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EFFECT OF COMPUTER MEDIATED INQUIRY BASED LEARNING ON SOCIAL SKILLS AMONG IX GRADERS

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ABSTRACT

A non-equivalent pre-test post-test control group design was used in this experimental study to examine the impact of computer mediated inquiry based learning on the social skills among IX graders. A sample of 200 IX students from government schools of Faridkot district was selected using the random sampling method. The experimental group (n = 100) was taught using computer mediated inquiry based learning, while the control group (n = 100) was taught using the traditional teaching method. The Social Skills Rating Scale developed by Sood et al. (2012) was used to collect the data. The collected data were analyzed using the mean, standard deviation and t-test. The results indicated that computer mediated inquiry based learning was more effective than the traditional teaching method in improving the social skills among IX graders.

Keywords

Computer mediated inquiry based learning, social skills, IX graders

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INTRODUCTION

Computer skills are crucial in today's technological society for information creation, sharing and communication. Computer based learning enhances understanding of chemical concepts and making its practical applications more efficient. Integrating computers into the chemistry curriculum enhances the quality of teaching (Pietzner, 2014).Casulleras et al. (2010) found that virtual laboratories and computer simulations allow students to analyze the impact of various

variables on observed processes. To effectively use computer simulations, students need to understand the significance of various variables and relevant scientific concepts. Teachers guide students through activities, encourage reflection and allow them to engage in scientific inquiry projects. However, simulations are not actual experimental environments with real data and relying only on simulations may weaken the validity of the scientific inquiry process.

Perkins et al. (2006) found that Physics Education Technology (PhET) simulations enhance student engagement in physics through animation and interactivity. It provides flexibility for teachers to use guided inquiry through assignments, labs and exercises.

Computer mediated inquiry based learning uses the 5Es of learning cycle, involving engagement, exploration, explanation, elaboration and evaluation phases. Teacher links prior knowledge of students with new knowledge, students explore hypothetical situations, teacher explains the scientific terms and theories, students apply their new knowledge to real life situations and teachers evaluate the student's progress.

Social skills provide the foundation for human personality development. The term "skill" refers to a person's ability to perform tasks with proficiency. The capacity to solve problems is the broad definition of skill. These are the skills that allow a person to establish and maintain meaningful connections with others, such as friends, family and classmates. Students with strong social skills are capable of forming strong friendships, adjusting to the school environment and managing tension effectively (Sood et al., 2012).

REVIEW OF RELATED LITERATURE

Ketelhut et al. (2010) investigated the effects of a multi-user virtual environment (MUVE) as a means of inquiry for collaboratively solving problems. Results demonstrated that, in terms of engagement, inquiry based curriculum based on virtual environments was better than traditional methods of teaching.

Raes et al. (2012)studied the effect of online information problem solving (IPS) as an element of an online inquiry project. The results indicated that using teacher and technology enhanced

scaffolding in online inquiry learning projects was more effective in promoting knowledge acquisition and metacognitive awareness of information problem solving (IPS) processes.

Song et al. (2012) examined how the Stanford Mobile Inquiry Based Learning Environment (SMILE) motivates students to generate their questions and engage in reflective thinking during their mathematics classes.

Wang et al. (2015) conducted a study on first-year undergraduate science students to investigate the influence of model based inquiry (MBI) with a virtual physics lab (VPL) on inquiry skills. Compared to conventional teaching method, the results suggested that the pedagogy of model based inquiry (MBI) and mobile based inquiry virtual physics lab (MBI-VPL) was more effective in the development of scientific inquiry skills, process skills, comprehensive skills, learning attitude, communication skills and reflection skills.

Lau et al. (2017) investigated the student's interactions in online collaboration and their attitudes towards wiki based learning during a scientific inquiry based project. The results of quantitative and qualitative data analyses revealed that the students had favourable opinions about the inquiry based project, student's abilities to conduct critical inquiries, work together to solve problems and search on internet was increased effectively.

