

***“A Study About The Perception Of Teachers Towards The Use Of Simulation
In Teaching-Learning Of Biology”***

Mod Istyak Ali¹ &Dr. Sarita Kumari²

¹Research Scholar, Department of Educational Studies, Faculty of Education, Jamia Millia Islamia, New Delhi, India

²Assistant Professor, Department of Educational Studies, Faculty of Education, Jamia Millia Islamia, New Delhi, India

Abstract

The purpose of present study to know the perceptions of Kendriya Vidyalaya teachers about the use of simulation in teaching-learning of biology. The study has been conducted along with the key objective of the study i.e. to study the perceptions of the teachers towards the use of simulation in teaching-learning of biology.

This study adoptive descriptive survey design and the target population of the study included biology teachers of 10 Kendriya Vidyalaya senior secondary schools of which five were running in two shifts i.e. morning and evening. The sample size comprised all the 20 twenty biology teachers from the schools. The tool for the data collection was questionnaire. The data were collected based on the objective. Then, it was analyzed descriptively and qualitatively in line with the respect design adopted. The analyzed data was presented by the use of tables and graphs. The findings of the study were discussed under tables and the graphs. Findings of the study has shown that the use of simulation in teaching-learning of biology is very important because it provides flexibility to the teachers improves their conceptual understanding, enhance attention, promotes motivation to the teachers. The use of simulation is helpful in the assessment of the students' learning also and the use of simulation is a better way of time saving for effective teaching-learning of biology.

Key Words: Simulation, Perception, Teaching-learning, Biology, Senior Secondary School

Introduction

In the present scenario of education there are lot of the researches performed in every discipline of education and we know that research is the basic need of the development of the any discipline of education, so a research conducted at “Michigan University” performed, it was found that students were attracted to the simulation much more than the academic

traditional methods of learning, due to the well written scenarios, audio & visual effects and colors of the simulation. These factors are enough to cause the child to absorb information dozens better than that absorbed from a teacher in a classroom (Sharmin 2015).

In the present scenario of education there is a challenge that education should be integrated to Information and communication technology with curriculum transaction and authorized to students to allow them to work effectively in a world that is going on now a day. The present theory of education focused on the importance of interactivity, involvement of the students in learning of the any new concepts. These are also note down the benefits of the interactive aspects of simulation technology to the students of biology and like other subjects.

Modern educational theory highlights the importance of interactivity, involvement of the audience who should be stimulated to think and to learn and whose reactions should affect the conduct of the teaching-learning (Ramsden 1992, Biggs 1999). The use of simulation in teaching method began to retain attention among teachers because as a teaching method, alleged benefits include the promotion of understanding of the concepts, increased motivation, flexibility, interactive participation in classroom, improved attitudes, productivity, creativity and divergent thinking (Parrott 1994).

Most of students claim that Science is a very hard subject to study. So it is the function of the teachers to make easy, understandable and meaningful learning of biology. Although teachers should be used innovative and interactive method to teach biology to the students. In the conventional teaching methodology, knowledge was imparted to the students by means of a systematic conversation or a discussion, the conventional scheme of teaching needs to adopt more ways to incorporate the child in the classroom. With the development of the simulation many concept becomes easy for the better understanding of the biology concept. In biology there are some special concept which is not understand by the traditional method so teachers and students faces many difficulties in teaching-learning of biology on that concepts. So the use of simulation in biology it becomes easier for understanding. There are many difficult concepts in biology which cannot be theoretically understood by simple lecture method. These topics of biology required pragmatic experiences and examples related to real life situation. Instead of just writing an example it will be great if it is expressed in the form of simulation which will gain concentration of the student and will lead to a better comprehension. In present time of the world, Information and Communication Technology gives more opportunity to the development of the educational curriculum and teaching-

learning process because it is providing more flexibility to the teachers to improve their teaching methods. Simulation supports biology teachers to improve their knowledge and learning needs and enables them to become the most efficient and competent at par with their peers in schools. On the basis of above discussion, we can say that simulation is mostly used to facilitate and enhance biology teaching. Without its use the teaching-learning process of biology was found to be less motivating, for biology learners.

Most of the studies in our country and other country performed at the primary level to science and other subject but at the secondary level, limited studies present related to perceptions of the teachers to use of Simulation in biology so the researcher wants to know the perception of the teachers regarding use of simulation in teaching-learning of biology at the senior secondary level in this present study.

Research Question

- What is the perception of teachers regarding use of simulation in teaching-learning of biology?

Objective

- To study the perception of the teachers towards the use of simulation in teaching-learning of biology

Research Methodology**Population**

A population is any group of individuals that have one or more characteristics in common that are of interest to the Investigators (Best and Kahn 2010).

The population for the study constitutes the senior secondary level biology teachers of Kendriya Vidyalaya schools of Delhi.

Sample

The present study will use purposive sampling technique to select schools of Delhi where simulation in biology has been performing these days.

- Selection of school: Ten Kendriya Vidyalaya schools will be selected from Delhi through purposive sampling.
- Selection of teachers: Two biology teachers from each senior secondary school will be selected purposive.

Sampling Procedure

In this study the sample was drawn from various 10 Kendriya Vidyalaya schools located in Delhi. It comprises of 20 senior secondary level biology teachers. The sample for the study will be selected purposively.

