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A Novel Game-Based Approach for Computer Networks

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***Abstract*—Teaching consists of Ideation, Perception, Inception, and Reproduction. A teacher's job is challenging to sustain and maintain all the above characteristics in the classroom. The vital role of a teacher in the classroom pertains to gaining the student's attention. In this gesture, the Active Learning classroom plays a predominant role in understanding a student's empathy. This paper uses a novel game-based learning-by-doing approach to imbibe the concept of the OSI model with the RRR game. The game named RRR represents Ride, Route, and Retract. The learning model applies to a representation of 3I's Tautology. The Outcome of this experiment is a representation to visualize the context and annotate the content. The pedagogy represented in this game aims to meet the learning objectives and outcomes of the specific topic that aims to meet Outcome-based Education.**

Keywords:
Perception, Inception, pedagogy, machine learning, classroom dynamics.

***JEET Category*—Research paper**

I. INTRODUCTION

With the Update of new Technological aids and interventions, there has been a drastic change in the teaching field. The Teacher's role is confined to Teaching and making the pupil live. Education is the means of transformation of living.

The motivational words of the great speaker of Telangana minister Sri.K. Taraka Rama Rao," State Development consists of 3I's Ideation, Investment, and Innovation," invokes State development. These words also give a gateway to Educational Learning because Education shows the best way to impart values and lives. The same scenario has been established as a wing to wind up and wear up Learning prospects.
Human being Perception reveals many secrets hidden in mind, and to introspect the perception and the production abilities, the 3I Strategical classroom plays a vital role.

The 3I's represent

I-IMAGINATION
I-INNOVATION
I-IMPLEMENTATION

With the intervention of advanced tools in the 21st Century, the Teacher acts and suggests being a mentor, imparting the principles of Artificial Intelligence in Teaching to replace the Teacher with a Robo and get it trained so that student's questions and doubts with the help of Robo. There is a hypothetical situation can a Robo replaces a teacher, and is it justified to take a Robo to train and work like a teacher?

The above discussion resembling the aid of Teaching starts with the aim of Learning, and the term Artificial Intelligence corresponds to Intelligence of Learning and Thinking. These two characteristics are available to the Teacher. In this gesture, there is no replacement for the Teacher. A Robo or an Artificial Intelligence-based system can only provide refreshments to the students.

To inculcate Learning as a habit and a teacher's role in utilizing Technology in the classroom is often more important than building a new Technology. Recreating an active learning classroom, either with Technology or with Compassion, justifies the divinity of Teaching.

The concept of imagination works with Technology, but Technology does not drive the Concept of Learning. Imaginativeness in seeing and well-being using the Technology driven Teaching and Learning Environment. 21st Century tools like Virtual Reality pushes the learning environment of imagination into experienced Learning.
Recreation is the possibility of perceiving, perceiving, and representing views and ideas into a bond matching all the equivalent criteria. To establish an active learning classroom environment, frequent communication and interactive motivation incubate the Learner toward Tautology and develop an ideal setting. Upgrade and Update became the needs of the 21st Century Teacher to build an interactive Learning Aided classroom and to enrich the perspective of Learning in multiple ways. Experimental Learning Pedagogy puts the Learner Emphasis on the Potential growth of Pupils to imbibe Learning. And justify the classroom. Moods may differ, Situations may vary, Pupils may differ, Money may differ, and Qualifications may differ.

The indifference that explains all the differences in all the ways is called Teaching. Teaching inculcates Learners into Moral citizens in society.

II. LITERATURE SURVEY

With the rapid change in Classroom environments, the Tautology and ideology of a Teacher are also changing. Varying pedagogy with the erratic mindset of Pupils enacts the need to deploy a new interactive mechanism in the Teaching and Learning Environment. Following the Principles and Patterns of Bloom's Taxonomy, a traditional classroom environment resembling forces can occur.

In Teaching Pedagogy, Brainstorming is the base the knowledge enhancement and imagination impartation. Figure (1) represents the small brainstorming activity that makes the Teaching Pedagogy imaginative.

Figure 1: Picture of Brainstorm for Computer Network**.**

The above figure was given to the Pupils, who asked to connect all the images to a Network model. The activity makes the students think of various ways to recreate a story for the above image. The above model revokes the ability of the students to think in multiple ways to create an account.