Sitindaon et al. (2017) conducted a quasi-experimental study to examine the effects of guided inquiry learning utilizing PhET media on problem solving and critical thinking skills. The results showed a positive relationship between critical thinking and problem solving skills.

Yuliati et al. (2018) employed a mixed research design to examine student's ability to solve problems in direct current electricity through inquiry based learning with PhET simulation. The scientific method (inquiry based learning with PhET simulation) exhibited superior problem solving abilities in comparison to other methods (memory based method, plug-and-chug (both structured and unstructured) and no clear technique).

Ormanci and Çepni (2020) investigated the influence of the PhET assisted guided inquiry approach on perceptions about communication and information skills. According to the findings, the PhET

assisted guided inquiry method was effective in enhancing the perceptions of students who were unfamiliar with technology regarding their communication and informational skills.

Ismailov (2021) implemented a quasi-experimental design to evaluate the influence of an inquiry based telecollaboration on confidence and engagement in intercultural communication. The results indicated that inquiry based telecollaboration exhibited higher levels of confidence and engagement in intercultural communication.

Al Mamun et al. (2022) examined the ways of student interaction in online guided inquiry based learning. Students engaged in discussions using online modules of guided inquiry The results indicated that student's interactions (in terms of persistence, systematic investigation and comprehension of science concepts) were impacted by individual differences.

Kousloglou et al. (2023) investigated the influence of a mobile technology supported inquiry based teaching learning sequence (TLS) on the knowledge of the 4Cs skills of collaboration, communication, critical thinking and problem solving, creativity among ninth grade students. Technology supported inquiry based teaching learning sequences (TLS) was effective in raising awareness of these abilities.

Rahayu and Wibowo (2023) examined the effects of inquiry based electronic worksheet assisted by PhET on communication and collaboration skills and concluded that it was effective for teaching science and also contributed to enhancing collaboration and communication skills.

Thongkoo et al. (2024) examined the effect of a collaborative inquiry based online system on motivation, learning performance and perceptions towards learning system using a quasi-experimental design. The findings revealed that the experimental group exhibited superior performance in problem solving capabilities, programming understanding and proficiency in coding as compared to the control group.

The studies conducted by Ketelhut et al. (2010) ; Lau et al. (2017) reported that technology supported inquiry based learning promote interactive interaction and engagement. Sitindaon et al. (2017) indicated that guided inquiry learning with PhET improved critical and problem solving skills more effectively than traditional learning method. Ismailov (2021) revealed that

online inquiry based strategy was effective for student's intra cultural awareness to boost their intercultural communication confidence and engagement. Rahayu and Wibowo (2023) concluded that the inquiry based worksheet utilizing PhET was effective for teaching science and also contributed to enhancing collaboration and communication skills. However, Wang et al. (2015) suggested that the pedagogy of model based inquiry (MBI) and mobile based inquiry virtual physics lab (MBI-VPL) was equally effective in the development of scientific inquiry skills, process skills, comprehensive skills, learning attitude, communication skills and reflection skills under the scientific inquiry skills as compared to conventional teaching method.

The above review examined the effectiveness of PhET Simulations in promoting higher-order thinking skills such as critical thinking , problem solving and communication skills which are core skills required for developing connections with family, friends and society. This study is aimed at contributing valuable insights into how technology can be helpful in enhancing social skills and preparing students for challenges of 21st century.

OPERATIONAL DEFINITIONS OF THE VARIABLES

- **Computer Mediated Inquiry Based Learning**: For the current study computer mediated inquiry based learning is limited to integration of 5E inquiry cycle with computer simulation. The Physics Education Technology (PhET) simulations and online labs applicationis used at the exploration phase of 5E of inquiry cycle.
- **Traditional Teaching Method**: A traditional lesson plan followed the six steps of the Herbartian approach was used to teach the control group.
- **Social Skills:** dimensions of social skills include concerns for others, relationship skills, communication skills, self-care/self-control skills and decision making/problem solving skills. These are assessed by social skills rating scale.