Description of tools

During this research, the data are collected through research tool. The tools needed for a particular research work is decided according to the nature and purpose of the study. The selection of appropriate tool is as important as other steps of the research. The investigator used suitable tool to find out the information in the form of data by which all the problems can be underground in their study. Some of the information was find out through with casual conversation with participants. The main research instruments used for data collection in this study for teachers was questionnaires.

Questionnaire

A questionnaire was developed by the investigator with the help of experts to study the perception of the teachers about the use of simulation in teaching-learning of biology at senior secondary level.

The whole questionnaire can be broadly categorized into sections, catering to the objectives of the present study. In questionnaire of teachers there are total number of items with 37 close ended which consisted 7 sections of dimensions. The questionnaire comprised 3-point Likert scale type items where participants have to tick any one of the given alternatives. All the segment of the questionnaire, which was based on five-point rating scale (Agree-3 Disagree-2, & Neutral-1 and Always-3, Sometimes-2, Never-1), broad themes of simulation about the perception and problems of biology teachers.

Thematic analysis of Questionnaire

Table 1.

Brief Account of Themes Used in Questionnaire for the perception of teachers

S. No	Dimension	No. of items	No. of Q (C)	Source
1.	Perception	32	32	
a.	Delivery of Content	4	4	Lowe, R.K. (2003)
b.	Conceptual Understanding	5	5	Brenda., K. & Stuart N., (2006).)
c.	Classroom participation	5	5	Balim, A. G., Inel, D., & Evrekli, E. (2012).
d.	Comprehension	5	5	M. Kannan (2007)
e.	Motivation	5	5	Moreno & Neo, (2009)
f.	Promote Flexibility	4	4	Reiber& Park, (1991)
g.	Classroom interaction	4	4	Mayer & Moreno, (2002)

Q: Question, C: Close ended

Validity and Reliability of Tools

In general, a test is valid if it measures what it claims to measure. The items for the tool were written in the context of the objective of the study. Validity of the used tool was assured by the experts in the related field. Comments of the experts were integrated in this tool. The reliability of the tools however, could be measured through a pilot study.

Data collection

The investigator collected the data in the following manner:

- i. After preparing the questionnaire, the investigator takes a brief session among biology teachers.
- ii. The investigator gathered the responses given by the participants through questionnaire

Analysis of Data

The data of this study collected in proper manner and the data was exhaustive and as such these data analyzed by qualitative method of the research. Responses to the close ended questions were fixed into categories and the teachers' responses in each category was determined. The findings of this study are discussed under the objective wise.

1.1. Delivery of content

On the basis of these items investigator wants to identify the perception of teachers about the use of simulation in teaching-learning of biology in delivery of content.

Table 1.1
Use of simulation in delivery of biology content

S. No	Items	Agree	Disagree	Neutral
(a)	Students enjoy lessons presented by simulation.	70%	5%	25%
(b)	Simulation delivered content easily.	85%	5%	10%
(c)	Simulation delivered biology content in a systematic way.	80%	10%	10%
(d)	Simulation technique presented biology concepts with logical flow (Simple to Complex).	75%	10%	15%
Average percentage		77.5%	7.5%	15%

