REVIEW OF TEACHING METHODOLOGIES WITH CYBER WORLD

[1]Raj Sinha,
Research Scholar,
Department Of Science and Technology,
JayotiVidyapeeth Women's University, Jaipur, Rajasthan, India
rajsinha@jvwu.ac.in

[2]Dr. Shobha Lal,
Professor of Mathematics and Computing,
Department of Science and Technology,
JayotiVidyapeeth Women's University, Jaipur, Rajasthan, India
dean.fet@jvwu.ac.in

Abstract: Despite the fact that the Internet has positively impacted people's lives, there are negative issues emerged related to the use of Internet. Cases like cyber-bully, online fraud, racial abuse, pornography and gambling had increased tremendously due to the lack of awareness and self-mechanism among Internet users to protect themselves from being victims to these acts. However, past research revealed that the level of awareness among Internet users is still low or moderate. One of the vital measures to be taken is to cultivate knowledge and awareness among Internet users from their early age, i.e., young children. Young children specifically, need to be educated to operate in a safe manner in cyberspace and to protect themselves in the process. The objective of this review paper is to explore various teaching methodologies, and various cyber threats present on those methodologies and then what tips to be followed for implementing cyber security.In this paper we have focused on Teacher-centered teaching methodology

Keywords: Cyber-Security, Teaching Methodologies, Teacher-centered Teaching Methodology

1. INTRODUCTION

Methodology- In Latin terms 'Method' means 'Mode' or way. In education 'Methodology' means the mode by which the material is communicated from the teacher to the pupil.

Teaching Methodologies: Teaching and learning are the two sides of a coin. The most accepted criterion for measuring good teaching is the amount of student learning that occurs. There are consistently high correlations between students' ratings of the "amount learned" in the course and their overall ratings of the teacher and the course. Also we can define Teaching Methodologies as follows:- "Teaching methodologies are patterns of teacher behavior that are

recurrent, applicable to various subject matters, characteristic of more than one teacher and relevant to learning" [1].

2. CLASSIFICATION OF TEACHING METHODS

2.1 Teaching methods can be categorized into four broad types: [2]

2.1.1. **Teacher-centered methods:** Here the teacher casts himself/herself in the role of being a master of the subject matter. The teacher is looked upon by the learners as an expert or an authority. Learners, on the other hand, are presumed to be passive and copious recipients of knowledge from the teacher. Examples of such methods are expository or lecture methods – which require little or no involvement of learners in the teaching process. It is also for this lack of involvement of the learners in what they are taught, that such methods are called "closed-ended".

2.1.2. **Learner-centered methods:** In learner-centered methods, the teacher/instructor is both a teacher and a learner at the same time. In the words of Lawrence Stenhouse, the teacher plays a dual role as a learner as well "so that in his classroom extends rather than constricts his intellectual horizons".
The teacher also learns new things every day which he/she didn't know in the process of teaching. The teacher "becomes a resource rather than an authority". Examples of learner- centered methods are the discussion method, the discovery or inquiry-based approach, and Hill's model of learning through discussion (LTD).

2.1.3. **Content-focused methods:** In this category of methods, both the teacher and the learners have to kt into the content that is taught. Generally, this means the information and skills to be taught are regarded as sacrosanct or very important.
A lot of emphasis is laid on the clarity and careful analyses of content. Both the teacher and the learners cannot alter or become critical of anything to do with the content. An example of a method that subordinates the interests of the teacher and learners to the content is the programmed learning approach.

2.1.4. **Interactive/participative methods:** This fourth category borrows a bit from the three other methods without necessarily laying emphasis unduly on either the learner, content, or teacher. These methods are driven by the situational analysis of what is the most appropriate thing for us to learn/do now given the situation of learners and the teacher. They require a participatory understanding of varied domains and factors.