OBJECTIVE

To compare the mean gain scores of social skills of Experimental group and Control Groups taught through computer mediated inquiry based learning and traditional method.

HYPOTHESIS

H_1. There is no significant difference in mean gain scores of social skills ofExperimental group and Control Groups taught through computer mediated inquiry based learning and traditional method.

DESIGN OF THE STUDY

The present study was experimental in nature. The study used a quasi-experimental design with non-equivalent pre-test post-test control group design to study the effect of computer mediated inquiry based learning on social skills among IX graders.

SAMPLE

Two schools, Dr. Hari Singh Sewak School of Eminence Kotkapura and Dr. Chanda Singh Marwah Govt. Girls Sen. Sec. School, Kotkapura, were chosen from the list of government schools in the Fraidkot District based on the availability of a computer and internet connection. The intact sections of IX graders from selected schools were randomly assigned to either experimental or control groups . The experimental and control groups were each intended to have 100 students.

TOOLS USED

1. The social skill rating scale developed by Sood et al. (2012)
2. The instructional material based on computer mediated inquiry based learning and traditional teaching method was developed by the investigator for selected topics from the IX class science syllabus.

RESULT AND DISCUSSION

The calculated values of mean, median, standard deviation, skewness and kurtosis indicated that data was normally distributed on the pre-test, post-test and mean gain scores of social skills for control and experimental groups.

After establishing normal distribution, the experimental and control groups were matched on the pre-test scores of social skills and achievement in science using a t-test. The calculated t-values were presented in the following Table 1.

Table 1

Matching of Experimental and Control Groupstaught through computer mediated inquiry based learning and traditional method

on the Basis of Social Skills (Pre-test Scores)

Groups	N	Mean	Standard Deviation	t-ratio
Experimental	100	350.94	29.305	1.882 (N.S)
Control	100	358.55	27.852	

N.S means non-significant

The calculated t-value was 1.882 for df=198 (Table 1), which is not statistically significant indicated that there is no significant difference between the experimental and control groups on the pre-test scores of social skills.

Table2depicts the difference in mean gain scores of social skills of students of experimental and control groups taught through computer mediated inquiry based learning and traditional method'

Table 2

Mean Gain Scores and t-value of Social Skills of the Experimental and Control Groupstaught through computer mediated inquiry based learning and traditional method

Variable	Groups	N	Mean	Standard Deviation	Standard Error of Difference SE_D	t-ratio
Social Skills	Experimental Group	100	50.30	19.173	2.465	7.643**
	Control Group	100	31.46	15.494		

***Significant at 0.01 level of significance ($t_{0.05}$ = 1.97,$t_{0.01}$=2.60, df = 198)*

The mean gain scores of social skills for the experimental and control groupstaught through computer mediated inquiry based learning andtraditional method were 50.30 and 31.46, respectively as shown in table 2. The calculated t-value was 7.643 for df=198, which is significant at 0.01 level of significance. The experimental and control groups differ significantly in terms of mean gain scores of social skills. Consequently, this result in the rejection of null hypothesis H_1: "There is no significant difference in the mean gain scores of social skills of control and experimental group students". The findings suggested that the computer mediated inquiry based learning was more effective than traditional teaching method to improve the social skills of students.

The results are justified by the findings of Ketelhut et al. (2010); Kam and Hoop (2013); Lau et al. (2017) ;Lawrie et al. (2014) ;Sitindaon et al. (2017) ;Rahayu and Wibowo (2023); Thongkoo et al. (2024). The findings indicated that guided inquiry learning improved critical and problem solving skills more effectively than traditional learning method.

CONCLUSION

This result indicates that computer mediated inquiry based learning is more effective than traditional teaching method in fostering the development of social skills. Computer mediated inquiry based learning develop the ability among the students to express their ideas clearly and effectively during group discussions as compared to traditional method of instruction. This process encourages them to interact with others in a respectful and socially acceptable way.

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