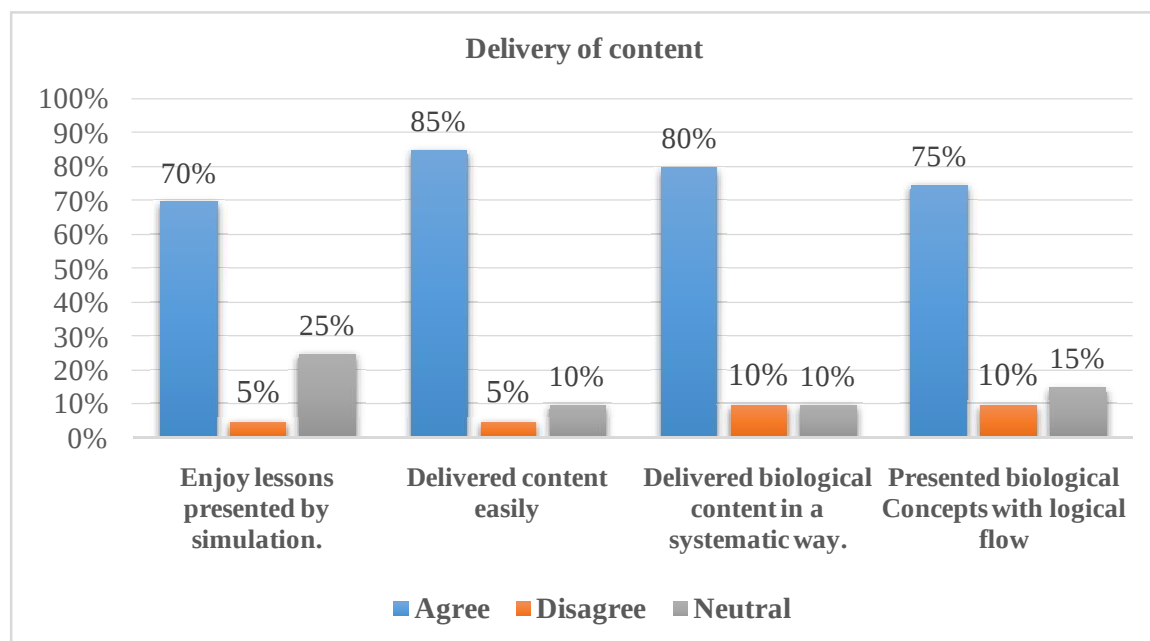


Figure 1.1

The figure 1.1 highlighted that 70% teachers agreed on that students enjoys lessons presented by simulation technique but 5% teachers not agreed with it while 25% participants were on neutral, 85% teachers agreed on that simulation delivered content easily, whereas 5% teachers not agreed with this while 10 teachers were neutral about it, a majority of the teachers like 80% agreed that simulation delivered content in a systematic way whereas 10% teachers were not agreed with it while 10% teachers were neutral and also majority of the teachers 75% were said that simulation presented biology concepts with logical flow while whereas 10% teachers were not agreed with it while 15% teachers were neutral for that simulation presented biology concepts in a logical flow.

On the basis of above percentage (77.5%), it was found out that a vast majority of the teachers agreed that simulation helps them for delivery of content in teaching-learning of biology.

1.2. Conceptual understanding

On the basis of items investigators wants to know the perception of the teachers about the use of simulation for conceptual understanding in teaching-learning of biology.

Table 1.2
Use of simulation for conceptual understanding of biology content

S. No	Items	Agree	Disagree	Neutral
(a)	Simulation technique provide better understanding of biology concepts in teaching-learning of biology.	85%	10%	5%
(b)	Simulation can help in making biology teaching-learning interesting and clear.	80%	5%	15%
(c)	Simulation enables students to learning in easy manner.	85%	00%	15%
(d)	Simulation can enhance conceptual understanding in teaching-learning of biology.	80%	10%	10%
(e)	Simulation is useful to knowledge management for teaching-learning of biology.	75%	10%	15%
Average percentage		81%	7%	12%

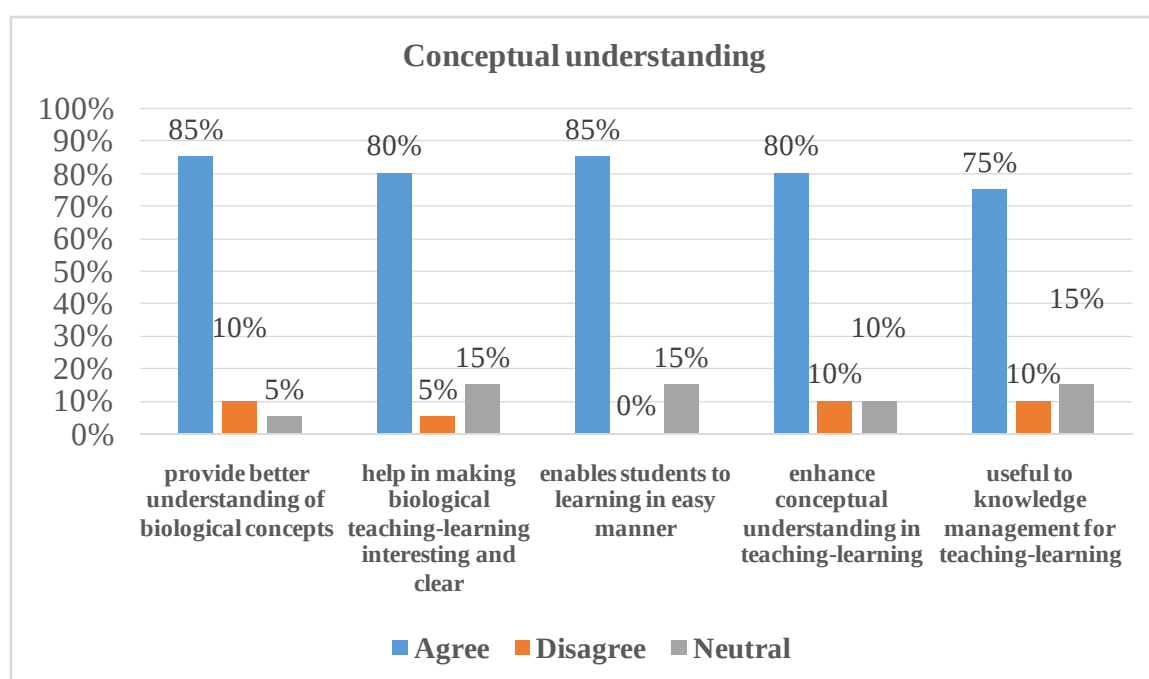


Figure 1.2

It was identified from the above analysis that 85% teachers said that simulation provide better understanding of biology concepts whereas 10% teachers were not agreed with it while 5% teachers were neutral, 80% teachers agreed on that simulation help them to making biology teaching-learning interesting and clear whereas 5% teachers not agreed with it while 15% teachers were neutral about that simulation makes teaching-learning interesting and clear, 85% teachers agreed on that simulation enable students to learning in easy manner while 15% teachers neutral for it, figure also shows that a majority of the teachers agreed with that 80%

teachers agreed that simulation enhance their conceptual understanding in teaching-learning of biology whereas 10% not agreed with it while 10% teachers neutral for it. 75% teachers agreed on that simulation is useful to knowledge management for teaching-learning of biology although 10% not agreed with it while 15% teachers were neutral about it.

