 2.0 is the evolutionary dynamic web motivates and encourages the users to share the feeling to others. Boulos, Maramba & Wheeler (2006) found that in society, web 2.0 is providing the opportunities of learning for supporting the organizational, technological, pedagogical innovations in education, technology and evaluation (Redecker, Ala-Mutka, Bacigalupo, Ferrari & Punie, 2009). Overall, we say, web 2.0 tools includes wikis, blogs, social networking sites, presentation programs, and web applications those are mostly using for community based interaction, inputs, content sharing, and other collaborative activities can be performed. Out of these, various social media websites like micro blogging, social curation, forums, bookmarks, social networking, e-mail, and wikis people prefer to share information (Jena, 2019).

INDIVIDUAL AND COLLABORATIVE WEB 2.0-ASSISTED LEARNING

Out of several literatures, a few studies reviewed those were closely relevant to the present research work, specially the studies related to individual and collaborative learning through Web 2.0 technology (Huffaker, 2004). It has significant relation with the individual and collaborative learning process (Jena, 2015a). Most of the studies about to the effect of web2.0 technology were conducted in USA, UK, Australia, Africa and other western countries but very few researches were conducted on the individual and collaborative web2.0 technology in India (Jena 2015b). Among these literatures, one study in India showed a significant result of web2.0 technology in both the learning modes (Jena, Bhattacharjee, Gupta, Das, & Debnath, 2018; Bose, 2010). In addition, different descriptive studies have been conducted and found that web2.0 technology is an effective online platform allowed learners at different levels to learn effectively in individual and collaborative learning environment (Jena, Gogoi & Deka,2016). And technology only could enhance the academic achievement of learners (Beldarrain, 2006; Exter, Rowe, Boyd & Lloyd, 2012; Grosseck, 2009; Jena, & Pokhrel,2017). One of the web based survey conducted by An, Aworuwa, Ballard & Williams in 2008 has been found the positive and significant effects of web 2.0 in communication, interaction, collaboration, reconstruction of knowledge, and in the skills of reading and writing in individual as well as collaborative platform(Jena, Deka, & Barman, 2017). Web2.0 technology could be used in individual and collaborative pedagogical practices those may be integrated in both formal and non-formal learning situation by using social media and other self-regulated learning modes (Dabbagh & Kitsantas, 2012). Two more research findings focused on the effect of wikis and blogs, and podcasting on learning and communication in the social constructivist environment found that wikis and blogs, and podcasting has significant effects on developing skills of communication and creativity(Cochrane & Bateman, 2008; Deka & Jena, 2017). Contrary to these studies, a few researchers (e.g. Bennett, Bishop, Dalgarno, Waycott & Kennedy, 2012; Cole, 2009; Grech, 2015) found there is no significant usage of web2.0 technology in individual and collaborative performance.

WEB 2.0 TECHNOLOGY EFFECTING THE PERFORMANCE AND RETENTION OF LEARNING

Web2.0 based learning instructions has a positive effect on the academic performance as well as retention of the learners (Jena, Bhattacharjee, Gupta, Das, & Debnath, 2018). In addition, a few researcher found that Web2.0 technology is a online platform where social networking tools are promoting and enhancing the academic performance of the learners (Alrahmi, Othman & Musa, 2014 ; Ajjan, Hartshorne & Buechler, 2012; Galy, Downey & Johnson, 2011 ; Huang, Hood & Yoo, 2014 ; Lambert, Kalyuga & Capan, 2009; Sejzi, Aris, Ahmad & Rosli, 2015; Yang, Guo & Yu, 2016). Moreover, some of the studies found that the web2.0 technology is online learning procedures being increased the retention level in among the learners (Abate, 2013; Sargent, Borthick & Lederberg, 2011). Contrary to these, a study found that web2.0 has no effect on the academic performance and retention level of the learners (Yildirim , Ozden & Aksu, 2010). The studies conducted by (Davis, 2012; Rashid & Asghar , 2016 ; Sana, Weston & Cepeda, 2012) found that the use of web2.0 technology had no effect on the academic performance and retention of the learners. We consider the findings of researchers and has been tried to assess the effects of web 2.0 technologies on learning performance and retention on the learners. However, the questions rose whether web 2.0 technology empowered slide share, YouTube and WhatsApp are effective over the traditional approaches? If it is then how individual and collaborative web2.0 technology would affect the learning performance and retention of the secondary school students over traditional approach?

OBJECTIVE

To study the effects of advanced Web 2.0 technology assisted slideshare, youtub and whatsapp on the individual and collaborative learning performance and retention in tissues system

HYPOTHESIS

1) The performance of individual and collaborative web2.0 technology assisted slide share, YouTube and WhatsApp training students in association with those in the comparison group will demonstrate better in tissue system.
2) The retention of individual and collaborative web2.0 technology assisted slide share, YouTube and WhatsApp training students in association with those in the comparison group will demonstrate better in tissue system.

