

## **STUDENT'S AWARENESS AND USAGE OF WEB2.0 TECHNOLOGIES FOR BIOLOGY LEARNING**

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### **Abstract**

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*The study examined students' usage web2.0 tools in education, level of awareness and adoption in their classroom learning. The results indicated that wikis, social networking sites, email and presentation tools are frequently and most used web2.0 tools. Moreover, the awareness is high in case of different types of email and social networking sites compare to other web2.0 tools. There exists significant difference in student's awareness and usage of web2.0 application in learning biology at senior secondary school level. The students indicated the positive polarity towards the adoption of web2.0 tools in classroom learning and beyond it. It can be concluded that student awareness and adoption of web2.0 tools can support the instructor to integrate technology with pedagogy and content effectively.*

**Keywords:** Awareness, Usage, students, web2.0, learning.



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### **Introduction**

Learners in the 21st century are blessed with online technologies which has increased the frequency of communication, content creation and collaboration. The information gateway broadens the path and welcomed every learner in the learning community. Today, learning community has become a global network with huge collective information. The advent of web 2.0 has provided the platform where everyone can create, share, remix, collaborate and contribute. Shifting from static to participatory web platform, the users become more active contributor to collective intelligence and same time frequent retriever of collective information. An interactive and generic feature of web2.0 tools extrinsically motivated and invited the individual to extract the user generated collective intelligence. Realising the potentiality of web2.0 application, the learner and the teacher can enhance their classroom interaction in order to gain shared experiences and continuously construct their own knowledge. For learner, this web2.0 applications expand their learning horizon and offer unique way to construct their knowledge. The architecture of web2.0 services offers

opportunities to every teacher and learner to contribute and collaborate and hence improve the participation in various ways.

However, integration of various web2.0 applications into the classroom interaction is still a very challenging task for every teacher. The role of teacher is to ensure every learner should be able to learn meaningfully. As becoming the part of global learner community, learner and teacher should aware of web2.0 applications and its various purposes. The usage of web2.0 applications will bridge the gap between learner and instructor. This new opportunity will offer an array of exciting learning possibilities that had never before. Earlier the characteristic of web was, as means of providing and obtaining information. Exchanging of ideas and experiences was either delayed and less interactive in older version of web technologies. The pace and power of teacher as well as student were undermined by old technologies. But, currently the new version of web technologies has transformed the modes of interaction, sharing of information, creating innovative ideas, extending classroom wall and therefore the gap exists between learning and teaching community has been mended meaningfully. The features of web2.0 applications allow the user to contribute and collaborate content directly through various forms into the websites such as text (blogs and wikis), images (flicker, Instagram) video (YouTube, TikTok Vimeo, Dailymotion) and audio (podcast) (Albion, 2008). The new role of student and teacher in web-based learning environment is very appealing and stimulating. Teacher positive perception towards pedagogical benefits and importance of web2.0 tools for teaching and learning support the supplement classroom instruction (Yuen, Yaoyuneyong and Yuen, 2011). Teacher's and student's willingness and interest in web2.0 integration can be seen as one of the ways to revolutionised the education and its related activities. However, student familiarity and use of web2.0 applications is still needing to be considered, since they do and learn as per their expectations. Being aware of recent technological changes and simultaneously its adoption will help the students for life-long learning. In this study the focus is on awareness and use of web2.0 by senior secondary school students.

### **Web2.0 in Education**

The term web2.0 first coined by Tim O'Reilly (2005). He defines web is a platform with exciting new applications and sites popping up with surprisingly regularity. According to Tim O'Reilly (2005) the features of web2.0 as a platform where user can control their own data. The six core competencies of web2.0 are as follows:

- Services, not packaged software;
- Architecture of participation;
- Cost effective scalability;
- Remixable data source and data transformations;
- Software above the level of a single device;
- Harnessing collective intelligence.