On the basis of average percentage (81%) of the perception of the teachers related to this dimension it was found out that simulation is useful for conceptual understanding in teaching-learning of biology.

1.3. Classroom participation

The items related to classroom participation frame to identified the perception of teachers about that simulation plays any significant role in the teaching-learning of biology for classroom participation.

Table 1.3
Useful in classroom participation

S. No	Items	Agree	Disagree	Neutral
(a)	Simulation can promote active participation of all students.	75%	15%	10%
(b)	Simulation engaged students with intellectually in teaching-learning of biology.	80%	10%	10%
(c)	Simulation can enhance classroom participation in teaching of biology.	85%	5%	10%
(d)	Simulation can be motivated to students for actively participate in teaching-learning of biology	75%	15%	10%
(e)	Simulation would be useful for classroom participation for teaching of biology.	85%	10%	5%
Average percentage		80%	11%	9%

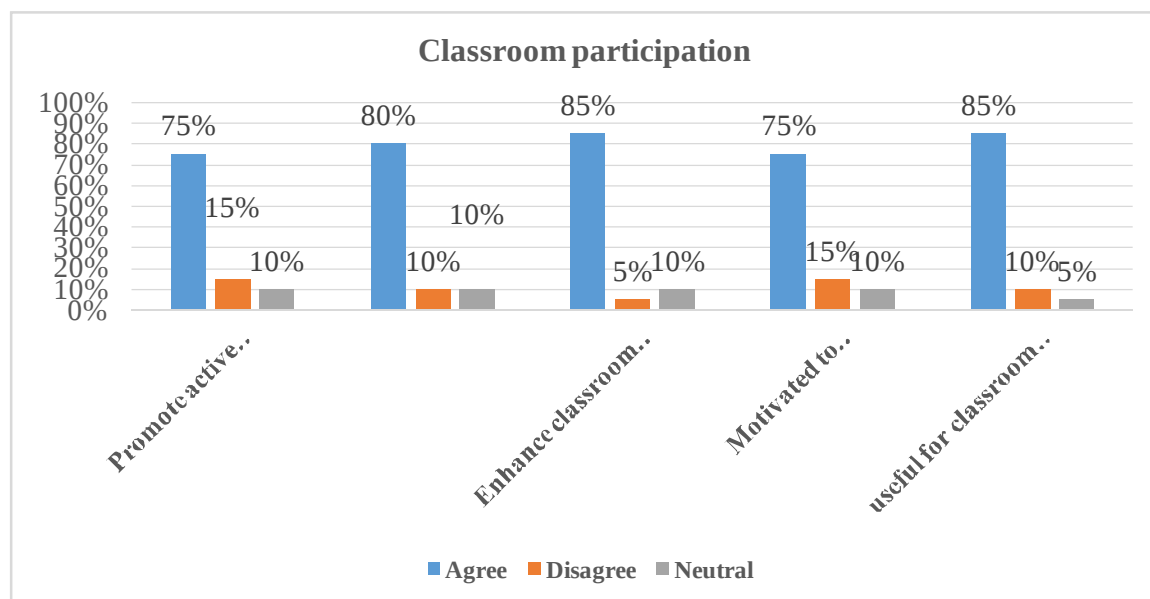


Figure 1.3

The figure 1.3 illustrate that 75% teachers agreed on that simulation promote active participation of the students in teaching-learning of biology whereas 15% teachers disagreed with it while remaining 10% teachers were neutral for this item, 80% teachers said that simulation engaged students whereas 10% not agreed with it while 10% were neutral about simulation and students engagement, another item highlighted that 85% teachers were agreed on that the use of simulation in teaching-learning of biology enhance classroom participation while 5% teachers not favored it but 10% teachers were neutral about it, 75% teachers agreed about that simulation technique motivated to students to actively participation in teaching of biology whereas 15% teachers not agreed about it while 10% neutral for this item, on the analysis of last item it was found out that we 85% teachers said that simulation is useful to the students for classroom participation although 10% teachers not agreed with it while remaining 5% teachers were neutral for it.

On the basis of the average percentage it was identified that a majority of teachers about 80% said that simulation is useful in the teaching-learning of biology for the classroom participation.

1.4. Comprehension

The items related to comprehension frame to identified the perception of teachers about that simulation plays any significant role in the teaching-learning of biology for classroom participation.

Table 1.4
Use for comprehension in teaching-learning of biology

S. No	Items	Agree	Disagree	Neutral
(a)	Simulation provides a comprehensive picture of content matter for biology teaching.	80%	15%	5%
(b)	Simulation provides better learning experiences for teaching of biology.	75%	15%	10%
(c)	Comprehension rate becomes higher with the use of simulation in teaching-learning of biology.	75%	10%	15%
(d)	Simulation gives a comprehensive explanation of biology content.	90%	5%	5%
(e)	Use of simulation provides comprehensive understanding of biology content to students.	75%	5%	20%
Average percentage		79%	10%	11%