METHODOLOGY

110 participants assigned for traditional (n=40), experimental group 1 (n=40) and experimental group2 (n=30). Out of 50 secondary schools, three schools and their respective students of class IX were randomly selected in Silchar town, Assam, India. In the traditional group (n=40, 14.5-15.5 age range & SD 0.41), experimental group1 (n=40, age ranged 14.5-15.3, SD 0.42) and in the experimental group 2 (n=30, age range 14.3-15.4, SD

0.44) were participate. Here non-randomization and selective manipulation principle used to conduct the experiment. Nonequivalent pretest posttest quasi-experimental design was used to conduct the experiment where sample units were not randomly selected rather the whole class students are the participants of the study. Individual and collaborative web2.0 technology assisted Slide share, Wiki, YouTube and WhatsApp applications used in experimental group1 and experimental group2 while traditional group was treated with traditional approach. During the intervention extraneous variables like history, maturation, regression, instrumentation and Hawthorne effect was minimized with ANCOVA techniques.

INSTRUMENTATION
Achievement Test on Tissue
The concept of Tissue test was developed for class IX students who were participated in the experiment. According to their biology course and contents, the pretest was developed by following all the standardized steps. The blueprint is prepared and accordingly domain and weightage was provided to the items. 25 multiple choice items with three strong distractors and one correct response was constructed for each item. Preliminary try out was conducted with six experts to find out the content validity ratio. The content validity ratio, test retest reliability, and Cronbach alpha reliability was estimated, and found 0.83, 0.85, and 0.89 respectively. Maximum 10 – 15 minutes needed to response whole items. An equivalent set of the posttest was developed on the tissues to assess their post intervention performance. During planning, a single blueprint was prepared for pretest and posttest for tissue but equivalent items with respect to the domains prepared to construct the equivalent set of test. 25 multiple choice items with three strong distractors and one correct response constructed for each item. Preliminary try out conducted with six experts to find out the content validity ratio. The content validity ratio, test retest reliability, and Cronbach alpha reliability found 0.83, 0.85, and 0.89 respectively. Maximum 10–15 minutes needed to response whole items. Delay test assess the retention of learning performance. After intervention, naturally posttest assigned to the students. However, minimum one month delayed of posttest if any test assigned to the student related to the intervention is retention test or delay test. The extraneous variable like maturation has significant role in this test and it could directly affect the response of the delay test. 25 multiple choice items with three strong distractors and one correct response constructed for each item. Preliminary try out conducted with six experts to find out the content validity ratio. The content validity ratio, test retest reliability, and Cronbach alpha reliability found 0.83, 0.85, and 0.89 respectively. Maximum 10 – 15 minutes needed to response whole items like pretest, posttest on tissue, delay test developed by following all the standardized steps. Content validity ratio established through Lawshe CVR 0.83, test retest and Cronbach alpha reliability o.86 and 0.89 respectively. Maximum 10-12 minutes needed to response the whole items.

PROCEDURE OF EXPERIMENT
Activity 1: Individual web2.0 (Slideshare, Wiki, WhatsApp, YouTube)

Forty class IX student of school II was assigned for individual web 2.0 technology assisted Slide share, Wiki, YouTube and WhatsApp based learning A special training program was organized on how to operate the laptop, desktop, smart phone and how to browse materials for learning purpose. The researchers installed hundred rupees data package to continue the internet facility. During the training, the researchers faced difficulties because 25% students have no laptop or desktop in their home. That is why, the researchers requested the school headmasters to provide their computer lab. It is another interesting fact that parents were requested to take their laptops and desktops to the school for their children's better training in online mode. Accordingly, parents installed their laptops or desktops in school for training. In day1, the researchers taught through Wiki and WhatsApp applications and in day2, the software like YouTube application and Slide share was installed and followed by that demonstration was given on how to learn online through YouTube and Slide share. No frequent feedback was given to the students. After the training programme, participants practiced and learnt tissue system of animal through Slideshare, Wiki, WhatsApp, and YouTube for two weeks. However, it was advised that at any difficulty participants could contacts to the researcher only through WhatsApp application. In this way, the two directional online learning processes were continued and completed the learning task on concept on tissues(See fig 1&2).

Activity 2: Collaborative web2.0 (Slide share, Wiki, WhatsApp, YouTube)
Thirty class IX students of school III was assigned to collaborative web2.0 technology assisted Slide share, Wiki, WhatsApp, and YouTube learning intervention on animal tissue system. Similar to individual web2.0 technology based training, parents of collaborative participants were requested to install their smart phone, laptop, and desktop in their classroom. Next day the training was organized regarding the installation of software applications and training on how to learn through these applications. No frequent feedback was given to the students. After the training programme, participants practiced and learnt tissue system concept through

collaborative Slideshare, Wiki, WhatsApp, and YouTube for two weeks. However, it was advised that at any difficulty participants could contacts to the researcher only through WhatsApp application (see fig 3&4).