Web2.0 means a qualitative leap in web technologies that have made the internet more creative, participative and socializing (Blees and Rittberger, 2009). Web2.0 is more than a set of cool and new technologies and services with powerful ideas that are changing the way people interact (Anderson, 2007). Until recent years web was experienced as read only or static web. The web-based services include blogs, wikis, multimedia sharing services, content syndication, bookmarking, collaborative editing, podcasting and content tagging services (Anderson, 2007; Albion 2008). Though, Web2.0 is describe as read/write web to distinguish it from the read only web most often experienced in the past. By considering the significant features of web2.0, and its acceptance in education community is believed to be improve the quality of education. Anderson (2007) reported on significant debate over advantage and disadvantage of incorporating web2.0 services into mainstream education. Many research reports show the positive impacts on student learning at school as well as higher education (Alexander, 2006; Owen, et.al, 2007; Anderson, 2007, Albion, 2008, Blees&Rittberger, 2009; Chawinga, 2017; Chawinga& Zinn, 2016). Through web2.0 applications in education, student become active participant and creator of the content rather than passive consumer. As their active learning activities facilitated by web2.0 applications students can get connected with wider community. Today, millions of applications and websites with interactive teaching-learning features are available for all types of students and instructors.

The change in conventional teaching approaches and methods shifting from teacher centric to learner centric. The defining features of web2.0 applications facilitate students to learn anywhere anytime and anyone where they create content, communicate, collaborate, and actively construct their own knowledge in a shared learning environment. This web2.0 allows the student to publish their own content, access, collaborate and join the learning community beyond school wall. Alongside, web applications keep updating students about the changing learning environment, knowledge and content so to become global digital citizen. Therefore, teacher must consider the potential of web2.0 alongside students' ability to learn through it and work together to integrate recent technology into their classroom.

## **Rationale of the study**

It is necessary to understand the benefits and limitations of web2.0 in classroom settings. Before that teacher as well as student should have knowledge about the potential benefits of web2.0 tools. Many researchers have conducted studies on perception, awareness, attitude, familiarity, adoption and use of various web2.0 tools in education at school as well as higher education level. The related reviewed based on awareness, types and purposes of web2.0 technologies, and adoption of web2.0 by school students. A plethora of research studies on various Web2.0 technologies such as social networking, social bookmarking, weblog, Microblog, RSS Feed, Podcast, Vodcast etc. have been conducted on multiple perspective.

The major studies (Darmawan et.al., 2019; Chawinga, 2017; Kilis et. al., 2016; Rahman, Othman, and Rahmi, 2016; Taylor and Weigel, 2016; Nee, 2014; Swensen, Silseth and Krange, 2014; Wilczak, 2013; Beltran-Cruz and Cruz, 2013; Chimo, 2012; Patel, 2011; Wardhani, 2011; Kukkonen et.al., 2011; Kiyici, 2010; Ophus and Abbitt, 2009; Colbert, Olson and Clough, 2006; Senegal, 2005; and Fullick, 2005) conducted on effectiveness of Web2.0 tools such as Wikis, blog, Social networking Sites (Facebook), Edmodo, Twitter, Flickr, Podcast (YouTube), Prezi, Slide Share, google classroom, RSS Feed in teaching and learning biology at different levels of education.

This study examines to what extent students are aware of and uses web2.0 tools in their learning. However, research literature offers significance of web 2.0 in teaching learning. This study describes how students have using these emerging technologies to share ideas and resources to prepare for knowledge construction; described also are the underpinning theories that inform this work together with an analysis of student use and feedback. Based on this theoretical and empirical underpinning, the authors determined to examine the potential of web technology to facilitate science teaching at the higher secondary level. This investigation seeks to learn about the use of Web2.0 tools by students as producers of knowledge

## **Problem statement and Research Questions**

The conception of the problem for the present study based on pedagogical adoption of recent technologies at different levels of education. However, the researcher observed from many research findings that there is a potential pedagogical benefit of web2.0 technologies, where both teachers and students equally benefited in their teaching-learning practices. But availability of technology itself is not enough to predict the quality of education. Awareness and use of web technologies and its repurposing in education can bring effective changes amongst student and teacher.

The present study answered the following research questions;

1. What is the current awareness of Web2.0 technologies amongst students at senior secondary school level?
2. Which Web2.0 technologies are mostly used by the students at senior secondary school level?

### **Objective of the study**

Based on the above statement following objectives have been formulated

1. To study the level of awareness of Web2.0 technologies amongst students at senior secondary school level?
2. To study the usage of Web2.0 technologies by the students at senior secondary school level?

### **Research Design and Methods**

The present study is intended to investigate the awareness, familiarity and adoption of web2.0 by students at senior secondary school level in Bhubaneswar city, Odisha. A survey design was adopted in order to get the relevant data. The method enables to understand the student's awareness and adoption of web2.0.