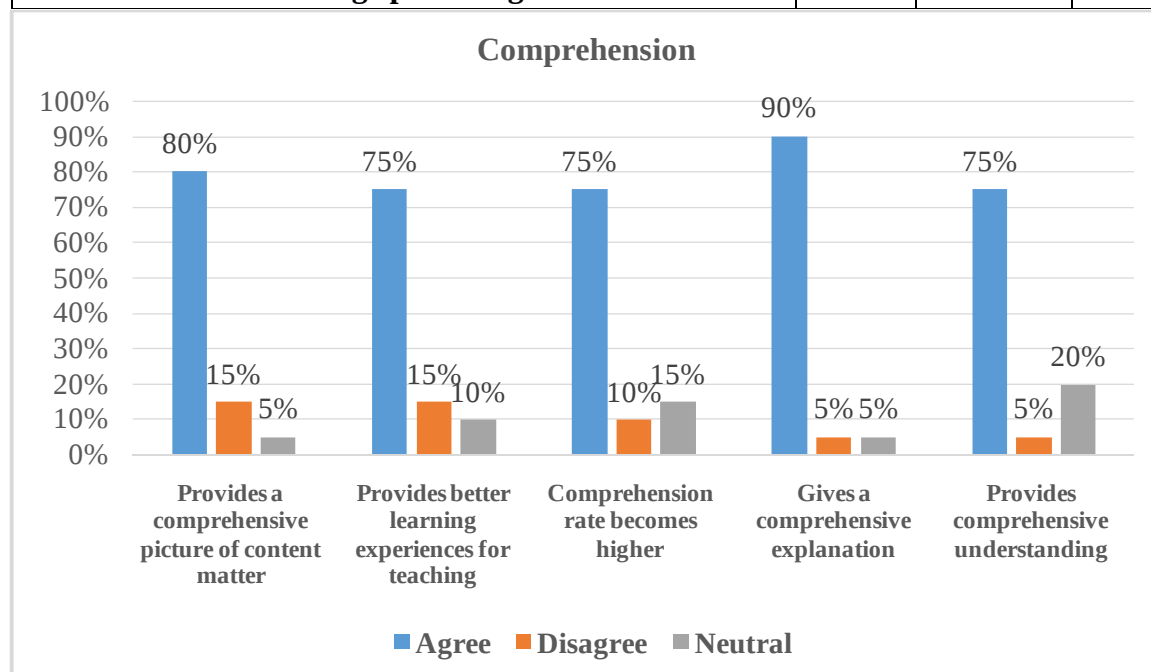


Figure 1.4

The figure 1.4 shows that 80% teachers were agreed on that simulation provides a comprehensive picture of content matter for biology teaching whereas 5% teachers were not agreed while 15% teachers were neutral, 75 teachers were agreed about it that simulation provides better learning experiences for teaching of biology whereas 15% teachers were not agreed with it while 10% teachers were neutral about it, 75% teachers were agreed on that comprehension rate becomes higher with the use of simulation in teaching-learning of biology whereas 10% teachers were disagreed with this item while 15% teachers were neutral, 90% teachers agreed that simulation gives a comprehensive explanation of biology content whereas 5% teachers were not agreed with it while 5% neutral for that simulation

gives a comprehensive explanation of biology content, 75% teachers in favour that the use of simulation provides deep understanding of biology concepts in teaching-learning of biology but 5% teachers were not in favour of it while 20% teachers were neutral related to that the use of simulation in teaching-learning of biology provides deep understanding of biology concepts.

Thus it was found out that average percentage (79%) of the dimension related items that simulation is helpful in teaching-learning of biology for the comprehension of the concepts.

1.5. Motivation

The statements about motivation tried to find out the decision of the teachers related to that simulation play any significant role for motivation in teaching-learning of biology.

Table 1.5
Use for motivation to teaching-learning of biology

S. No	Items	Agree	Disagree	Neutral
(a)	Simulation provides conditions to motivate students in teaching-learning of biology.	75%	25%	00%
(b)	Simulation increase motivation for teaching-learning of biology.	90%	5%	5%
(c)	Simulation promotes extrinsic motivation in teaching of biology.	85%	5%	10%
(d)	Simulation works as a tool of intrinsic motivation for biology teaching.	75%	10%	15%
(e)	Use of simulation in teaching of biology motivates to teachers always.	85%	5%	10%
Average percentage		82%	10%	8%