Activity 3: Traditional treatment
Class IX students of school I were treated with traditional intervention. Tissue concept was analyzed and classified into learning specifications and followed by these traditional question-answering methods were assigned for learning better understanding. This process was continued upto two weeks and no frequent feedback was given to the students.

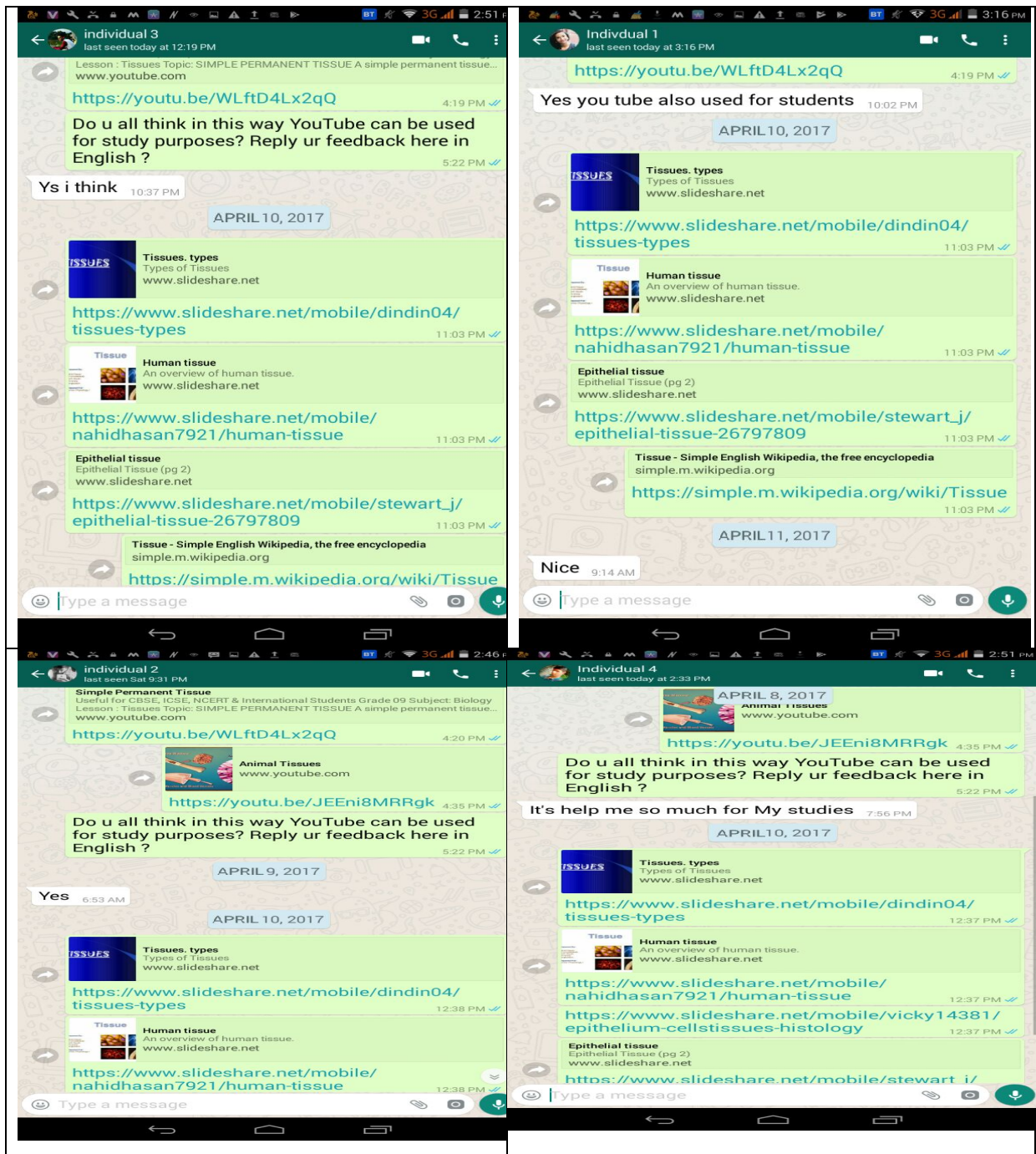Fig 1 *Individual web2.0 (Slideshare, Wiki, WhatsApp, YouTube)*