Figure 1 relates to the Computer Network because the entire globe correlates with the connection of similar kinds of things. Suppose a driver and a software engineer want to live both eat the same food grains from the farmer. Hence a farmer forms a network with the Driver and the software engineer to deliver his food grains since the web is an exchange of data between two or more nodes. Software engineer and Driver can start their conversation of information with the farmer. Suppose a natural calamity tsunami occurs, and the farmer cannot grab the situation. Software Engineers with the hypothetical Technology can observe from their monitor raising the ships, which indicates danger ahead. With the help of the computer network models, build a good path to safeguard the farmer and exchange the same information with the Driver. Thus the Driver can defend the farmer with his car before the tsunami touches the farmer's feet.
Hence computer network is a vital thing not only for exchange but also for living. (Dr.G.Venkateswara Rao, 2022).

Role of Active Learning and Game-based Education

Two of the latest buzzwords in engineering education are 'active learning' and 'Outcome Based Education. Active Learning is the idea that students actively engage in learning rather than passively absorbing content. (D, 2020).

Outcome-Based Education (OBE) is a corrective educational move that has influencing many countries in recent years. Despite the global acceptance of OBE, there is little evidence about its impact on Workplace Communication skills. (Fan, 2019).

Project-based Learning and Problem-based Learning are the two approaches that intensify and justify active learning strategies with real-time problem-solving approaches. Active Learning implements collaboration and coordination mechanisms among the students to think, pair, and share. Strategies that imbibe the learning mechanisms to enhance the traditional measures with Bloom's Taxonomy to enrich and enhance students' Learning in all respects.

III. EXPERIMENT

The motivation to do this activity is to begin with the end in mind. The activity provokes the teachers to develop a compassionate mechanism to visualize the learning syndrome in annotating a learning perspective to build an ingenious model encapsulated with the layers and functionalities. The activity illustrates Compassion, probing, and generically applying each layer.

Activity

The aim is to understand the OSI Reference model from the bottom-up approach, the Top-down approach, and vice versa.

The Open Systems Interconnection (OSI) model describes seven layers computer systems use to communicate over a network. It was the first standard model for network communications, adopted by all major computer and telecommunication companies in the early 1980s. Figure 2 represents the OSI Model.

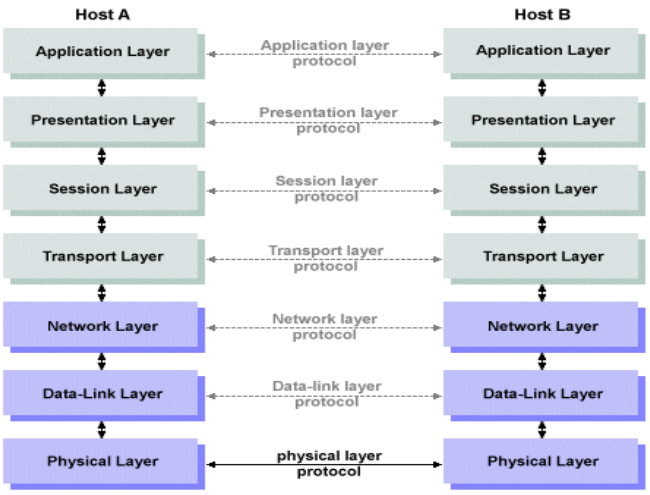

Figure 2: OSI MODEL

LEARNING OBJECTIVE

The learning objective for the above activity is to understand all the layers

LEARNING OUTCOME

The Learning Outcome of the above activity is to imbibe the responsibilities of every layer

RRR(RIDE,ROUTE,RETRACT)

The game begins with the imagination of the RRR movie as a motivational spirit where Jr.NTR comes with a Bike and Ramcharan with the horse. Figure 3 shows the final destination point where both will interchange the packets through the ropeway.

