Energetic Teaching Activity Role Play and Round Quiz: A Case Study

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Abstract: Teaching Learning process involves different activities. Every lecture has an outcome. However, if the lecture is forenoon, there is a need to energize the students with learning outcomes. Role-play and round quiz are energetic learning activities. Role-play activity increase numerous abilities in the students such as team building, leadership quality, demonstration, thinking, working, playing, creativity, etc. Round quiz is a game applied for the fuzzy logic course. Round quiz clears the tiniest of their doubts and prods them to answer it themselves. Students become energetic for these activities. The paper demonstrates learning with joy.

Keywords: Role-play, Round quiz, Energetic activity, assessment, outcome.

1. Introduction

Now a day, knowledge and information is available on the internet, hence teacher's role is to facilitate the students' instead of one-way teaching. The teacher must facilitate students in the right way with the right material and clear visualization of imaginary things. Active and collaborative teaching methods help a teacher to facilitate the students. Role-play and round quiz are active and collaborative teaching, learning tools that help students in fun learning. The role-play activity and round quiz designed for final year students of electronics and telecommunication engineering, for the fuzzy logic course. For post lectures the role-play round quiz supports teacher to keep students' active. Students' master all skills required for engineering. These techniques help all types of students' i.e. shy student, active students, silent students and clever students. The students' relationship will develop with teachers and colleagues. These tools empower the students. Social skills of students increase. These collaborative activities maintain the learner interest in the course.

2. Literature review

Adolfo Cobo et al. [1] adopted role-play as a teaching methodology in engineering education. Researchers practiced the role-play for trouble shooting or doing maintenance of industrial scenarios of mechanical, electrical, chemical or electronics industry. They implemented role-play in communication networks to trouble shoot the layers of TCP/IP networks. They analyzed the study based on rubrics developed, including knowledge, relevance, and selection of instrumentation. This was the innovative teaching tool for theory courses.

Aidan O'Dwer [2] conducted open book, multiple-choice questions for postgraduate as well as undergraduate students. He presented the systematic study with quizzes. The author had given the choice for students to choose the book. He also led the quizzes of papers presented. The quizzes directed individual and team that supports to create different types of quizzes such as formal and informal quiz, paper based quiz, open book quiz, social quiz, etc.

Genevieve Marie Johnson and Julia Ann Johnson [3] evaluated the learning styles of students in study groups and online quizzes. Researchers surveyed 48 college students and analyzed the students' learning style and preference of online study.

Maria Asuncion Rojas and Jhonny Villafuerte [4] had presented that role-play is task based, communicative and cooperative learning tool. They believe that role-play is science. Role-play develops the healthy relationship between students' and teacher. It helps to strengthen the students' confidence in speaking, as well as active exploration of course knowledge.

Mohad Firdaus Mohd Ab Halim et al. [5] proposed innovative quiz that bridges the gap between theory and practical. The authors explained the detail procedure and testing the quiz required for electrical and electronics engineering student. They suggested that this quiz clears the fundamentals of electrical circuits.

Shawna Shapiro and Lisa Leopold [6] accessed the role-play and critical role. For role-play active involvement and critical thinking is required. For completing the role-play, the students' must have cognitive and linguistic skills with deep knowledge of course content.

Stephan Krusche et al. [7] applied interactive learning techniques for software engineering course. In teaching, they used case studies, quizzes and icebreakers. The results evaluated based on the students' feedback and performance in that course.

Suzanne E. Weinstein and Shao-Wei Wu [8] suggested difference between frequent quizzes verses regular assessment quizzes. Researchers evaluated 51 college students and proved that frequent quizzes enhance the students' learning. They recommended the frequent quizzes avoid students to cheat and make them ready for any time.

Tim W. Lowe [9] analyzed the summative and formative online quizzes based on the number of attempts made and scores achieved. In this quiz, the attempts are unlimited. Authors proved that summative assessments promote students to attempt the quizzes many times and helps to clear the concept of mathematics.