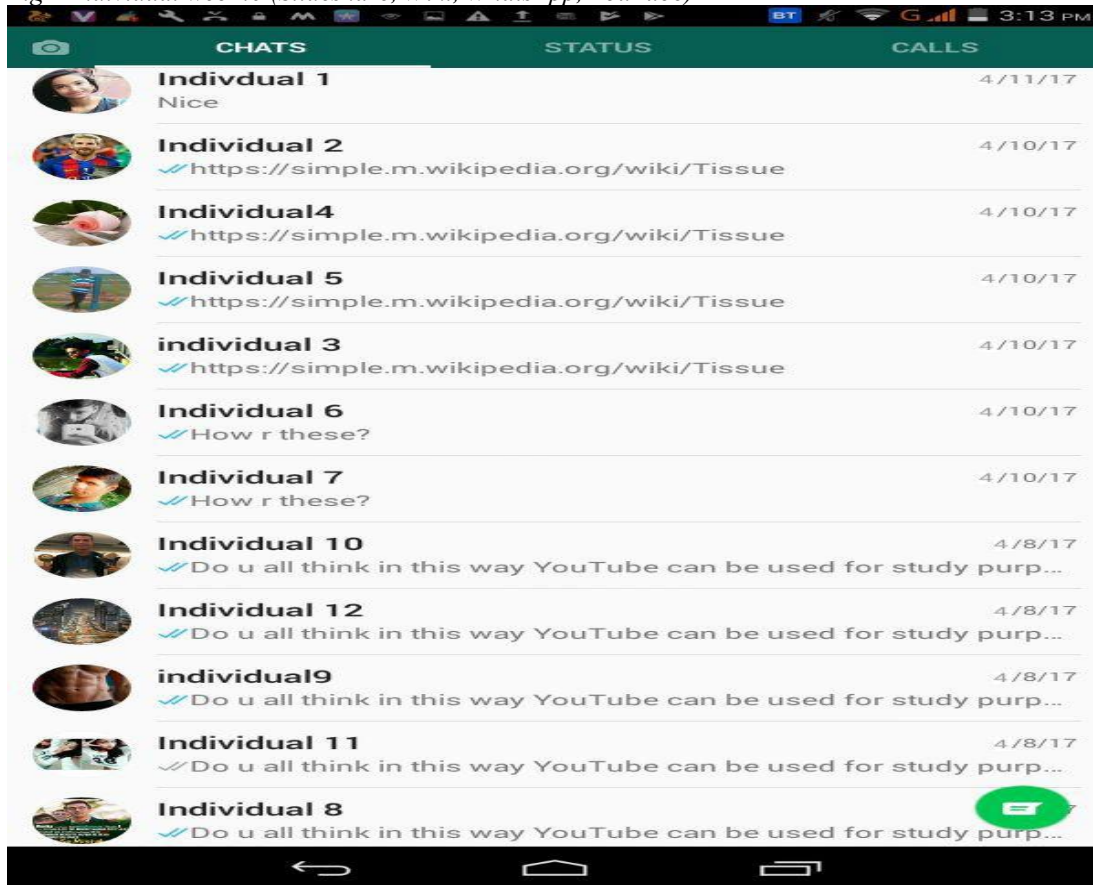Fig 2 Individual web2.0 (Slideshare, Wiki, WhatsApp, YouTube)