2.2 Teaching theories can be organized into four categories based on two major parameters: a teacher-centered approach versus a student-centered approach, and high-tech material use versus low-tech material use. Figure 1 shows the hierarchical classification of Teaching Methodologies.
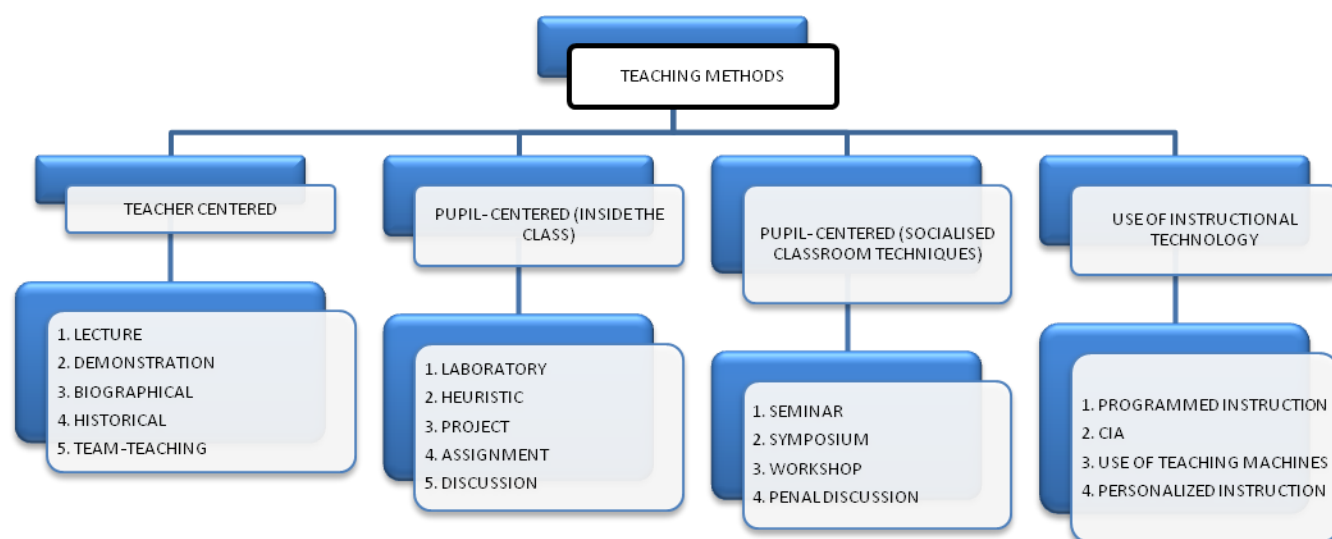
Figure 1: Classification of Teaching Methods

2.2.1. **Teacher-Centered Teaching:** It focuses on

i. Telling

ii. Memorization

iii. Recalling information

iv. Passive recipients of knowledge

v. Restricted to only asking and answering questions

vi. Teaching environment is formalized

vii. Teacher occupies a central position.

Table 1 discusses characteristics, merits and demerits of various Teacher-Centered Teaching Methodologies.

Teaching Methodology	Characteristics	Merits	Demerits
Lecture Method	• Commonly used method • In colleges and big classes • Teacher talks – Students listen passively • Teacher controlled and	• Economical • Knowledge imparted – quickly • Syllabus covered – short time • Quite attractive and	• Students participation is negligible • Passive recipients • Never sure – concentrating or understanding

	information centred • Own speed • May make use of black board at times • Dictate notes • Does not expect any question or response from the students	easy to follow • Impart factual information and historical anecdoctes • Teacher – own style • Teacher dominates 70-85% • Logical sequence of the subject • Minimises – gaps or overlappings	• Knowledge imparted rapidly; weak students develop a for learning • No place for learning by doing • Does not provide for corrective feedback and remedial help to slow learners • Undemocratic and authoritarian method
Lecture cum demonstration Method	• Includes lecture and demonstrate method • From concrete to abstract • Superior method of learning • Combines instructional strategy of information imparting and showing how • Teacher performs experiment and explains what he is doing • Asks relevant questions	• Economical in time and money • Psychologically based • Specially for: - apparatus is costly - danger -difficult and complex -special technique -quick revision -several experiments	• No scope for learning by doing • Not child centred – no individual differences • Fails to develop laboratory skills • Fails to impart training in scientific attitude • Fail to observe many finer details
Biographical Method	• Associates the facts and principles of biology with the life of the scientists • Helps the students to learn the facts and principles along with hardships undergone by the scientists, their experiments, apparatus and improvisations •	• Works well for some which are obviously political or biographical in nature. • It also is necessary to take a historical approach in order to place allusions in their proper classical, political, or biblical background.	• "The intentional fallacy". Tends to reduce art to the level of biography and make it relative rather than universal. • New Critics refer to the historical / biographical critic's belief that the meaning or value of a