Zina Adil Chaqmaqchee [10] compared the students' perspective for two different University higher education students. The researcher found the different university students have a different perspective for quizzes and discussion. They predicted that more study is required for quizzes in different context.

3. Problem identified:

- The success of teaching activities is not measured by individual faculty
- Pedagogical effectiveness of teaching activity implemented by faculty is not analyzed.

Three factors affect the effectiveness of teaching activities:

i) Teacher variables: Dedication, Experience and motivation.
ii) Student variables: Entry behavior and motivation
iii) Institution variable: Facilities, motivation

If all the above factors exist, the success is measured by The following formula:

Success=Teachers interest+ student involvement + Outcome of the activity.

3.1. **Objectives**:

- Prove role-play and round quiz are Energetic Teaching Activity
- Promote evaluation of learning by using rubrics method
- Analyze clarity in fundamentals of respective course.

4. Research Methodology:

The case study was conducted at Rajarambapu Institute of Technology affiliated to Shivaji University, Kolhapur. To overcome the problems identified in the energetic activities, role–play and round quiz are finalized through literature review. It is decided to apply for an undergraduate elective course (fuzzy logic) of the final year of Electronics and Telecommunication Engineering department. Total 53 students have participated in the case study. Students test was conducted at the beginning of the course, in the middle of the course and after role-play as well as round quiz activity i.e. at the end of the course. Three prominent variables, namely clarity in fundaments, recommendation for role-play or round quiz and active involvement of students were selected for statistical analysis. The students' three tests were used for ANOVA analysis, Correlation analysis and ROC analysis for energetic activity. Students were circulated with questionnaire to get feedback about the activity. The data collected from questionnaire was used for feedback analysis.

One way repeated measures ANOVA was used for testing because it is helpful for one group i.e. final year B. Tech. of ETC department. The ANOVA testing helps to analyze the energy of students in role-play activity and round quiz. Correlation analysis is applied to test the impact of variables. Correlation also shows the relation of variable with each other i.e. positive or negative relation. ROC (Receiver operating characteristics) curve used to test the decision of faculty objective with positive and negative energetic activity. The impact of the results and outcome are discussed.

5. Role-Play:

Role-Play is a speaking and acting activity. Students dip their toes in functional languages for multiple scenarios through role-play. Students explore realistic situations.

5.1. **Role-Play activity**:

Any role-play activity has seven steps. The Role-play steps are as follows:

i. Step1: Group the students
ii. Step2: Start the process, encourage open discussion
iii. Step 3: Introduce the problem
iv. Step 4: Details added
v. Step 5: Assign Roles
vi. Step 6: Act out the functional scenario
vii. Step 7: Discussing what students have learned.

5.2 Types of role-play activities:

Mainly four types of role-play activities practiced.

The types of role-play described below:

i. Functional Role-play: Used for functional language or to increase the proficiency of any language. This role-play used for describing the functions of block diagram. This is good for block diagram presentation.
ii. Interview Role-play: This activity practiced in the business world. In this role-play, students play-act out scenario of interview. In this, students can ask different questions for a course, which are not found in books.
iii. Real world visualization of imaginary scenarios: Present the real world scenario for imaginary concepts. This helps all students to think in a particular situation for imaginary scenarios.
iv. Role-play Game: Different technical games will be played to clear the concepts. This is useful for mathematics, e.g. fuzzy mathematics. Fantastic games can be formed for a suitable course.

Role-play is an educational tool useful for engineering education. Role-play have fun learning. Role-play does not have disadvantages if a teacher follows the course boundaries and try to fit in a course or topic goals. From this teacher will also learn many things.

5.3 Picture of Role-Play:

Picture of Role-play shown in fig.1. Role-play help every student to take part actively. In role–play, students become energetic.

Fig. 1.0 Role-play of Lambda cut in fuzzy logic

5. 4 Advantages of Role-play:

- Students think out of the box
- Breaks the barriers of classroom
- Builds confidence, creativity and good language communication
- Students take part in decision making, work as a leader or team member
- Apply the course contents in a relevant real world context.