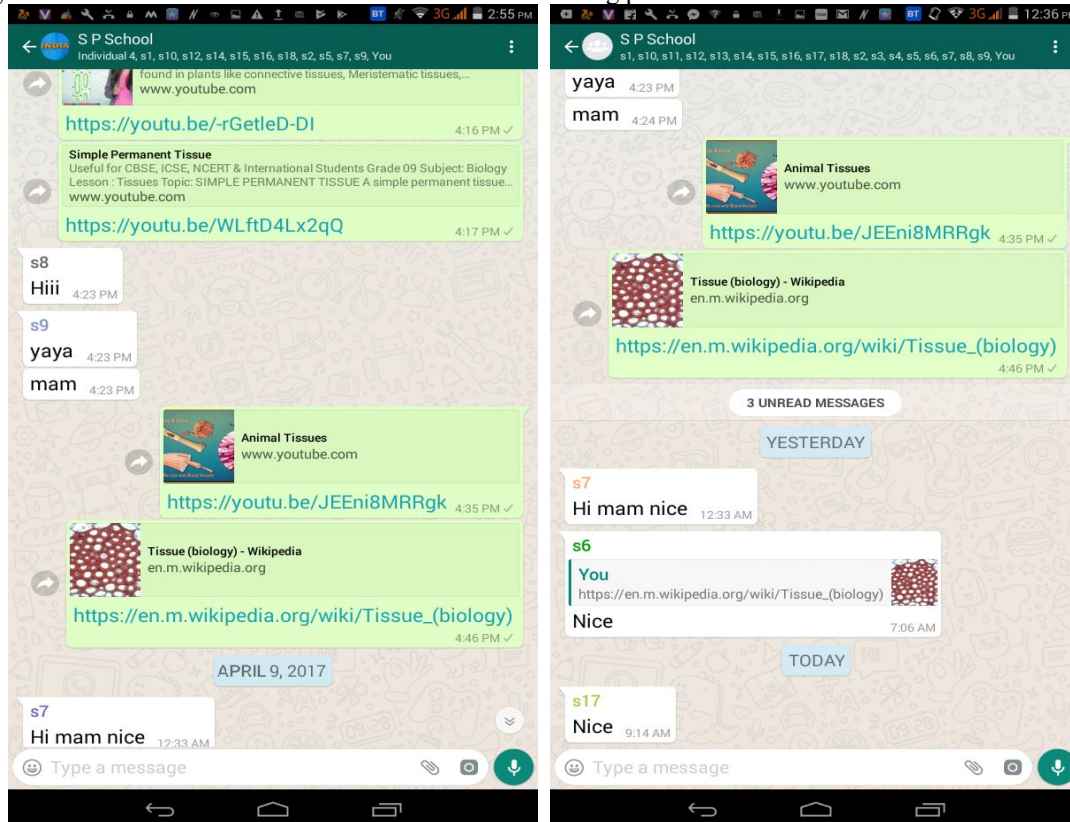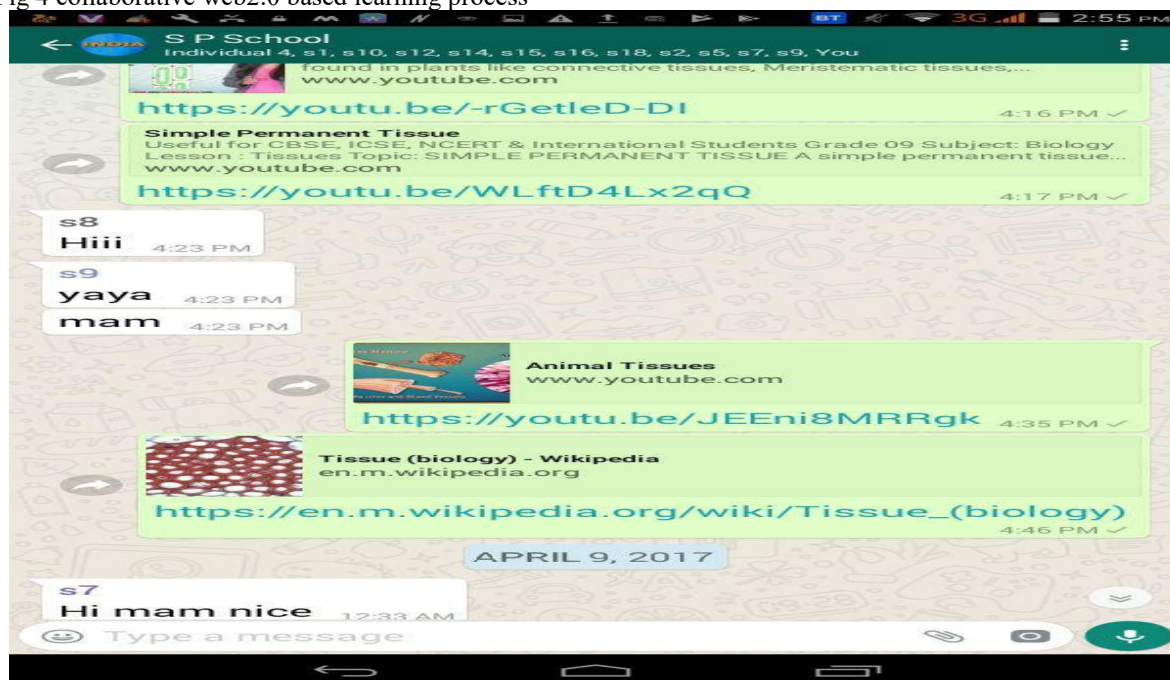Fig 3   Interaction of the collaborative web2.0 based learning process

Fig 4 collaborative web2.0 based learning process

PROCEDURE OF DATA COLLECTION

The present study is quasi-experimental research where three groups were assigned to treatment 1, treatment 2 and traditional approach to learn tissue contents. Experimental group I was treated web2.0 technology assisted Slide share, Wiki, YouTube and WhatsApp. Experimental group II was treated through collaborative web2.0 technology assisted Slide share, Wiki, YouTube and WhatsApp learning but traditional group was treated with lecture cum discussion method. According to the purpose of the study, the researchers administered pretest to all the three groups and after instruction; posttest was assigned to assess their learning performance. After two weeks of posttest, a delay test was administered to assess the retention level and the effectiveness of web2.0 technology based learning over traditional approach. Here pretest, posttest, and delayed test data were collected for analysis and interpretation to draw the inferences.

ANALYSIS AND RESULTS

Hypothesis 1 : The performance of individual and collaborative web2.0 technology assisted slide share, YouTube and WhatsApp training students in association with those in the comparison group will demonstrate better in tissue system.