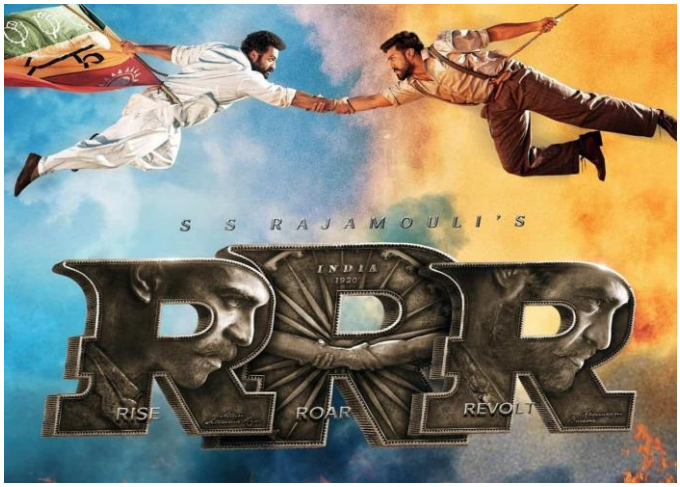

Figure 3: Final Destination point.

The following are the game rules in the RRR(Ride Route, Retract). This game suggests riding first Route Next and Retracting to the final destination.

RRR game rules

1. In the context of the RRR game, every hero must start with the initial physical point.

2. The game is designed so that every hero must start his vehicle with utmost precautionary measures.

3. Packet loss refers to the loss of scores to every hero in the travel to the destination point.

4. Every node point after the start of the game has the scores.

5. The destination locality where the two heroes exchange their packets will be sent to them through mobile google maps.

6. There will be specific signal points at every junction, and the heroes should not jump the signals, which may reduce scores.

7. When there are makeup rules in the game to win, there will be break-up rules that will take the responsibility to bear the consequences with a session with the Policemen.

8. There will be some thefts in the middle to take the packets, and packet theft will not get any scores.

9. Final destination of the exchange refers to the overlap exchange between the two heroes. (M.Rithvik, 2020)

10. The game analysis starts with the intensified ride and extensive route that retract to the destination with the protocols ahead of living the joy of exchange.

This game works on the strategy of a Win/Win situation where the loser is always a winner.

In every phase in the model, every point indicates layers to organize the context from the starting point to the destination point.

1. Physical Layer

In the physical layer, Ramcharan goes to the horse, which is bounded to the earth, and NTR takes the bike to the parking location, which resembles the Physical Layer consisting of Data in the form of bits. NTR starts with a bullet, and Ramcharan invokes his journey with the horse. Hence both the Heroes secure a score of 1 point.

2. Datalink Layer

In this layer, both the heroes used to take precautionary measures to save themselves and were assigned a task to establish the packet interchange without loss. The above job represents a network address to collect the protective suits and Helmet. The data link layer takes responsibility for adding the header and footer and detects the errors in sending the packets. Since the route map is unavailable with both the Heroes, there are chances to deviate and overtake themselves in the same route. In this gesture, both the heroes will get the same score resembling 2. It is necessary to overcome the limited speed among themselves to have a protected journey.

3. Network Layer

Both of them cannot be at a stage to know the location to reach the destination through a path. The network layer's responsibility is to find a way shown in figure 4. In this route map, the travel journey varies among both the heroes because one may choose the route with the principle of optimality. Hence, one who deviates the path in this journey may get quit from the game.

Figure 4: GPS for Network Layer

4. Transport Layer

Both the heroes find the destination path and are in a hurry to reach the destination. In a hurry mood, mostly every individual commits a mistake. In this gesture, one of them crossed and jumped the signal point. This action resembles the need for Rules and Regulations. The Transport Layer Responsibility is to follow all the protocols. Figure 5 represents the transport layer.

After the successful journey from the above route, both the heroes should follow all the protocols in their journey. In this gesture, one who jumps from the signals eliminates from the game.

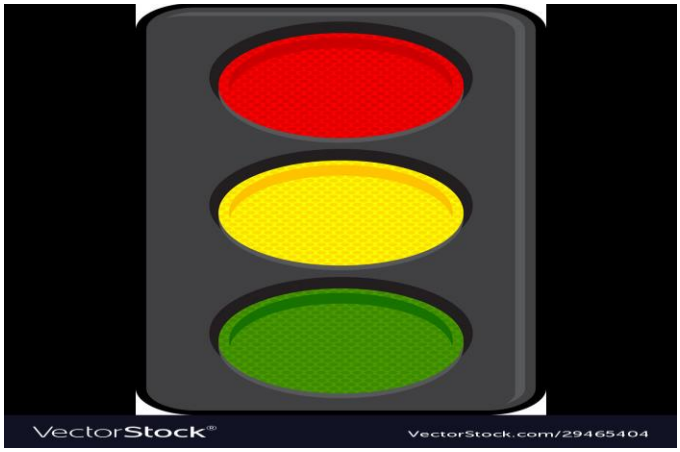

Figure 5: Jumping the signals

5. Session Layer

Since signal jumping is a punishable offense, one of the heroes goes to the police officers for counseling, which consumes more time than estimated. The responsibility of the Session Layer is to conduct the sessions and make data an ensembled way to deliver. Figure 6 represents the Session Layer.