6. **Round Quiz:**

Round quiz is useful for summative assessment. This is the interactive quiz. In the round, quiz students sit in the round immediately. The late sitter will take the first question. Round quiz played as we play in school level the game is "Mother's Letter Lost". The rules of the round quiz are followers:

1. Step 1: Form the round in one minute
2. Step 2: The late sitter will ask the first question
3. Step 3: More than a hundred questions should be asked and given to the students or no. of students multiplies by four/three.
4. Step 4: No repetition of questions and to be limited in the course contents.
5. Step 5: Asking the question in 10 seconds
6. Step 6: Answers should be given within 10 seconds.
7. Step 7: The next student will ask the question and students must answer that question. If the answer is wrong, the question is forwarded, and the teacher will take a decision.
8. Every student must take part in the quiz.
9. No time wastage but fun in learning.
10. Conduct in the last lecture of day or last lecture of topic/course.

Round Quiz helps to clear the fundamentals of fuzzy mathematics. This quiz will help to clear all doubts in the teaching-learning process.

6.1 Image of Round-Quiz:

Image of Round Quiz shown in fig.2. This quiz helps every student to take part. The first and frequent quiz will be asked by standing student and question given by faculty.

Fig.2.0 Round quiz in classroom in one minute

7. Data Collection:

Data is collected by the primary Questionnaire method. The Questionnaire is designed to analyze the role-play and round quiz. The questions are given below:

Table1: Questionnaire for students

Questions	Strongly Agree (5)	Moderately Agree(4)	Agree (3)	Neutral (2)	Disagree (1)
Could you get the clarity in fundamentals?	[ ]	[ ]	[ ]	[ ]	[ ]
Would you recommend the Role-play to a friend or colleague?	[ ]	[ ]	[ ]	[ ]	[ ]
Would you recommend the Round quiz to a friend or colleague?	[ ]	[ ]	[ ]	[ ]	[ ]
Were you actively involved in activities?	[ ]	[ ]	[ ]	[ ]	[ ]
Did you enjoyed the activities?	[ ]	[ ]	[ ]	[ ]	[ ]

8. Stastical Analysis:

The role-play and round quiz are analyzed stastically using stastical tools, ANOVA testing, Correlation testing and ROC testing.

8.1 ANOVA Testing:

ANOVA testing used is one way repeated measures ANOVA. Same test is assed for final year B. Tech. class at beginning of the course, middle of the course, after role-play and round quiz activity i.e. at the end of the course. This analysis provides to find the students energy changed from beginning of the course to the end of the course. For testing the ANOVA the SPSS software is used.

Table2: ANOVA testing for Role Play

Test Result Variable(s)		Sum of Squares	df	Mean Square	F	Sig.
Clarity in fundamentals	Between Groups	.353	2	.176	.722	.491
	Within Groups	12.462	51	.244		
	Total	12.815	53			
Recommend Role-play	Between Groups	.364	2	.182	2.606	.084
	Within Groups	3.562	51	.070		
	Total	3.926	53			
Involved actively in role-play	Between Groups	.497	2	.249	2.336	.107
	Within Groups	5.429	51	.106		
	Total	5.926	53			

The significance value of ANOVA is greater than 0.05, therefore there is no significant difference in variables. The table shows that the role-play is suitable between groups, within groups and proved statistically i.e. role-play is suitable for engineering study.

Table3: ANOVA testing for Round Quiz:

Test Result Variable(s)		Sum of Squares	df	Mean Square	F	Sig.
Clarity in fundamentals	Between Groups	.059	2	.029	.149	.862
	Within Groups	10.034	51	.197		
	Total	10.093	53			
Recommend Role-play	Between Groups	.003	2	.001	.072	.931
	Within Groups	.979	51	.019		
	Total	.981	53			
Involved actively in round quiz	Between Groups	.177	2	.088	.356	.702
	Within Groups	12.638	51	.248		
	Total	12.815	53			

The significance value of ANOVA is greater than 0.05, therefore there is no significant difference in variables of round quiz. The table shows that the round quiz is suitable between groups, within groups and suitable for study, proved statistically.

