

# Assessing Web 2.0 Tools Adoption by Students in Higher Education-A Structural Equation Modeling Approach

Dr.R.Anusha<sup>1</sup>,Dr.T.Sunitha Rani<sup>2</sup>

<sup>1</sup>Asst.Prof,<sup>2</sup>Assoc.Prof & Head,Department of Computer Science , M.O.P. Vaishnav College for Women (Autonomous)

**Abstract:** Technological innovations have always kindled the learner's interests touse the new technologies in their learning. Web 2.0 tools play crucial role and enables the students to communicate, collaborate and work. The study aims to assess the awareness about web 2.0 tools such as wikis, blogs, RSS feed, video sharing and social media among the students to supplement the conventional learning and determine the various factors and barriers influencing the usage of web 2.0 tools . The study had inferences about the usage of web 2.0 tools in the learning process. The results indicated attitude, self efficacy are some of the strong predictors to determine the intention of web 2.0 tools usage.A SEM reflecting the role of security and personal barriers in the usage of web 2.0 tools is analysed in this study. The study can be extended to analyse the adoption of web 2.0 tools by school students

**Keywords:**Attitude, Blogs, learners, podcasts, RSS, self-efficacy,social media, video sharing, Web 2.0 tools, wikis

## 1.INTRODUCTION:

Cyberspace learning having become the new normal, web 2.0 has enabled unrestrained look – in onto personalized contents, counting Wikipedia, blogs, social forums and websites with multifarious information. Web 2.0 has an edge-over web 1.0 as it delegates the user-friendly adding of ideas and information to the existing, in the blogosphere. Fostering the inventiveness of the students, it facilitates sharing of knowledge and bridges the communication between enthusiastic learners in the internet. Apart from effective e-self learning, 2.0 tools have brought in about a futuristic approach in teaching, adding spice to the existing teaching methodologies. It especially includes the usage of simulators and simulations giving students a practical touch of the theoretic contents. Web 2.0 tools are very economical and resourceful with a demand of good internet connectivity.

Web 2.0 is a big wave that has swept the technological ignorance from all ages and has given a new dimension to thinking, design and use of internet. It has paved way for online collaboration and Knowledge Sharing. Its enhanced features keep people connected with ease and have social movement over the net. Its interactive and the multi-purpose feature bridges the gap between the naïve users and the technology.

Web 2.0 applications provide enormous advantages:

- Centralized information
- Anytime, anywhere access
- Secure information against theft
- Device compatibility with nominal investment
- Data sharing
- Mitigate constraints on resources

Though Web 2.0 tools have shown their significance in all areas, Education has become the prominent one. It has become mandatory to keep education on-the-go, even in adverse situations. Virtual learning environment is a boon to education field. It has enhanced the teaching learning process. Here the objective of this study is to demystify the issues and problems which have restrict the usage of Web 2.0 tools among the younger generation.

## 2.REVIEW OF LITERATURE:

Web 1.0 tools provided communication among the users but lacked interaction and collaboration .To fulfill the shortage of web 1.0 tools and to create active interaction and participation among users web2.0 tools such as blogs, wikis, social media,video sharing emerged and were used<sup>[2]</sup>. Web 2.0 digital tools have influenced the students to engage in meaningful learning by integrating social interactions<sup>[1]</sup>. Studies have inferred that Web 2.0 technologies provide the ability to support active and social learning, opportunities and venues for student publication. They facilitate effective and efficient feedback to learners<sup>[3]</sup>.The awareness of the students about the applications and utility of web 2.0 tools to augment their classroom learning experience and the key influencing factors of web 2.0 tools adoption was studied by Taylor<sup>[5]</sup>

A study<sup>[4]</sup> to examine the student decision to adopt Web 2.0 technologies was carried out at a large University in the Southeastern United States. 423 students responded to a survey instrument using the DTPB as the framework. The questionnaire covered 12 items covering four sections. The survey items aimed to measure the comfort level usage, attitude towards Web 2.0 tools. The researchers found the integration and usage of web 2.0 tools boosted the confidence and satisfaction of the learners.