Table 1.1 mean and SD of posttest of traditional, individual web2.0 and collaborative web2.0 learning

Group	Mean	S.D	N
Traditional	33.40	3.241	40
Individual Web2.0	41.75	2.318	40
Collaborative Web2.0	45.00	2.505	30
Total	39.60	5.584	110

The above table 1.1 reveals means and standard deviation (SD) of posttest of traditional, individual web2.0 and collaborative web2.0 assisted learning performance where traditional group posttest (m = 33.40 , SD = 3.241), individual web2.0 posttest (m=41.75, SD= 2.318) and collaborative web2.0 posttest (m=45.00, SD=2.505). Here the collaborative web2.0 technology assisted posttest mean performance was better than both traditional and individual web2.0 learning performance (see graph 1).

Graph 1 mean of posttest of traditional, individual web2.0 and collaborative web2.0 learning
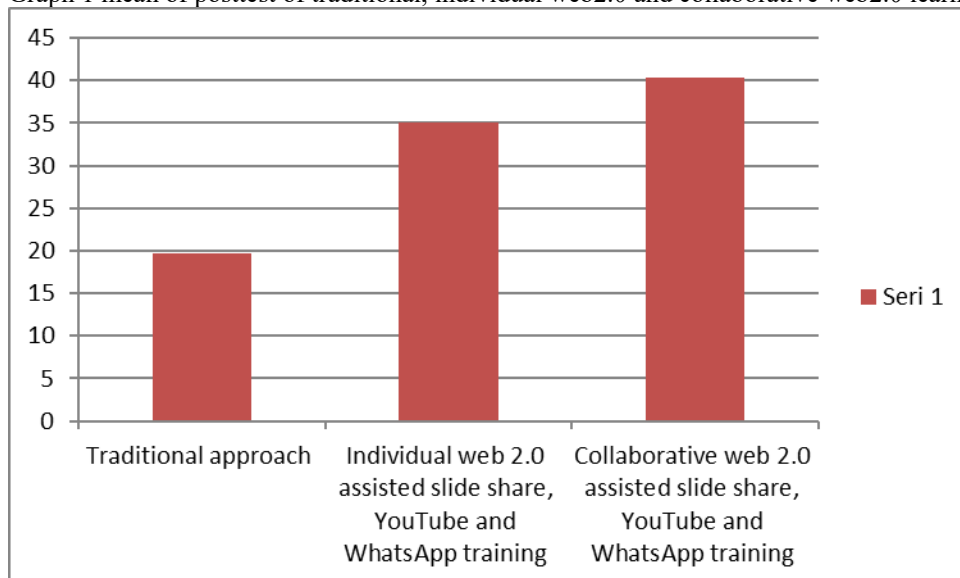

Table 1.2 ANCOVA among groups (traditional, individual web2.0 and collaborative web 2.0) and tests (pretests and posttests)

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2613.292ᵃ	3	871.097	117.610	.000
Intercept	44265.823	1	44265.823	5976.471	.000
Pretest	15.992	1	15.992	2.159	.145
Group	2607.668	2	1303.834	176.035	.000
Error	785.108	106	7.407		
Total	175896.000	110			
Corrected Total	3398.400	109			

a. R Squared = .769 (Adjusted R Squared = .762)

The univariate analysis was conducted by SPSS version 12 to find the ANCOVA among the posttest score of the students of traditional, individual web2.0 and collaborative web2.0 learning where pretest was the covariate. Here, posttest of the three methods of dependant variable. It was resulted that there were significant difference among the three methods (F=df=2/106, 176.035 p<.05) after the intervention of traditional, individual web2.0 and collaborative web2.0 learning.

Table 1.3 Estimated marginal mean of traditional, individual web2.0 and collaborative web2.0 learning.

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Traditional	33.346ᵃ	.432	32.490	34.202
Individual Web2.0	41.746ᵃ	.430	40.892	42.599
Collaborative Web2.0	45.078ᵃ	.500	44.087	46.068

a. Covariates appearing in the model are evaluated at the following values: Pretest = 13.48.

The effects of the covariates on the posttest mean are estimated in this model. Covariates appearing in the model was evaluated (pretest=13.48) while the traditional mean (33.346) , individual web2.0 mean (41.746) and collaborative web2.0 mean (45.078) .

Table 1.4 Bonferroni multiple comparisons among of traditional, individual web2.0 and collaborative web2.0 approaches

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.[b]
Traditional	Individual Web2.0	-8.399[*]	.609	.000
	Collaborative Web2.0	-11.732[*]	.663	.000
Individual Web2.0	Traditional	8.399[*]	.609	.000
	Collaborative Web2.0	-3.332[*]	.660	.000
Collaborative Web2.0	Traditional	11.732[*]	.663	.000
	Individual Web2.0	3.332[*]	.660	.000

Bonferroni multiple comparisons adjusted and estimated the marginal means. The mean difference between traditional and individual web2.0 (m=8.399, p<.05), traditional and collaborative web2.0 (m=11.732, p<.05) and individual web2.0 and collaborative web2.0 (m=3.332, p<.05) was significant.