### **Participants**

The present study was conducted at Bhubaneswar city, capital of Odisha state. The participants for the present study were students from senior secondary school studying in class XI. The sample were selected randomly. There were 1021 respondents from eighteen schools participated in the study.

### **Instrument**

A questionnaire was developed to examine the student's awareness, familiarity and usage of web2.0 technologies in their learning. The survey items comprise of two sections. Section A comprise of general information of participants use and knowledge of web2.0 tools. Section B consists of eight various types of web2.0 tools were five-point Likert questions (5= know and use, 4=know but don't use, 3=know, 2= heard only, 1=don't know).

### **Procedure**

Participants were first introduced about the purpose of the study. Then the questionnaire was administered directly face to face mode to all 1021 students of senior secondary school. It took twenty days to collect the data from eighteen schools.

### **Results**

#### **Students' Knowledge and Use of Web2.0 Tools**

There was one question on Web2.0 tools have been administered for the responses. Table 1 shows students' reported knowledge and use of web2.0 tools. The responses were recorded in 'Yes' and 'No' while no responses are recorded as 'No Comment'. It is evident from table 1, nearly 522(51.13%) out of 1021 students have knowledge about various Web2.0 tools in learning. The finding indicates majority of the students have knowledge of Web2.0 tools and are able to use in their learning. Whereas almost 320(29.59%) of students responded that they do not know about the Web2.0 technologies and about 197(19.29%) did not respond to any of given option. Majority of the respondents were knowing and use web2.0 tools.

In terms of significance differences exists in their knowledge and use chi-square value was calculated. The calculated value of chi-square is higher than the critical value of chi-square i.e., 5.99 at 0.05 level against df=2. Hence the null hypothesis rejected at 0.05 level therefore it can be concluded that there is significant difference between the observed and frequencies and expected frequencies against equal probability of the statements. The frequency loading is higher against 'Yes' response having positive polarity.

**Table 1 Frequency distribution of Knowledge and Use of Web2.0 in Learning Biology (N=1021).**

| <i>Items</i>  | <i>Responses (%)</i> |                |                       | <i>χ<sup>2</sup><br/>Value</i> | <i>Sig</i>   |
|---|----------------------|----------------|-----------------------|--------------------------------|--------------|
| Do you use Web 2.0 tools such as blogs, podcasting, wikis, RSS, and Social Software for learning? | <i>Yes</i>           | <i>No</i>      | <i>No<br/>Comment</i> | 161.6                          | <b>.000*</b> |
|   | 522<br>(51.13)       | 302<br>(29.58) | 197<br>(19.29)        |                                |              |

**Note: The numbers in the parentheses indicate percent.**

**\*Significant at 0.05 level**

### **Students' Use of Web2.0 Tools for Biology Learning**

Second question of the instrument asked students to indicate different kinds of web2.0 tools used by them. The responses were reported in yes and no. Table 2 shows frequency, percentage and chi-square value for each web2.0 tool. It is evident from table 2 that highest 80.4% of students using email, a second most popular tool among biology student are social networking tools (78.15%) which includes Facebook, Instagrametc, followed by the wikis (77.27%). Next most favored tool is presentation tool (69.93%). The finding indicates email, socialnetworking, wikisand presentation are most popular Web2.0 tools used by senior secondary students. While web tools like RSS Feed (90%), and Social Bookmarking (81.48%), Mind mapping tools with (88.24%), Podcast and Vodcast (79.43%), Blog (79.43%), Microblog (71.89%) are not used by the students for biology learning.

The calculated values of chi-square are higher than the critical value of chi-square 3.84 at 0.05 level against df=1. Hence the null hypothesis rejected at 0.05 level therefore it can be concluded that there is significant difference between the observed and frequencies and expected frequencies against equal probability for all statements. The frequency loading is higher against statement 1,3,4 and 8 having positive polarity and statement 2,5,6 10 and 11 having negative polarity.

The overall findings indicate that only four types of Web2.0 tools are highly popular among students and most of the tools out of eleven listed Web2.0 tools six are comparatively less used by the students. While instant messenger tool like WhatsApp's, Instagram, WeChat, Viber, etc. is showing less difference in yes and no percent.