Unfortunately, if one of the heroes jumps from the signals, police officers will fine them and take responsibility for this case.

Fig 6 Policemen to conduct sessions

6. Presentation Layer

There is a need to find out whether the packet carried by the two heroes consists of any drugs or unwanted items. There is also a chance that any thief can shift a packet at any time. It deserves to protect the packet efficiently. The responsibility of the presentation layer is to encrypt the data and check the reliability of the transmission of data. Figure 7 represents the Presentation Layer.

It has become an essential aid to both the heroes to sustain their journey with no loss of packets until the packets are wrapped to the final destination point. This means the packets may be lost or robbed by the theft. There may be chances to add unwanted items to the containers to win the game. In this case, one caught with the theft will be eliminated from the competition.

Figure 7: Checking and Protection

7. Application Layer

It is the last layer where both the heroes reach their destination points. The primary responsibility of this layer is to use protocols for communication like HTTP, SMTP, etc. Figure 8 shows the overall game. If both the heroes reach their destination point without any elimination. There is a tight fight to decide the winner of the game. In this gesture, competition turns to the exchange of wrapped packets among themselves. One application suggests sending the data to another application. If an exchange happens without any packet loss, then the one who initiates the deal and takes responsibility in a controlled synchronized flow to deliver packets is announced as a winner and called with the name Bahubali.

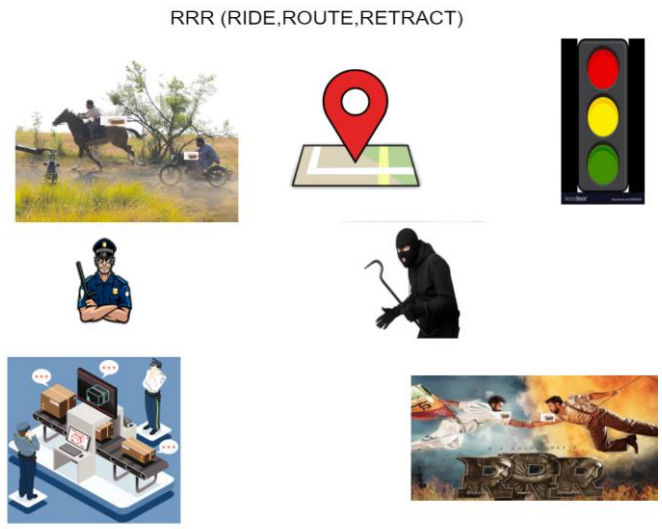

Fig 8: RRR Game

IV. RESULTS

The entire game scenario was explained to the students in an interactive way so that everyone participated. The game is illustrated, so the two students play the heroes' roles. After the demonstration of the game, students confessed to the original play, and the following are the results.

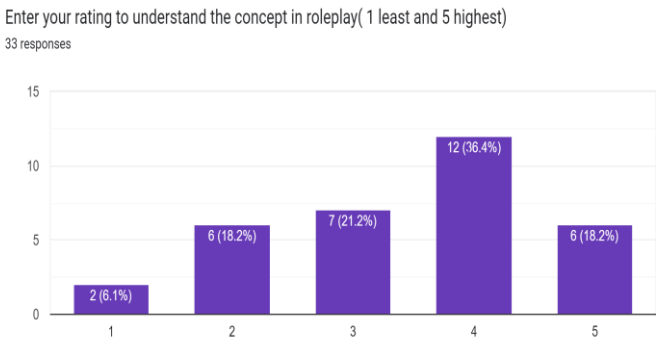

Fig 9: Shows the student's interest in roleplay.

