Effectiveness of Evidence-Based Learning Strategy for Enhancing Cyber Security Awareness of Higher Secondary Students

Dr. Bindu D.1 and Kumari Sandra C. S.2
1Assistant Professor, Department of Education, University of Kerala, Kerala, INDIA.
2M.Ed. Student, Department of Education, University of Kerala, Kerala, INDIA.

Corresponding Author: drbindu@keralauniversity.ac.in

ABSTRACT

Learning based on evidence and empirical data always make students more involved in the content area and help to conceptualise how to take decisions, based on tangible evidence offered by both scientific literature and experiments, or by data and information obtained through various procedures. This is the era where digital natives inhabit and immerse in Google world for every single need and deed which may results in intentional or unintentional engagements in several social media platforms that may lead to serious cyber threats and issues, even crimes. The present experimental study analysed the effectiveness of Evidence based learning strategy for enhancing cyber security awareness among higher secondary students. From a total sample of 100 higher secondary students, 50 each were randomly selected as control and experimental groups and are given learning experience through ongoing activity-based method and Evidence based learning strategy respectively. Pre-test and post-test on cyber security awareness were conducted and results obtained were statistically analysed through mean, standard deviation, and t-test. Result of the study revealed that the group instructed through evidence-based learning strategy showed significantly higher level of awareness than the group instructed through ongoing method.

Keywords- Effectiveness, Evidence-based learning strategy, Enhancing, Cyber security, awareness, Higher secondary students.

I. INTRODUCTION

Globalisation and revolution in information technology also changed the face of education and educational practices got equipped with diverse experimentation to equip the children to meet the challenges of modern society and its demands. Higher secondary education is the time which teenagers went through an undefined status, increased decision-making capacities, self-search, clumsiness, thriving for modern activities, and high pressure of societal norms. Thus, increased use of cyber space pulled adolescents to “crime behind the screens”. Cybercrimes is the type of crime which can be committed with ease and with no geographical boundaries. Cyber threats can damage systems which are digital, connected to the internet. Afterward the multi fold growth in the field of internet usage with significant increases in the number of cybercrime cases along with the global nature resulted. Various types of cyber-crimes by juvenile are cyber frauds, cyber bullying, cyber stalking, identity theft, drug trafficking, digital piracy, cyber suicides, cyber theft, hacking etc. Apart from these known cyber-crimes new crimes are committed by means of technology each day. To bring desirable modification in students, teachers, parents, and all other patrons must show their responsibility in this direction to be more aware and attentive than our students. According to the UNICEF report (2020), 13% of children and people aged 25 years or less in South Asia and in lower income countries only 14 % school-age children (3-17 years) access the internet at home; it’s estimated that during pandemic around 37.06 million children across 16 states in India continued education through various online classrooms and radio
programmes and lost socialisation. National crimes records bureau (NCRB) data stated that more than 400% increase in cyber-crime are committed in 2020 in comparison to 2019. Top 5 states reported cyber-crimes registered against children; UP (170), Karnataka (144), Maharashtra (137), Kerala (107) and Odisha (71); Information Technology Act, 2000. (Press Trust of India, New Delhi, November 14, 2021).

As realised by much educationalists evidence-based approach to teaching is crucial to maximise students learning out comes. (Michele Bruniges, 2005). When a learning experience is given through more interesting and evidence-based manner the demotivating factors can be overruled and can instil versatile, think aloud empirical knowledge in learners. EBL can provide collaborative learning experience and can draw the attention of learners and retention of learned material as they experience critical thinking process through an energised mind process when compared to normal traditional way of learning.


II. RESEARCH DESIGN

Experimental design was adopted, and randomly selected students were assigned to control and experimental groups. Experimental group was treated with Evidence based learning strategy which is the independent variable while control group was approached with ongoing teaching method to enhance cyber security awareness, the dependent variable. The major objective of the study was to examine the effectiveness of Evidence based learning strategy.

III. SAMPLE

The study was conducted among 100 randomly selected students pursuing higher secondary education from St. Mary’s HSS Pattom Thiruvananthapuram.

IV. TOOLS

Lesson transcript based on Evidence based learning strategy which was prepared by the researcher and validated by the expert. (b) Cyber security awareness questionnaire with a total of 36 items in draft and 30 items in final tool, selected having the difficulty index between 0.4 and 0.6 and having discriminating power more than 0.4. (Ebel & Frisbie, 1991).

V. STATISTICAL TECHNIQUES

Mean, standard deviation and t-test were employed for statistical analysis and interpretation of collected data.

VI. PROCEDURE ADOPTED

For the experimental study the investigator followed four steps:
(a) sample selection
(b) conducting pre-test
(c) administration of intervening technique
(d) conducting post-test.