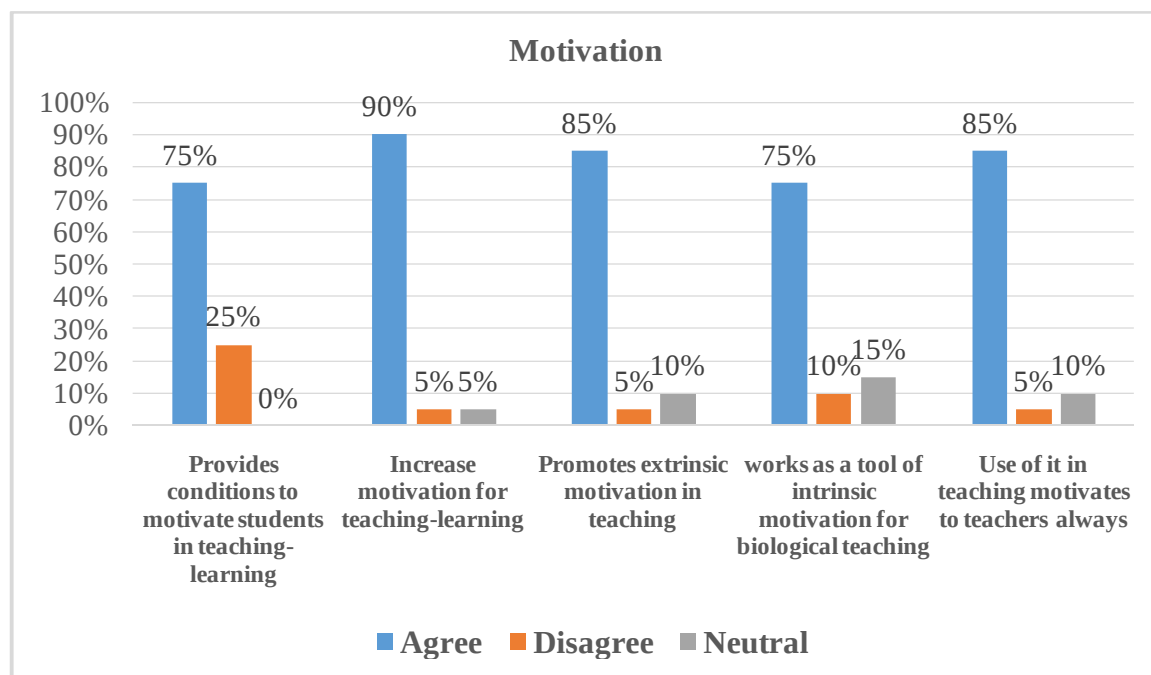


Figure 1.5

It is revealed by this figure that a majority of participants 75% were agreed that simulation provide conditions to motivate students in teaching-learning of biology while 25% participant were neutral related to item (a), 90% teachers addressed that simulation technique increases motivation for teaching-learning of biology but 5% teachers were not agreed with it while 5% teachers were neutral related to item (b), 85% teachers agreed that simulation promotes extrinsic motivation in teaching of biology but 5% teachers were not agreed with it while 10% teachers were neutral for item (c), 75% teachers point out that simulation works as a tool of intrinsic motivation for biology teaching but 10% teachers not addressed that simulation technique works as a tool of intrinsic motivation for biology teaching while 15% teachers were neutral for item (d), 85% teachers said that use of simulation in teaching of biology motivates to them always but 5% teachers not agreed with that simulation technique in teaching of biology motivates to them while 10% teachers were neutral with the item (e).

It was identified that a majority of the teachers (82%) were favored in simulation to use for the motivation in teaching-learning of biology.

1.6. Flexibility in teaching

The items related to flexibility frames to identify the perception of the teachers about that simulation play any role for flexibility in teaching-learning of biology.

Table 1.6
Simulation used for flexibility of biology teaching

S. No	Items	Always	Sometime	Never
(a)	Simulation technique offers real advantages over traditional teaching method.	85%	10%	5%
(b)	There is no limitation for time, place or etc. when using simulation in teaching of biology.	75%	20%	5%
(c)	I find myself more flexible when using simulation in teaching of biology.	85%	5%	10%
(d)	Simulation gives me more flexibility than traditional method of teaching.	90%	5%	5%
Average percentage		83.75 %	10 %	6.25 %