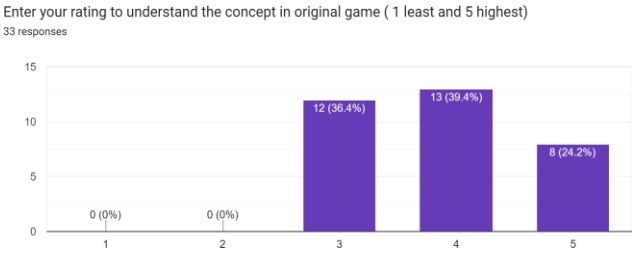

Fig 10 shows the student's interest in the game

Fig 9 and 10 it has to intervene so that students can grab the concept's attention in the traditional classroom or the same game-based approach with an analogy. Suppose the original game app illustrated the same interest and enthusiasm shown for Technology.

The above game was illustrated in the classroom, and the response of nearly half of the students was as follows

1. Have you enjoyed the game? For this question, 94% of students enjoyed the game. Fig 11 represents the results

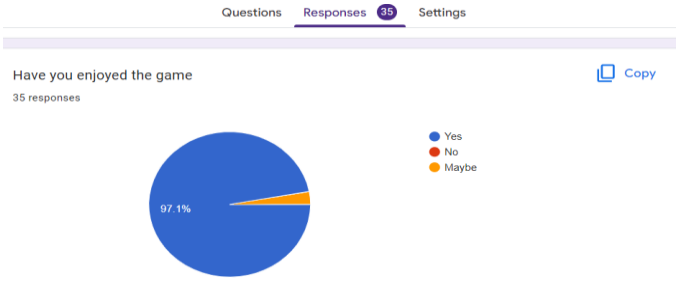

Fig 11: Question 1

2. Do you think this sort of activity develops creativity? For the above Question, 80% of students intended to develop creativity among themselves. Fig 12 Represents Question 2

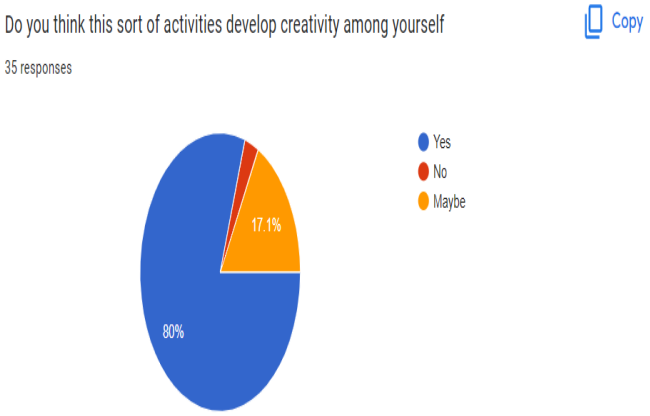

Fig 12: Question 2

Regarding the motivational spirit of the students to do more activities in future
Question 3 Do you think this sort of game motivates you to be more attentive in the classroom
Around 91% of students suggest that this game motivates them to be more creative.
Fig 13 Represents the output of students

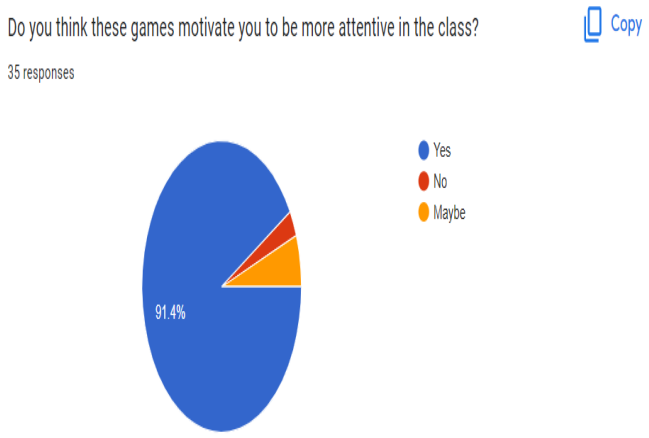

Fig 13: Question 3

V. CONCLUSION

Game-based Learning strategy always deploys a motivational novelty among the Teacher to sustain the obvious way of Teaching skills enriching a Learning environment for sustainable growth. In the new Technology mode of Teaching, this game can be further enhanced to a 3D game where students can experience each stage in the model and further experience the Learning in an idealistic way.

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