Hypothesis 2 : The retention of individual and collaborative web2.0 technology assisted slide share, YouTube and WhatsApp training students in association with those in the comparison group will demonstrate better in tissue system.

Table 2.1 Mean and SD of retention or delay test of traditional, individual web2.0 and collaborative web2.0 learning.

Group	N	Mean	SD
Traditional	40	19.70	3.220
Individual Web2.0	40	35.00	2.265
Collaborative Web2.0	30	40.27	1.721
Total	110	30.87	9.093

Table 2.1 The above table 4.2.1 reveals means , standard deviation (SD) of retention test delay test of traditional , individual web2.0 and collaborative web2.0 assisted learning performance where traditional group delay test (m =19.70, SD = 3.220), individual web2.0 delay test (m=35.00, SD= 2.265) and collaborative web2.0 delay test (m=40.27, SD=1.721). Here the collaborative web2.0 technology assisted delay test mean performance was better than both traditional and individual web2.0 learning performance (see graph 2).

Graph 2 Mean of retention or delay test of traditional, individual web2.0 and collaborative web2.0 learning
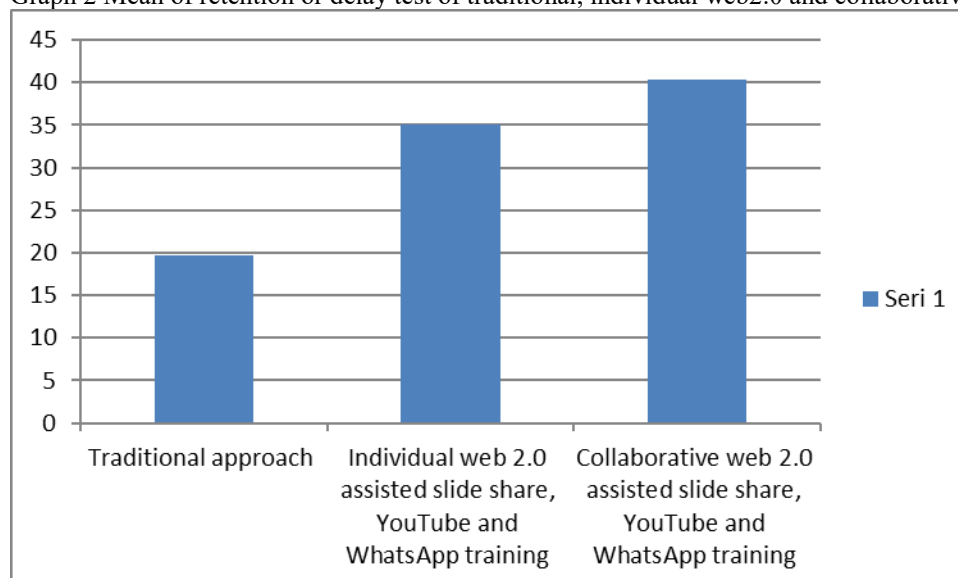
Table 2.2 ANCOVA among groups (traditional, individual web2.0 and collaborative web 2.0) and delay tests

Source	Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	8328.209[a]	3	2776.070	430.204	.000
Intercept	392.993	1	392.993	60.902	.000
posttest	6.257	1	6.257	.970	.327
Group	1777.097	2	888.548	137.697	.000
Error	684.009	106	6.453		
Total	113856.000	110			
Corrected Total	9012.218	109			

a. R Squared = .924 (Adjusted R Squared = .922)

The univariate analysis was conducted by SPSS to find the ANCOVA among the delay test score of the students of traditional, individual web2.0 and collaborative web2.0 learning where posttest was the covariate. Here pretest of the three methods of dependant variable. It was resulted that there were significant difference among the three methods (F=df=2/106, 137.697 p<.05) after the intervention of traditional, individual web2.0 and collaborative web2.0 learning.

Table 2.3 Estimated marginal mean of traditional, individual web2.0 and collaborative web2.0 learning.

Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Traditional	20.248[a]	.686	18.887	21.609
Individual Web2.0	34.810[a]	.446	33.927	35.693
Collaborative Web2.0	39.789[a]	.671	38.459	41.119

a. Covariates appearing in the model are evaluated at the following values: posttest = 39.60.