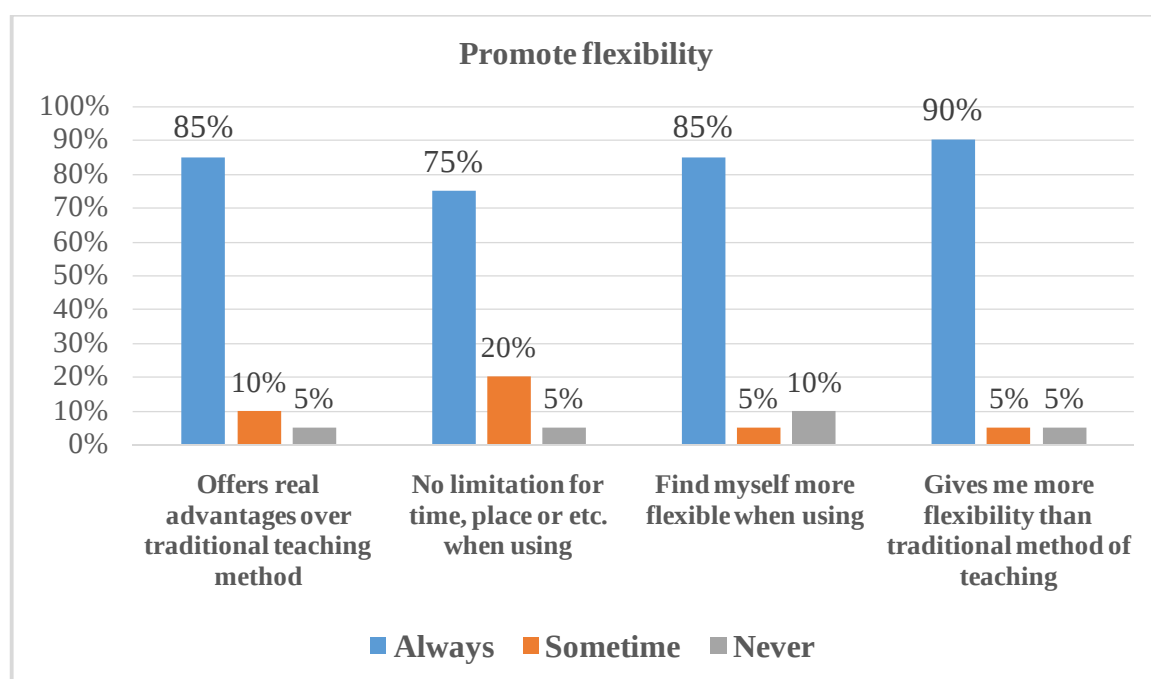


Figure 1.6

It was found out from the above analysis that 85% teachers said simulation offers real advantages over traditional teaching method always, where 10% teachers said sometime while 5% teachers said that simulation never offers real advantages over traditional teaching method, 75% teachers said that simulation is always free from time, place or etc. whereas 20% teachers said that some time it is free from time, place while 5% teachers said never about it, 85% teachers were said that they found more flexible when they used simulation in teaching of biology while 5% teachers said sometime they feel flexible with use of simulation while 10% teachers said never they feel flexible when used simulation in teaching of biology,

90% teachers said simulation give them more flexibility than traditional method always whereas 5% teachers said sometime while 5% teachers said simulation never give them more flexibility than traditional method of teaching.

It was found out form above analysis that a majority of teachers (83.75%) said that simulation promote flexibility to them for teaching-learning of biology.

1.7. Classroom interaction

On the basis of these statement investigator wants to know the perception of the teachers about that simulation is useful for classroom participation in teaching-learning of biology.

Table 1.7
Simulation use for classroom interaction

S. No	Items	Always	Sometime	Never
(a)	Simulation enhance classroom interaction.	70%	30%	00%
(b)	Simulation provide to student more encouragement to interact in classroom.	80%	15%	5%
(c)	Students are more interested in classroom when I teach biology through simulation.	90%	10%	00%
(d)	Simulation creates an interactive environment in classroom.	90%	5%	5%
Average percentage		82.5%	15%	2.5%

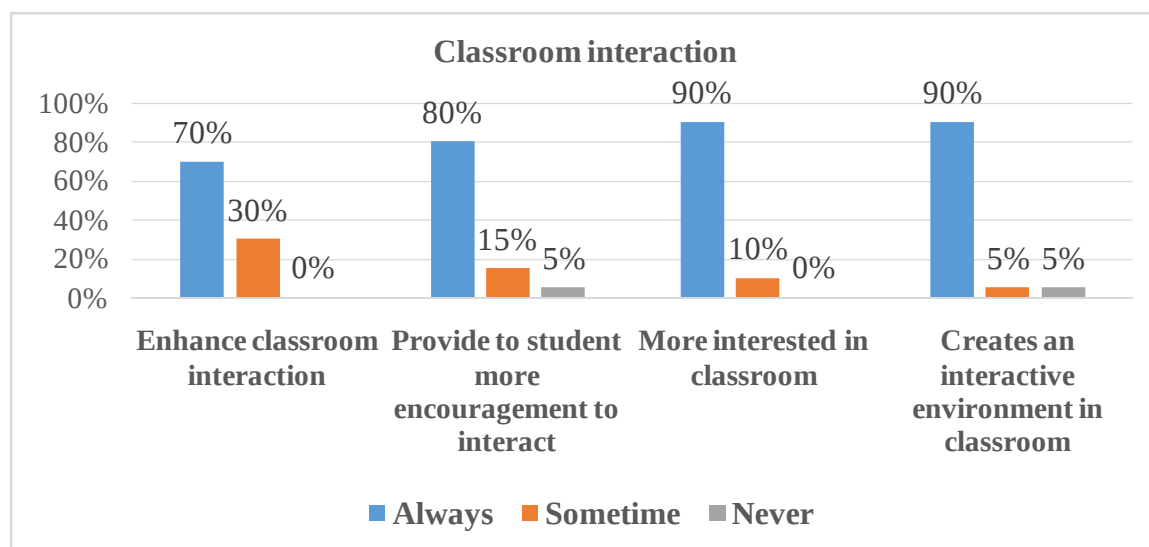


Figure 1.7

It was explained in the above figure that 70% teachers said that simulation enhance sometimes the classroom participation for teaching-learning of biology while 30% said that simulation enhance always classroom participation for teaching-learning of biology, 80% teachers said that simulation provide to students more encouragement to interact in classroom always while rest 20% teachers said that simulation provide to students more encouragement

to interact in classroom sometimes, 90% teachers said that students more interested always in classroom when they taught them through simulation while 10% teachers said that students sometime more interested in classroom of teaching-learning of biology, 90% teachers said simulation creates always an interactive environment in classroom whereas 5% teachers said sometime while 5% teachers said that simulation never creates an interactive environment in classroom of biology teaching.

On the basis of average percentage, it was identified that a vast majority of the teachers (82.5%) said that simulation always helpful for classroom interaction in teaching-learning of biology.

Conclusion

This study shows that simulation is useful to the teaching-learning of biology. The objectives of this study is to find out that simulation is useful for the biology teachers in teaching-learning of biology. The results of the present study revealed that teachers used simulation most of the concepts of biology like human anatomy, human physiology, plant anatomy & physiology, cell biology, molecular biology while ecology, structural organization in plant & animal and evolution is that topic in which simulation is sometimes used by teachers for teaching-learning of biology. The biology teachers were shown positive perception about that simulation is useful for teaching-learning of biology because it delivered biology content easily, enhance their conceptual understanding for the teaching biology concepts, it is also promoted their critical thinking to the teaching of biology concepts, it is also helpful for the making teaching-learning material of biology teaching.