## 3.CONCEPTUAL FRAMEWORK

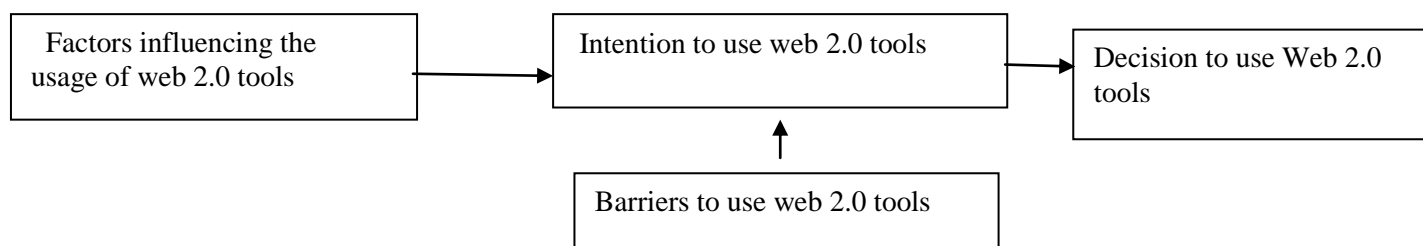


Figure 1:Conceptual Framework

## 4.RESEARCH OBJECTIVES:

1. To identify the awareness in the students about the use of Web 2.0 tools to augment the traditional classroom learning.
2. To determine the usage level of the tools and which tool is very popular.
3. To find out the usage of 2.0 tools for different purposes.
4. Identify the factors influencing the usage of web 2.0 tools usage
5. Identify the barriers to use web 2.0 tools.

### 4.1 RESEARCH METHODOLOGY:

The theoretical framework of decomposed theory of planned behavior (TPB) was employed in the study to observe and understand the learner's intention to use web 2.0 tools for their learning process. The study considered 23 variables for measuring the influencing factors and 11 variables to measure the barriers. The research was carried out by administering closed ended survey questionnaires to 205 students pursuing higher education in Chennai colleges to study the objectives of the research by covering all aspects. Random sampling was used and the sample included under graduate and post graduate students from arts, science and Engineering streams.

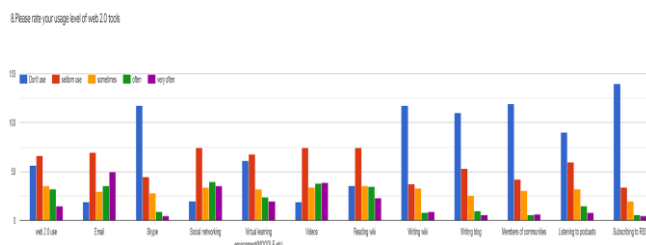
## 5.DATA ANALYSIS& SUMMARY OF RESEARCH FINDINGS

**Figure 2: Respondent's Profile**



The responses from figure 1 show that 72% of the students use Video sharing web 2.0 tools, 53.7% use instant messaging, 37.1% and 43% use Blogs and Wikis respectively. 61.5% of the students use social media tools and 25.4% use podcasts and 12.2% use RSS feeds.

**Figure 3: Usage levels of Web 2.0 tools**



The figure 3 clearly shows the most often used web 2.0 tools are videos, Social networking, virtual learning environment, E mails and wikis.

**Figure 4: Purpose of Usage of Web 2.0 tools**

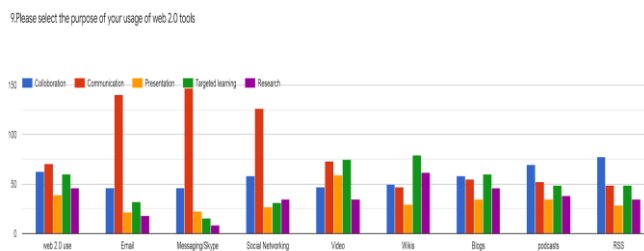


Figure 4 clearly shows the purpose of usage of web 2.0 tools for collaboration, communication, presentation, targeted learning and research purposes. Emails and Videos are used for collaboration, where as Social networking, e-mails and blogs for communication. Wikis, Podcasts and RSS were used for Research purposes.