	Students will realize the importance for hard work, perseverance, success and happiness • Develop the attitude of science and scientists		work may be determined by the author's intention as "the intentional fallacy." They believe that this approach tends to reduce art to the level of biography and make it relative (to the times) rather than universal
Historical method	• Invention • Discovery • Adventures • Life histories of scientists • Example : Archimedes and his bath - principles of archimedes – "eureka, eureka" , newton and the apple- newtons – gravitational force	• It Permits the investigation of topics that could be studied in no other way. • It is the only teaching method that can study evidence from the past. • This method is well suited for trend analysis.	• Cannot control for threats to internal validity • Limitations are imposed due to the content analysis. • Bias in interpreting historical sources.
Team Teaching	•The team-teaching method is flexible •In team teaching, teachers need to decide their activities by themselves •It is a collective responsibility •In team teaching, the whole responsibility is on	• Low cost • Support for teachers • Closer integration of staff • Better involvement of students • Mental stimulation to students	• Acceptance of change by teachers • Rigidity in teachers • Bad team management • Personality conflict • Inability to complete curriculum • Time for coordination and

	all the teachers •The requirements of pupils, schools and other things also considered •Teaching and evaluation both done on the co-operative basis		planning

Table 1: Comparative study of methods of Teacher-Centered Teaching Methodology

2.2.2. Pupil-Centered Teaching:
   i. According to the needs, requirements, capabilities and interests of the pupils.
   ii. Develop in learners' skills and abilities in independent learning and problem solving.
   iii. Classroom climate is flexible and psychologically open.
   iv. Teacher and students jointly explore.
   v. Pupil occupies a central position.

2.2.3. Instructional Technology:
Instructional technology includes practical techniques of instructional delivery that systematically aim for effective learning, whether or not they involve the use of media. It is a basic purpose of the field of instructional technology to promote and aid the application of these known and validated procedures in the design and delivery of instruction. [3]

3. IMPACT OF TEACHING METHODOLOGIES ON CYBER SECURITY

In this section we are discussing impact of various teaching methodologies on Cyber Security. Table 2 discusses various teaching methods with cyber threats on them and cyber security tips to overcome from those cyber threats.

Cybersecurity should not be limited to the classroom — virtual or otherwise. Since most home networks do not provide the same increased firewalls or protections offered by institutions, teachers and students become more susceptible to hacking attempts as they spend more time online. It is important to practice safe online behavior everywhere.

Almost all teachers and students are now-a-days using online contents, various websites to enhance their knowledge and to update themselves. While surfing sometimes they are in a threat of getting attacked by various malwares and also sometimes to gather knowledge or to prove them superior they use to break cyber-laws and knowingly or unknowingly they commit cyber-crime.

Teaching Method	Characteristics	Cyber Threats	Cyber Security tips to end users
Teacher-centered methods	i. The teacher is the center of knowledge and in charge of learning. ii. Students are usually passively receiving information. iii. The instructor's role is to be primary information giver and primary evaluator. iv. Students are viewed as "empty vessels" who passively receive knowledge from their teachers. v. Teachers and professors act as the sole supplier of knowledge, and under the direct instruction model, teachers often utilize systematic, scripted lesson plans. vi. Teacher Centered Instruction is fairly low-tech, often relying on the use of textbooks and workbooks instead of computers vii. Assessments are in many cases only carried out as summative and not formative evaluations and they rarely address qualitative issues of the learner's progress.	The Teacher's Data is prone to following mentioned cyber-attacks: i. Phishing ii. Distributed Denial-of-service iii. Data Breach iv. Ransomware v. IOT Vulnerabilities	Teachers should follow the following tips to secure their data from cyber threats: i. Encrypt your Data ii. Comply with your Institution's Cyber Protocols iii. Safeguard your devices from Physical Attacks iv. Back Up your Data v. Practice Good Password Management