On the basis of this study results we can said that simulation is useful for teachers in teaching-learning of biology because it gives the comprehensive picture of the biology concepts, enhance attention of students, motivate students to learning, increase curiosity of students, provide flexibility to teachers in teaching like delivered content easily, explain whole concept in less time, helps teachers to assess the student's learning, provide better understanding of biology concepts, with the help of simulation they can explain everything and also increase their curiosity for the teaching and learning of biology concepts.

References

- Abraham, J. (2016). E-Learning: Trends and challenges in the Educational Scenario in India. Jamia journal of Education, 3(1), pp, 92-103.

- Aksoy, G. (2012). The Effects of Simulation Technique on the 7th Grade Science and technology Course. *Creative Education*, 3 (3). pp, 304-308.
- Aksoy, G. (2012). The Effects of Simulation Technique on the 7th Grade Science and technology Course. *Creative Education*, 3 (3). pp, 304-308.
- A. Olalekan, A., & Oludipe, O. (2016). Effects of Computer Simulation Instructional Strategy on biology students' academic Achievement in DNA replication and transcription. *Asian Journal of Educational Research*, 4(2), pp, 113-12.
- Best, J.W. & Kahn, J.V. (2010) *Research in Education*. New Delhi: Prentice Hall of India Private Limited, Ninth Edition.
- Brenda., K. & Stuart N., (2006). Concept cartoons, teaching and learning in science: an evaluation. *BERA Conference, Lancaster*, 5 (2), pp, 15-17.
- Balim, A. G., Inel, D., & Evrekli, E. (2012). The effects the using of concept cartoons in science education on students' academic achievements and enquiry learning skill perceptions. *Elementary Education Online*. 7(1), pp, 122-125.
- Barak, M., Ashkar, T., & J. Dori, Y. (2011). Learning science via animated movies: Its effect on students' thinking and motivation. *Computers & Education*, 56(3), pp, 839-846.
- B. (2010). Alternative Methods in Learning Chemistry: Learning with Simulation, Simulation, video and multimedia. *Journal of Turkish Science Education*, 7(2), pp, 12-13.
- Balim, A. G., Inel, D., & Evrekli, E. (2012). The effects the using of concept cartoons in science education on students' academic achievements and enquiry learning skill perceptions. *Elementary Education Online*. 7(1), pp, 122-125.
- Dalacosta, K., Kamariotaki, P. M., Palyvos, J., & Spyrellis, N. (2009). Multimedia application with animated cartoons for teaching science in elementary Education. *Computers & Education*, 52(4), pp, 741-748.
- Kadhiravan, S. (1999) studied on "Effectiveness of Computer Assisted Instruction in relation to students use of Self-Regulated Learning Strategies", pp, 12-14.
- Kittidharma O., S., & Tirakoat, S. (2012). The Efficiency of Simulation on a Science Lesson: A Case study of a Lesson on digestive system. *International Journal of Computer and Communication Engineering*, 1(4), pp, 121-125.

- Lowe, R.K. (2003). Simulation and learning: Selective processing of information in dynamic graphics. *Learning and Instruction*, 13, pp, 157-172 &, 247-262.
- Mayer, R.E. & Jackson, J. (2005). The case for coherence in scientific explanations: Quantitative detail can hurt qualitative understanding. *Journal of Experimental Psychology: Applied*, 11, pp, 13-18.
- Mayer, R.E. (2003). The promise of multimedia learning: using the same instructional design methods across different media. *Learning and Instruction*, 13, pp, 125-139.
- Mayer, R.E. & Anderson, R.B. (1992). The instructive simulation: Helping students build connections between words and pictures in multimedia learning. *Journal of Educational Psychology*, 84 (1), pp, 444-452.
- McClean, P., et al. (2005). Molecular and cellular biology simulations: Development and impact on student learning. *Cell biology education*, 28, pp,359-372.
- Morrison, J. B. & Tversky, B. (2001). The effectiveness of animation in instruction. In J. Jacko & A. Sears, Eds. *Extended Abstracts of the ACM Conference on Human Factors in Computing Systems*, pp, 377–378.
- Ramsden, P. (1992). *Learning to Teach in Higher Education*. London: Routledge.
- Rieber, L. P. (1991b). Effects of visual grouping strategies of computer–animated presentations on selective attention in science. *Educational Technology, Research, and Development*, 39, pp, 5–15.
- Riemann, P. (2003). Multimedia learning: Beyond modality. *Learning and Instruction*, 13, pp, 245-252.
- Roblyer, M. & Edwards, J. (2000). Education Technology in context: the big picture, in *Integrating educational technology into teaching*, 5(1), pp, 12-14.
- Rosen, Y. (2009). The Effect of Simulation Based Online Learning Environment of Transfer of Knowledge and Motivation for science and Technology learning. *Journal of Educational Computing Research*, pp, 450-467.
- Shreesha, M. (2016). Simulation as a tool of communication in education a study of its effectiveness on primary school students in Karnataka, pp, 111-113.
- Shurkin, J. (2015). Science and Culture: Cartoons to better communicate Science. *PNAS online journal*, (38), pp, 112.