**5.1 DECISION TO USE WEB 2.0 TOOLS ANALYSIS :**

Structured equation modeling procedure using AMOS software was used to develop the conceptual model to assess the web 2.0 tools adoption by considering various factors and barriers influencing the usage of web 2.0 tools by the students. Model fit indices were tested through the structured model. Different factors of the model were extracted by using Exploratory Factor Analysis(EFA) through SPSS to prove the validity of the questionnaire.

**Table 1: KMO and Bartlett's Test: Influencing factors & barriers to measure the Intention to use of Web 2.0 tools**

Variables	Influencing factors	Barriers
Kaiser-Meyer-Olkin Measure of Sampling Adequacy	.920	.851
Bartlett's Test of Sphericity	Approx. Chi-Square	4021.441
	Df	231
	Significance	.000

The KMO measure on sample adequacy with Bartlett's test of sphericity with approximate chi-square value of 4021.441 and 1231.653 are statistically significant at 5% level. The Factors also possess individual variance of 24.65%, 23.97% and 21.267% for the influencing factors and 32.46%, 31.65% for barriers. This shows that the sample size is adequate for the data reduction process.

**Table 2: Factor Analysis Measuring the Influencing factors**

Factor No.	Variable	Factor Loading	Name given to the factor
1	Increase student faculty interactions	.792	Self-Efficacy
	Helps finding study materials and research publication	.764	
	works across different operating systems	.761	
	increase student-student interaction	.690	
	Improves IT and information management skills	.642	
	I have a better internet connectivity to use	.545	
	Will improve career and employment opportunities	.575	
2	Its easy to use web 2.0 tools	.723	Attitude
	Using web 2.0 will help in assignments	.766	
	I feel it will improve my learning	.727	
	Improves overall performance and grades	.685	
	Will improve career and employment opportunities	.617	
	Improves subject knowledge and practical applicability of concepts learnt	.641	
	Sufficient digital resources	.521	

3	Download or access audio/video recordings of lecture didn't attend	.706	<b>User Friendly</b>
	Receive alerts about course information(TT change,Material post)	.542	
	I feel tools are compatible to use in my course	.593	
	My lecturer's feel using web 2.0 is very important to supplement traditional learning	.711	
	My lecturer's motivate me to use web 2.0 tools	.833	
	My usage is influenced by my peers	.722	
	I use because my peers feel that i will be benefited	.551	

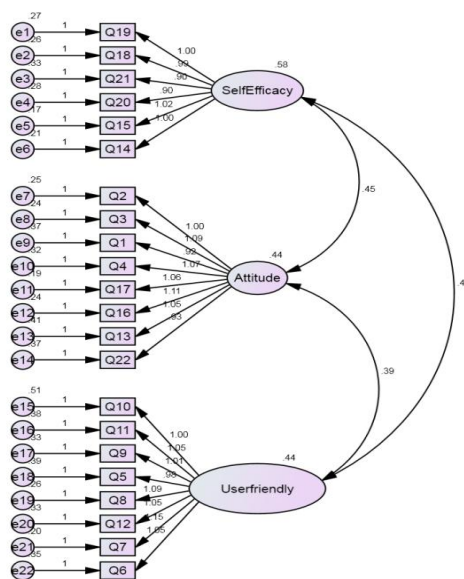
**Table 3: Factor Analysis Measuring the barriers in web 2.0 tools usage**

Factor No.	Variable	Factor Loading	Name given to the factor
1	Adaptability	.822	<b>Personal Barriers</b>
	Low bandwidth and poor internet	.782	
	Lack of computer knowledge	.771	
	Busy schedule	.699	
	Poor technological skills in using web	.694	
	financial constraints	.629	
2	Confidentiality	.731	<b>Security Barriers</b>
	Phishing	.818	
	Information leakage	.809	
	Malicious application	.882	
	Poor or insufficient authentication	.854	

The Factor analysis enabled to group the influencing factor variables into 3 factors namely self-efficacy, attitude and User friendly and barriers into 2 factors as Personal and Security barriers.

### 6.CONFIRMATORY FACTOR ANALYSIS ON INFLUENCING FACTORS FOR STUDENTS

AMOS is used to test the validity scales in the study. The following figure 5, shows the interrelationship as per CFA.