**Table 2 Types of Web2.0 Tools Used by Students (N=1021)**

| <i>What kind of Web 2.0 tools do you use for learning biology?</i> | <i>Responses (%)</i> |            | <i>χ<sup>2</sup> Value</i> | <i>Sig</i>   |
|--|----------------------|------------|----------------------------|--------------|
|  | <i>Yes</i>           | <i>No</i>  |                            |              |
| Email  | 821(80.41)           | 200(19.58) | 377.7                      | <b>.000*</b> |
| Blog   | 210(20.56)           | 811(79.43) | 353.7                      | <b>.000*</b> |
| Social networking  | 798(78.15)           | 223(21.84) | 323.8                      | <b>.000*</b> |
| Wikis  | 789(77.27)           | 232(22.72) | 303.86                     | <b>.000*</b> |
| Instant messenger  | 419(41)              | 611(59.84) | 32.8                       | <b>.000*</b> |
| Mind Map   | 120(11.75)           | 901(88.24) | 653.78                     | <b>.000*</b> |
| Podcast /Vodcast   | 207(20.27)           | 814(79.72) | 360.87                     | <b>.000*</b> |
| Presentation tool  | 714(69.93)           | 307(30)    | 162.24                     | <b>.000*</b> |
| Microblog  | 287(28.10)           | 734(71.89) | 195.69                     | <b>.000*</b> |
| RSS Feed   | 101(10)              | 920(90)    | 656.96                     | <b>.000*</b> |
| Social bookmarking   | 189(18.5)            | 832(81.48) | 404.94                     | <b>.000*</b> |

*Note: The numbers in the parentheses indicate percent.*

*\*Significant at 0.05 level*

***Students' Familiarity Levels of Web2.0 Tools***

Table 3 shows the mean score of familiarity levels of web2.0 tools. Web2.0 tools like wiki (M=3.98), social networking sites (M=3.76) and instant messenger (M=4.08) which indicates high number of students familiar with these tools. While social bookmarking (M=2.68), blog

(M=2.59), Podcast and vodcast (M=2.54) shows average familiarity. Whereas Mindman (M=1.95) and RSS feed (M=1.76) shows lowest familiarity amongst students.

**Table 3 Descriptive Statistics for Student’s Familiarity with Web2.0 Tools**

|                | WIKI  | Blog  | RSS<br>Feed | SBM   | SNS   | Podcast<br>/Vodcas<br>t | IM     | MM    |
|----------------|-------|-------|-------------|-------|-------|-------------------------|--------|-------|
| Mean           | 3.98  | 2.59  | 1.76        | 2.68  | 3.76  | 2.54                    | 4.08   | 1.95  |
| Std. Deviation | 1.69  | 1.582 | 1.234       | 1.594 | 1.349 | 1.515                   | 1.473  | 1.370 |
| Skewness       | -1.35 | .158  | 1.071       | .043  | -.972 | .168                    | -1.349 | .866  |
| Kurtosis       | .17   | -1.17 | .53         | -1.14 | .627  | -1.14                   | .46    | -.23  |

Note SBM –Social Bookmarking Site, IM- Instant Messenger, MM- Mind Map

Table 4 shows the familiarity level in case of knowledge about the various Web2.0 tools. The mean score of ‘know’ is higher i.e., 31 and the value indicates that students are highly aware of Web2.0 tools, but the adoption of tool is comparatively low. The students with mean scores 10.2 are actually using the Web2.0 tools in their learning and other activities and high familiarity level. Moreover, the mean score of ‘know but don’t use’ is 15 which shows students are familiar with the tools and not using it.

It has been also found that mean score of ‘heard only’ is 15.4, this clearly indicates low level of familiarity with various Web2.0 tools. The mean scores with 22.3 students are not at all aware about the Web2.0 tools and responded as 'don't know'. Wherein mean scores with 6.3 students have responded to no comments. Therefore, the findings indicate that familiarity level is high but adoption is low.

The calculated value of chi-square is higher than the critical value of chi-square 9.49 at 0.05 level against df=4. Hence the null hypothesis rejected at 0.05 level therefore it can be concluded that there is significant difference between the observed and frequencies and expected frequencies against equal probability for all statements. The finding of the result clearly indicates majority of students shows higher level of awareness of various Web2.0 tools and there is mix level of response for adoption and awareness.