The effects of the covariates on the posttest mean are estimated in this model. Covariates appearing in the model was evaluated (pretest=13.48) while the traditional mean (18.887), individual web2.0 mean (33.927) and collaborative web2.0 mean (38.459)

Table 2.4 Bonferroni multiple comparisons among of traditional, individual web2.0 and collaborative web2.0 approaches

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.[b]
Traditional	Individual Web2.0	-14.562[*]	.940	.000
	Collaborative Web2.0	-19.541[*]	1.208	.000
Individual Web2.0	Traditional	14.562[*]	.940	.000
	Collaborative Web2.0	-4.979[*]	.679	.000
Collaborative Web2.0	Traditional	19.541[*]	1.208	.000
	Individual Web2.0	4.979[*]	.679	.000

Bonferroni multiple comparisons adjusted and estimated the marginal means. The mean difference between traditional and individual web2.0 (m= -14.562, p<.05), collaborative web2.0 (m= -19.541, p<.05). Similarly, mean difference between individual web2.0 and traditional group in the retention test (m= 14.562, p<.05) , the collaborative web2.0 (m=-4.979 , p<.05). So far collaborative web2.0 is concerned traditional group mean difference (m=19.541, p<.05) and the mean difference between collaborative web 2.0 and individual web2.0 was (m= 4.979, p<.05). It showed that the mean difference between traditional and experimental group found significant, not only that there was significant difference between individual and collaborative web 2.0 in the retention of participants learning performance (Madar & Abdikadir, 2015; Mahmud & Hassanuzzaman, 2009; Parker & Chao,2007; Rahimi, Berj & Veen, 2012). .

Discussion

The study claimed that the impact of collaborative and individual web2.0 technology based learning on the performance of secondary school students in Silchar town was statistically significant. This was the first study in India where both collaborative and individual web2.0 technology used in learning biology especially in the learning of tissues to secondary school students who have no laptop or desktop for personal use. This result was corroborated with the earlier studies (eg. Redecker, Ala-Mutka, Bacigalupo, Ferrari, and Punie, 2009). The learning environment in the secondary school of Silchar , Assam , India was not fully technology assisted or the learners have no laptop, desktop , etc. However, the researcher undertook the study and applied web2.0 technology in two schools by collecting and requesting the parents to install their laptop, desktop in the concerned classroom. After all the instruction was provided through individual and collaborative modes, as a result the learning performance was found better than traditional approach. The effects of collaborative and individual web2.0 technology was statistical significant over traditional approach. This result was corroborated by the earlier studies conducted by Bennett, Bishop, Dalgarno, Waycott, and Kennedy,2012. Contrast to these few researchers found web2.0 technology has no such influence over traditional approach rather it disturb the learning performance instead of better conceptualization of learning (Yildirim, Ozden, and Aksu, 2010). The retention was assessed after one month of intervention where maturation, motality etc were the main extraneous variables minimized during statistical analysis. In this study, no participants drop out up to the retention test. In Assam, mostly in area of Silchar town learner has so many opportunities to continue their higher course at the end of their course. However, the participants responded the retention test and found collaborative web2.0 technology has the significant effect over the individual web2.0 and traditional approach.

Conclusion

Web2.0 technology is an internet-assisted software of World Wide Web based tool. It includes Wiki, Blog, Facebook, Podcasts, Slideshares, Whatsapp, Twitter, Journals, and Linked in, Powerpoint presentations, Youtube, Skype, and Videoconferencing. Nevertheless, in the recent study, Wiki, Youtube, Whatsapp and Slideshare were used both in individual and collaborative mode. It was concluded that collaborative web2.0 technology was better over individual web2.0 technology based learning. In India, still technology based learning, smart classrooms, internet assisted online platform inside institutional boundary or at least a well-equipped library we cannot find in secondary level. The researcher has put an effort, provided online instruction through web2.0 technology assisted software, and the learners perceived self-regulatory efficiency of web2.0 technology. The retention level also found satisfactory which was not possible in traditional mode of learning. Recently researchers, scholars, educators are emphasizing on self learning, self pacing and self-evaluation of learning performance before going to sit for summative evaluation. However, traditional mode of instruction is still going on with rote learning and it is encouraging students to learn through note, traditional exercise, and vocabulary practice. The literatures argued and the recent studies corroborated that web2.0 technology would be provided through individual smart phone, Ipad, tab, laptop and desktop. Out of these IT accessories mobile is a cost effective and available with learners' family member. Therefore, the family members should provide the learner to access the Smartphone for one to two hours. Teacher should encourage self-learning and should provide opportunity to use web2.0 technology based learning platform. The stakeholders should take the initiations to develop the curriculum, syllabus, and the mode of instruction by integrating web2.0 technology in them. Parents should provide at least one to two hours for using their Smartphone for web2.0 technology based learning to their children. The following recommendations, the researchers put in front of the scholars, researchers, educationists, and the world of colleagues: 1) individual and collaborative web2.0 technology has been used in the recent study but it needs further investigation to use mixed model to both individual, and collaborative modes for a particular group and to know its effects over traditional approach; and 2) the effect of individual and collaborative web2.0 technology on participants gender, socioeconomic status, home environmental status, IQ like variables should be undertaken in relation to their learning performances.

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