8.2 Correlation Testing:

The correlation tool generally used to describe the degree to which one variable is related to another. It finds the relationships among variables. The correlation analysis describes the comparative changes occurred in role-play and round quiz test variables and their cause effect relationship examined using SPSS software.

Table 4.0: Correlations for Role Play

Test Result Variable(s)		Clarity in fundamentals	Recommend role play	Involved Actively in role-play and round quiz
Clears Basic fundamentals	Pearson Correlation	1	.099	-.034
	Sig. (2-tailed)		.475	.807
	N	54	54	54
Promotes role_play	Pearson Correlation	.099	1	.192
	Sig. (2-tailed)	.475		.164
	N	54	54	54
Actively Participated	Pearson Correlation	-.034	.192	1
	Sig. (2-tailed)	.807	.164	
	N	54	54	54

Table 4.0 indicates positive correlation with for clears basic_ fundamentals with clears fundamentals and promotes role-play. Positive correlation with fundamentals, promotes role-play and active participation. Negative correlation with active participation promotes role-play fundamentals because few students are directed by teacher to take part in role-play. Table indicates positive correlation. Here the majority is positive correlation that if one variable increases, the other also increases. The table shows the variable itself had positive correlation. The total table specifies the role-play is significant proved statistically. From the above tables it is proved that the students become energetic after role-play and round quiz.

Table 5.0: Correlations for Round Quiz

Test Result Variable(s)		Clears_basic_fundamentals	Energetic	Promotes_role_play	Actively_Participated
Clarity in fundamentals	Pearson Correlation	1	.074	-.041	-.355**
	Sig. (2-tailed)		.597	.767	.008
	N	54	54	54	54
Energetic	Pearson Correlation	.074	1	-.021	-.047
	Sig. (2-tailed)	.597		.878	.733
	N	54	54	54	54
Recommend Role-play	Pearson Correlation	-.041	-.021	1	-.042
	Sig. (2-tailed)	.767	.878		.764
	N	54	54	54	54
Actively_Participated	Pearson Correlation	-.355**	-.047	-.042	1
	Sig. (2-tailed)	.008	.733	.764	
	N	54	54	54	54

In the table 5.0 the variables energetic have 1 Pearson correlation value, that means the variable energetic, itself proves that it is stastically significant. In table 5.0 the Pearson value for the variable-clarity in fundamental and energetic have a positive correlation with each other. The value for this correlation is 0.074 that means if we increase; the variable-clarity in fundamental then the variable-energetic value also increases. The variable-clarity in fundamentals with variable-actively participated is negative i.e. -0.355. This means that if we increase the variable-clarity in fundaments will decrease the variable-active involvement of students. The table 5.0 defines that there is positive correlation with energetic activity and hence the round quiz activity is significant proved statistically.

8.3ROC for Role Play and Round Quiz:

ROC curves used first time to test the linking with positive and negative energetic objective. The ROC curve is used for testing the decision. The curve intersects with factors involved or not? If the curve intersects, the meaning is that the all factors are linked with each other. With this curve, it is tested that the factors are positively linked or negatively linked. This is very useful tool used in machine learning to take decision. This tool is used for testing whether the energetic activity affects positively or negatively for learning of students and their involvement in these activities.