**Table 4 Familiarity level of Students’ on Web2.0 Tools (N=1021)**

| Web2.0<br>tools | Responses (%)   |                   |               |               |             | $\chi^2$<br>Valu<br>e | Sig |
|-----------------|-----------------|-------------------|---------------|---------------|-------------|-----------------------|-----|
|                 | Know<br>and use | Know<br>but don’t | Heard<br>only | Don’t<br>know | No<br>Comme |                       |     |

|   | <i>use</i>    |               |               | <i>nt</i>     |                |             |        |              |
|---|---------------|---------------|---------------|---------------|----------------|-------------|--------|--------------|
| Wiki  | 83<br>(8.1)   | 26<br>(2.5)   | 691<br>(67.7) | 47<br>(4.6)   | 109<br>(10.67) | 65<br>(6.4) | 1937   | <b>.000*</b> |
| Blog  | 126<br>(12.3) | 187<br>(18.3) | 187<br>(18.3) | 202<br>(19.8) | 245<br>(24)    | 74<br>(7.2) | 108    | <b>.000*</b> |
| RSS feed  | 80<br>(8.1)   | 83<br>(25)    | 47<br>(7.5)   | 255<br>(46.9) | 479<br>(7.8)   | 77<br>(4.6) | 835    | <b>.000*</b> |
| Social<br>Bookmarking                                     | 148<br>(14.5) | 158<br>(15.5) | 199<br>(19.5) | 253<br>(24.8) | 174<br>(17)    | 89<br>(8.7) | 87.7   | <b>.000*</b> |
| Social<br>Networking<br>site                              | 76<br>(7.4)   | 385<br>(37.7) | 459<br>(45)   | 35<br>(3.4)   | 18<br>(1.8)    | 48<br>(4.7) | 1144.7 | <b>.000*</b> |
| Podcast/<br>Vodcast                                       | 150<br>(14.7) | 227<br>(22.2) | 143<br>(14)   | 153<br>(15.0) | 290<br>(28.4)  | 58<br>(5.7) | 185.7  | <b>.000*</b> |
| Instant<br>Messenger                                      | 62<br>(6.1)   | 92<br>(9)     | 678<br>(66.4) | 91<br>(6.8)   | 69<br>(8.9)    | 29<br>(2.8) | 1834.2 | <b>.000*</b> |
| Mind<br>Mapping   | 92<br>(9)     | 116<br>(11.4) | 79<br>(7.7)   | 216<br>(44.1) | 450<br>(22.1)  | 68<br>(6.7) | 635.8  | <b>.000*</b> |
| Average<br>%age of<br>response<br>against<br>Web2.0 tools | <b>10.2</b>   | <b>15</b>     | <b>31</b>     | <b>15.4</b>   | <b>22.3</b>    | <b>6.3</b>  |        |              |

## Discussion

The result of the study shows that students report using email, social networking, presentation tools, wikis and instant messenger tools more than any other web2.0 tools in their biology learning. Students also reported highest level of familiarity but comparatively least in adoption of web2.0 applications. The finding of the study indicates that overall the majority of biology students are highly aware and familiar with various Web2.0 tools and many of them using the tools for their learning process. Still many students are not at all aware of the Web2.0 tools. It is also indicating some students are some degree of awareness and familiar with the web tools. The result also indicates the many individual web tools are not know to biology students but collectively the awareness and familiarity with Web2.0 is satisfactory. Many student's despite of knew about the tools but not using because most probably lack of knowledge about technology integration, attitude and perception towards the use of technology, lack of school and parents support and provisions, technical problem etc. Students are highly aware of social networking sites, instant messenger, blog and wikis and adopted by them in their learning. These findings supported from studies conducted by Thelwall (2009); VanDoorn and Eklund (2013), Roblyer et.al., (2010), Hegadi and Angadi  
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(2015), Romero-Frías and Arquero (2009), Heafner and Friedman (2008). Mazer, Murphy and Simonds (2007) that students are more familiar with these web tools and positive perception towards it.

### **Conclusions and Implications**

Despite students' limited usage of web2.0 tools in learning biology, it is encouraging to know that students are well familiar with web2.0 tools. Thus, teachers should integrate the web2.0 applications in the classroom teaching and guide students to explore and adopt new technologies in their learning.

This study provides useful information, allowing teachers and school administration to consider the student familiarity and usage of web2.0 applications. It also provides institution to gain better understanding of student's current use of web2.0 technologies in learning. Integration of current technology in pedagogical practices can increase opportunities for teaching-learning of biology and relevant subject.

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