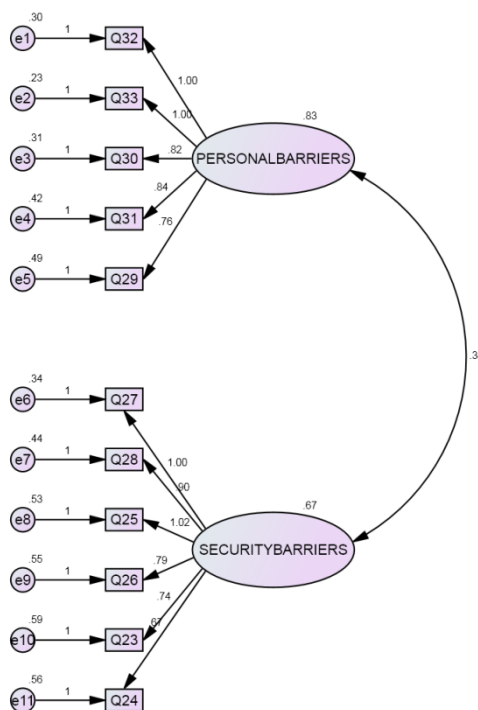
**Figure5:Influencing factors**

CFA showed 3 factor model for influencing factors. Single headed arrows indicate direct dependents like Improved subject knowledge(0.89),improved learning(0.87),Career and employment opportunities(0.84),Overall improved performance and grades(0.82) are the most important influencing factors for the adoption of web 2.0 tools by the students.The double headed arrows shows the covariances between attitude,self-efficacy and user friendly and have significant impact on each other. The CFA provided a satisfactory fit to the data as indicated in the table 4 below. All estimated loadings like GFI, AGFI, CFI, NFI, RMA, and RMSEA were significant.

**Table 4: Influencing factors- Model fit**

Measure	Threshold
Chi-square/df (CMIN/DF)	3.950
P-value for the model	.000
Goodness-of-Fit Statistic (GFI)	.738
Adjusted Goodness-of-Fit Statistic (AGFI)	.678
Comparative Fit Index (CFI)	.846
Normed-Fit Index (NFI)	.806
Tucker-Lewis index (TLI)	.828
Incremental Fit Index (IFI)	.847
Root Mean Square Residual (RMR)	.046
Root Mean Square Error of Approximation (RMSEA)	0.56

**6.1 CONFIRMATORY FACTOR ANALYSIS ON BARRIERS FOR STUDENTS TO USE WEB 2.0 TOOLS**



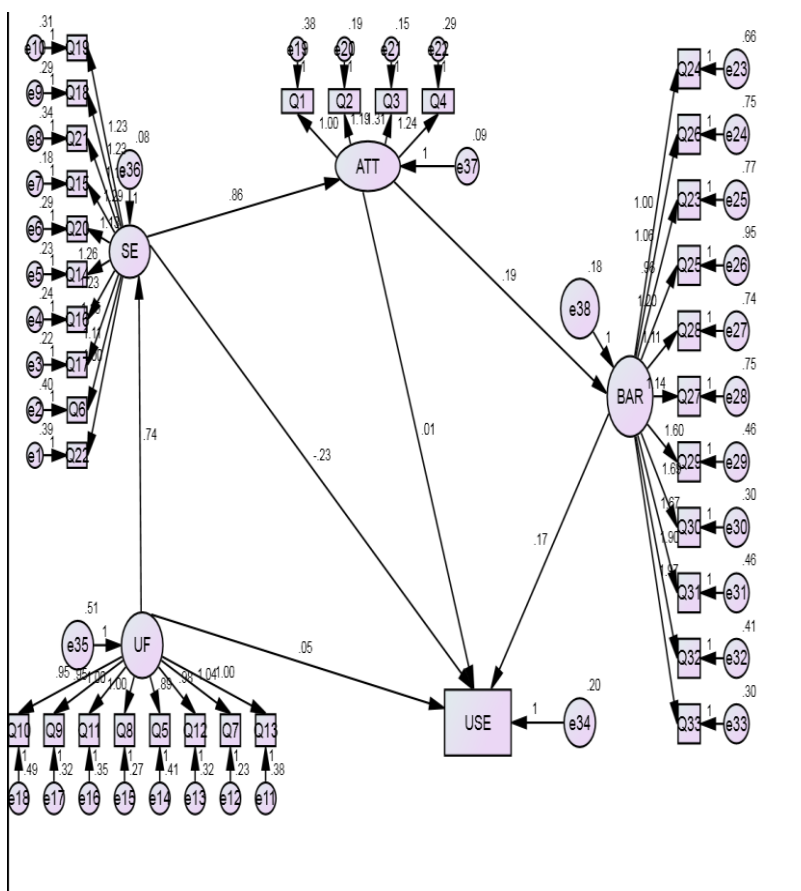
**Figure6:Barriers to use Web 2.0 tools**