The investigator selected 100 higher secondary students of St Mary’s HSS Pattom Thiruvananthapuram. The students were pretested to know about the previous knowledge. Students were randomly selected and grouped into two, one is considered as control group and the other is considered as experimental group. Planned lesson transcript was implemented and instructed for one week in experimental group. Lesson transcript to enhance cyber awareness of higher secondary student was framed based on evidence-based learning strategy. Both the groups were post tested with the same awareness test questions and scores of both the pre-test and post-test were recorded for analysis.

VII. ANALYSIS AND FINDINGS

Data were analysed using descriptive statistics to examine the profile of the samples. Arithmetic mean, standard deviation finally the test of significance was calculated which are as follows.

Table .1. Data and results of test of significance of the Pre-test scores of pupils in the Experimental and Control Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of pupils (N)</th>
<th>Arithmetic Mean</th>
<th>Standard deviation SD</th>
<th>CR</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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The obtained t-value is not significant even at 0.05 level (t= 1.3268, p>0.05). so, the experimental and control groups do not differ significantly in their pre-test scores.

Table 2. Data and results of test of significance of the Post-test scores of pupils in the Experimental and Control Groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of Pupil (N)</th>
<th>Arithmetic mean</th>
<th>Standard deviation (SD)</th>
<th>Critical Ratio</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental Group</td>
<td>50</td>
<td>27.23</td>
<td>10.09</td>
<td>4.6</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Control Group</td>
<td>50</td>
<td>18.43</td>
<td>6.86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The critical ratio obtained is significant (CR = 4.6; P < 0.01) which shows that there is significant difference between the means of the Post-test scores of the pupils in the Experimental and Control groups which means the two groups differ significantly in their performance.

Table 3. Data and results of test of significance of the Pre-test and Post-test scores of pupils in the Control Group.

<table>
<thead>
<tr>
<th>Tests</th>
<th>No. of Pupils (N)</th>
<th>Mean</th>
<th>Standard Deviation (SD)</th>
<th>Critical Ratio (CR)</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>50</td>
<td>15.325</td>
<td>6.2</td>
<td>2.1</td>
<td>P&lt;0.05</td>
</tr>
<tr>
<td>Post-test</td>
<td>50</td>
<td>18.43</td>
<td>6.86</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The value of critical ratio obtained is 2.1, which is significant at 0.05 level (CR = 2.1; P < 0.05) which indicates there is significant difference between the means of the Pre-test and Post-test scores of the Control group.

Table 4. Data and results of test of significance of the Pre-test and Post-test scores of pupils in the Experimental Group.

<table>
<thead>
<tr>
<th>Tests</th>
<th>No. of Pupils (N)</th>
<th>Arithmetic Mean</th>
<th>Standard Deviation (SD)</th>
<th>Critical Ratio (CR)</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-test</td>
<td>50</td>
<td>16.625</td>
<td>6.9</td>
<td>5.5</td>
<td>P&lt;0.01</td>
</tr>
<tr>
<td>Post-test</td>
<td>50</td>
<td>27.23</td>
<td>10.09</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The obtained value of critical ratio is significant (CR = 5.5; P < 0.01) which indicates there is significant difference between the means of the Pre-test and Post-test scores of the Experimental group.

Fig.1. Graphical representation of statistical values of pre-test and post-test of experimental and control group on enhancing awareness on cyber awareness of higher secondary students.
The table represents the comparison of mean values and standard deviation of post-test scores, experiment group and control group. It is evident that the mean of the experimental group in post-test is greater than that of the mean of the control group. Therefore, it is inferred that after the sample is subjected to experimentation post test score of experimental group is raised than the post test score of control group, i.e., there exists a significant difference between the post-test scores of two groups.

### VIII. CONCLUSION AND DISCUSSION

The results establish the effectiveness of evidence-based learning strategy for enhancing cyber security awareness and can be concluded that the evidence-based learning strategy for enhancing cyber security awareness of higher secondary students was effective and could enhance their awareness with respect to the content and objectives formulated as it was established through the performance of experimental group. Teaching learning process through evidence-based learning strategy can enhance students’ achievement one step ahead. Therefore, it was inferred that evidence-based learning strategy is a better teaching strategy for enhancing students’ performance.

### IX. EDUCATIONAL IMPLICATION

Teaching learning process based on evidence can be easy to categorize different types of delinquent activities and its nature. The result of the present study emphasises that evidence-based learning ignites the interest towards the content, attention enhancement, maximum learning, and achievement of expected outcomes. Evidence based learning can create curiosity and awareness about social circumstance to which they are a part. Curriculum planners, teachers etc can rely on evidence-based learning for a distinct teaching learning experience. Teachers should make use of the strategy for an effective learning outcome also should initiate students to engage in learning based on empirical data.

### REFERENCES