Learner-centered methods	i. Personal ii. Allow learners to exert agency iii. Have goals and accountability iv. They are inquiry-based, Collaborative, Authentic v. Allow for productive struggle vi. Provide and use models vii. Ensure time for critique and revision as well as reflection.	As in this method Teachers and learners both are exposed to an open internet space, the students/learners have to go through study of various cyber-laws, cyber threats so that they can protect themselves of being a victim of cyber- crime	In this method Learners and trainers have to get training of cyber security tips and also how to develop their own secured network, so that intruders or malwares are not allowed to threat them.
Content-focused methods	i. The focus is on the topic or subject matter. ii. During the lesson students are focused on learning about something. This could be anything that interests them from a serious science subject to their favorite pop star or even a topical news story or film. iii. They learn about this subject using the language they are trying to learn, rather than their native language, as a tool for developing knowledge and so they develop their linguistic ability in the target language. iv. This is thought to be a more natural way of developing language ability and one that corresponds more to the way we originally	In this Teaching Methodology as the main focus is on content so the intruders are more interested to steal information during the use of this teaching method	To secure their data users can first encrypt their contents then afterwards they can exchange their data, so that intruders would not be able to steal their contents.

	learn our first language.		
Interactive/participative methods	i. By Interactive/participative methods, we understand all the situations in which students are placed and who take them out ofthe subject of the object of training and turn them into active subjects, co-participants in their own training, not only the active methods themselves. ii. Student-centered learning is an approach that involves an active learning style and theintegration of learning programs according to the pupil's own learning rhythm. iii. The student must be involved andaccountable for the progress he has made in terms his own education.	In this method as the interactive teaching is used there may be a chance that an unauthorized user is also interacting, and during this interaction they can steal or hamper the important and confidential data	During this teaching Authenticity criteria of users is to be implemented and verified strictly so that unauthorized user would not be able to become a part of network.

Table 2: Teaching Methodology, cyber threats, cyber security tips

4. CONCLUSION

In this paper, we have discussed various Teaching Methodologies with their characteristics, merits and demerits. After that we have mentioned various cyber-threats on the methods of four main teaching methodologies with various tips of cyber security that can be implemented to overcome from those cyber threats.

5. FUTURE WORK

In future, we can find various cyber threats on other remaining teaching methodologies also. After finding various cyber threats we can develop methods and models to overcome from those cyber threats and enhance our cyber security methods and models.

6. CORRELATION WITH ANCIENT INDIAN LITERATURE

Evolutions of teaching methodologies are as follows [8]:

   i.   Oral communication
   ii. Written communication
   iii. Broadcasting and video
   iv. Computer technologies

            a. Computer-based learning
            b. Computer networking
            c. Online learning environments
            d. Social Media

As during oral and written communication teaching methods in Gurukul, both the teachers and students use to reside in a secured and safe environment for exchange of knowledge. At that time none other than authorized persons are allowed to visit or reside inside the gurukuls, so Data are not vulnerable for attacks like being stolen or deformed. Similarly there is a need in modern education system as well where authentic users can only access the data in a strict secure network, so that a secure cyber world can be created.

Reference:

[1] https://www.slideshare.net/Vijirayar/methods-of-teaching-biological-science
[2] https://ugcnetpaper1.com/teaching-methodology/
[3] Gagne, R. M. (2013). Instructional technology: foundations. Routledge.
[4] Achkovska-Leshkovska, E., &Spaseva, M. S. (2016). John Dewey's educational theory and educationalimplications of Howard Gardner's multiple intelligences theory. International Journal of CognitiveResearch in Science, Engineering and Education/IJCRSEE, 4(2), 57-66.
[5] Al-Azawei, A., Parslow, P., &Lundqvist, K. (2017). The Effect of Universal Design for Learning (UDL)Application on E-learning Acceptance: A Structural Equation Model. The International Review of Researchin Open and Distributed Learning, 18(6).
[6] Dupuis, M. J. (2017). Cyber Security for Everyone: An Introductory Course for Non-Technical Majors. Journal ofCyber-security Education, Research and Practice, 1(3).
[7] Defensenews (2018).https://www.defensenews.com/pentagon/2018/11/14/a-crisis-of-national-security-new-reportto-congress-sounds-alarm

[8]https://www.researchgate.net/publication/353210752_STUDY_OF_MALWARE_DETECTION_USING_MACHINE_LEARNING

[9]https://www.researchgate.net/publication/353210680_CYBER_CRIME_TRENDS_IN_COVID-19_ERA

[10]https://www.researchgate.net/publication/352178441_A_Study_on_Preventive_Measures_of_Cyber_Crime

[11]https://www.researchgate.net/publication/352178529_Social_Impact_of_Cyber_Crime_A_Sociological_Analysis