CFA revealed 2 factor fit for barriers to use web 2.0 tools.The single headed arrows indicate lack of (1.02),poor technological skills(1.00),poor authentication controls(1.00),information leakage(0.98), are some of the factors acting as barriers in the adoption of web 2.0 tools.The double headed arrows indicate the covariances between personal and security barriers having a significant impact on each other.

**Table 5: Barriers to use web 2.0 tools- Model fit**

Measure	Threshold
Chi-square/df (CMIN/DF)	3.516
P-value for the model	.000
Goodness-of-Fit Statistic (GFI)	.885
Adjusted Goodness-of-Fit Statistic (AGFI)	.823
Comparative Fit Index (CFI)	.910
Normed-Fit Index (NFI)	.880
Tucker-Lewis index (TLI)	.885
Incremental Fit Index (IFI)	.911
Root Mean Square Residual (RMR)	.056
Root Mean Square Error of Approximation (RMSEA)	0.51

The figure 7 shows the SEM based standardized regression coefficients between the influencing factors, barriers and usage of web 2.0 tools. The influencing factors ATT, SE and UF represent Attitude, Self Efficacy and User friendliness of web tools. The security and personal barriers are represented by BAR and the decision to use web 2.0 tools is indicated by USE. It can be inferred that the identified influencing factors have a high impact on usage of web 2.0 tools without the barriers. The model clearly indicates the usage of web 2.0 tools increase by 0.29(29%) whereas with the barriers the usage of web 2.0 tools reduced to 0.17(17%). Thus the model clearly proves the influencing factors such as student’s attitude, self-efficacy and user friendliness of the web 2.0 tools play a prominent role in the decision of adoption of web 2.0 tools by the students of Higher education in the absence of barriers such as personal and security barriers which reduced the usage to 0.17.



**Figure 7: SEM model for assessing adoption of web 2.0 tools**

## 7.CONCLUSION AND FUTURE WORK:

The use of web 2.0 tools provide powerful information sharing,collaboration opportunities for the learners.The study was carried out with an aim to understand the awareness of web 2.0 tools, role of influencing factors and barriers in the adoption of web2.0 tools by the higher education college students. The primary data was collected from Undergraduate and Postgraduate students from Chennai city colleges. The study applied confirmatory factor analysis and identified Attitude, Self-Efficacy and User friendliness as the influencing factors for the adoption of web 2.0 tools and developed a SEM model for the assessment of adoption of web 2.0 tools usage. Another interesting future research would be carried out to assess and predict the lecturer's intentions to use web 2.0 tools to supplement their in-class teaching. It can then be compared with the current study to understand whether the same factors influence the lecturer's intention to adopt the web 2.0 tools and the results can be used to promote better active,social and engaging learning environments.

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#### **AUTHOR BIOGRAPHY**

1. Dr.R.Anusha: Obtained Ph.D degree in 2018.She is currently working as an Asst.Professor ,Department of Computer Science, M.O.P. Vaishnav College for Women,Chennai,India.Her research interests include Machine learning,Software Engineering and Information Technologies.

2. Dr.T.Sunitha Rani: Obtained Ph.D degree in 2019.She is currently working as an Assoc.Professor and Head,Department of Computer Science, M.O.P. Vaishnav College for Women,Chennai,India. Her research interests include Cloud computing,Fuzzy systems and Information Technologies.