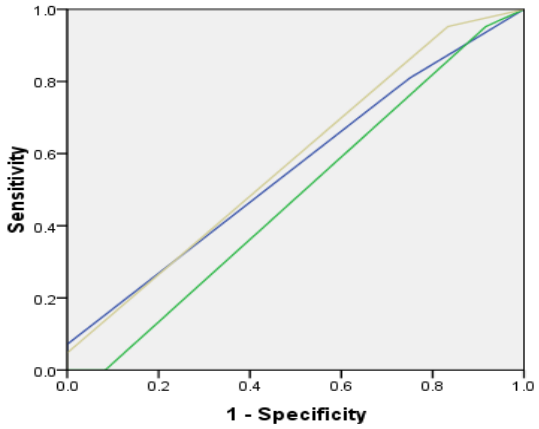

Fig.3.0 : ROC for Role Play

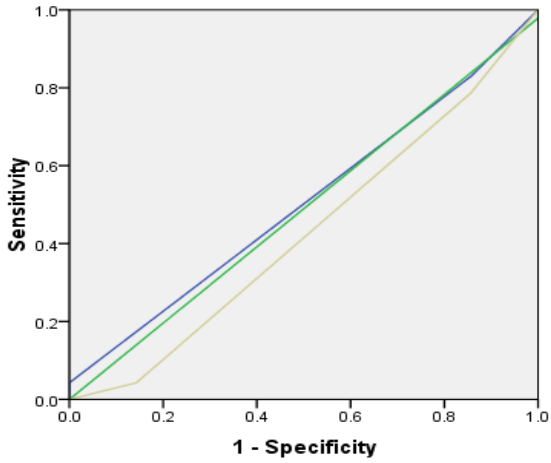

Fig.4: ROC for Round Quiz

In fig. 3 and fig.4, the true positive rate with the variable energetic is sensitivity. The middle line will give the energetic variable with proper cut off. The specificity means difference between the variable-clears fundamental with the variable-energetic. The result of positive test is defined as sensitivity/1-specificity, and the negative result value is defined as 1-sensitivity /specificity. The confidence level for this used is 95%. The case processing summary for Role-play is positive energetic is 42 and negative energetic is 12. The case processing summary for Round Quiz is positive energetic is 47 and negative energetic is 7. Larger values of the test result variable(s) indicate stronger evidence for a positive actual state. The positive actual state is 2.00. The test result variable(s): Clears fundamentals, Recommend role-play; Active Involvement has at least one intersection between the positive actual state group and the negative actual state group. The variables intersect with a point positively as well as negatively. The fig. 3 and 4 shows, that the sensitivity and specificity are balanced with energetic variable. Therefore, role-play and round quiz has been proved statistically **energetic.**

9. Results and discussion:

The analysis of energetic teaching activities role-play and round quiz have adopted the learning cycle of teaching activity.

The learning cycle of teaching activity is accepted based on four questions,

First question: Why-Need of activity, contextualize, Newness

Second question: What- Conceptualize, justify

Third question: How- Implement, Test

Fourth question: What Next- Analyze, Review

The analysis of the activities done using rubrics.

Table2: Rubrics for Role–play Evaluation.

Factors	Student Performance Indicators			
Knowledge	Poor	Fair	Good	Excellent
Speaking Skill	Poor	Fair	Good	Excellent
Presentation Skill	Poor	Fair	Good	Excellent
Quality of Scenario	Poor	Fair	Good	Excellent
Quality of Contents	Poor	Fair	Good	Excellent

Table3: Rubrics for Round-Quiz Evaluation.

Factors	Student Performance Indicators			
	1	2	3	4
Involvement	Poor	Fair	Good	Excellent
Respond Questions	Poor	Fair	Good	Excellent
Correct Answer	Poor	Fair	Good	Excellent
Quality of Answer	Poor	Fair	Good	Excellent

In classroom, the course teacher completed the evaluation of activity. From this activity teacher can identify the low performer students and students' participation in activity. In the final year class, the four students are identified and separate guidance is provided to these students.

The round quiz feedback analysis of students represented in fig. 5.0

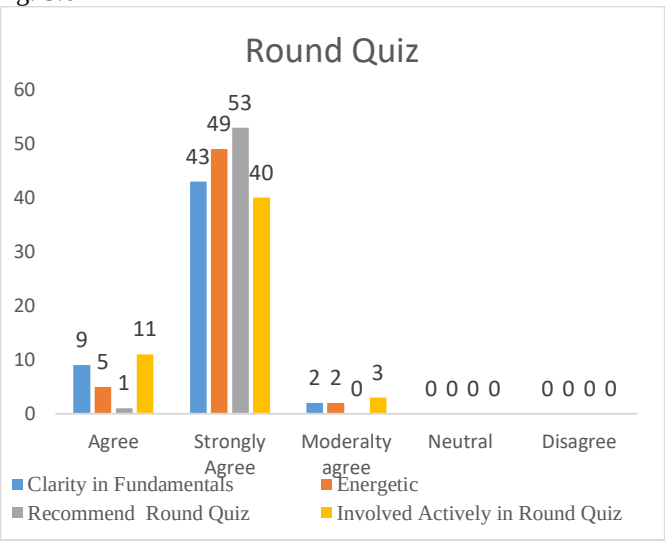

Fig.5.0: Feedback analysis of Round Quiz

The Role-play feedback analysis of students represented in fig. 6.

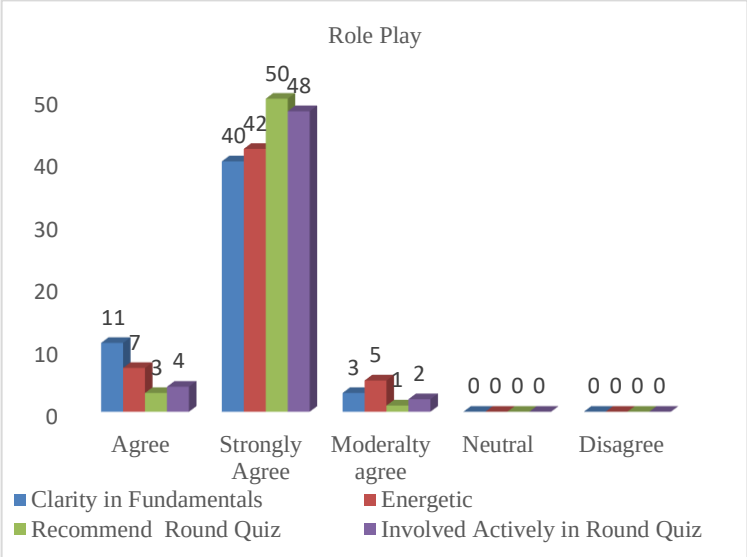

Fig. 6.0: Role-Play feedback analysis

Students' feedback is collected. 53 Students' have given the feedback. The analysis of these feedback is that the students become energetic when they are involved in the role-play and round quiz. They get the clarity in fundamentals, they also became creative. The ANOVA analysis, Correlation Analysis and ROC curve stastically verified that role-play and round quiz are energetic activities moving towards positive direction.

10.Outcomes:

The outcome of the students' activity is that 63 students developed the application on real life problems with the concept of fuzzy logic, few applications are listed below.

- Fuzzy Rule based diagnostic system for inspecting the effect of video games on the eyes.
- Analysis of water quality in fishery using a fuzzy logic controller
- Milk Quality analysis using the fuzzy Logic system
- Hotel rating using the Fuzzy interface system
- Fuzzy inference system for sugarcane yield prediction, etc.

All applications of students were uploaded on Moodle activities. The link of Moodle activity is: http://210.212.171.173/moodle/mod/assign/view.php?id=53310&action=grading

The outcome of these activities are students gained skills to apply fuzzy tools in real time problems and enjoyed learning concept.

11. Conclusion:

Role-play and round quiz are energetic teaching activities proved through feedback of students and statistical analysis. Fuzzy mathematics fundamentals were clear to students by implementing role-play activity. Round Quiz, activity helps students to answer all the short questions. The case study

supports the faculties to engage students with full energy. Role-play and round quiz teaching activities can use for any course. These activities help the classroom with full of learning enjoyment.

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