Research Article

A Moodle Based Case Library to Foster Ability to Solve Classroom Management Problems for Beginner Teachers

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Abstract

Knowingly or unknowingly, teachers use problem solving skills in the classroom for a range of ill-structured problems as that of classroom management. The researcher was interested to find out whether Case Based Reasoning to foster Ability to solve Classroom Management Problems hosted on a Moodle based virtual learning environment is beneficial to the in-service teacher training of beginner teachers or not? In the present study the Case Library consists of prior experiences as Cases in the form of stories enriched with scaffolds which include cartoons, hint questions, excerpts of underlying theory and expert solutions that help the learner to understand the problem and design their own alternate solutions to the problem. The present study is an experimental study in which pre-test post-test non-equivalent group design is used. The population for the present study is high school teachers teaching in Government and Government-aided schools of Kerala, India. To conduct the experiment, 46 teachers with an experience of 10 years or below were selected conveniently. Out of which 20 teachers were in the control group and 26 were in the experimental group. The teachers in the experimental group were required to take part in an online course on Case Based Reasoning using a Case Based Library on a Moodle platform. The findings of the study revealed that, there was a significant mean difference in Ability to solve Classroom Management Problems between experimental and control groups. The present study suggests the use of Case Based Reasoning instructional module for solving Classroom Management Problems.

Keywords: Moodle, Case Based Library, Ability to solve Classroom Management Problems, Case Library

Introduction

Problem solving is a difficult and an intricate way of learning (Jonassen & Serrano, 2003). It is a cognitive ability in which correct or appropriate processing of mental information is critical to successful performance (Carroll, 1993). Cognitive tasks are mental processes that function to produce a thoughtful response. These tasks may be reasoning, problem solving, planning, organizing, abstract thinking, etc. Therefore, problem solving ability is a person's cognitive capability to understand the nature of problems and take actions to solve them accordingly.

Classroom management, including both instructional and behavioural

management, is a significant issue for teachers, school leaders, system administrators and the public (Egeberg, McConney& Price, 2016). Classroom management is the process of ensuring that classroom lessons run smoothly despite disruptive behaviour by students (Al-Zu'bi, 1988). It is important that teachers need to be trained in managing classroom processes as well as content.

Classroom management is all of the things that a teacher does to organize students, space, time and materials so that student learning can take place (Wong & Wong, 2014). Effective teaching and learning cannot take place in a poorly managed classroom. Marzano, Marzano and Pickering (2003) called teachers as 'classroom managers' who solve numerous problems ensuring successful knowledge transfer. Knowingly or unknowingly, teachers use problem solving skills in the classroom for a range of ill-structured problems as that of classroom management. Case based reasoning could be one of the wonderful ways to tackle ill-structured problems. "Case-based reasoning means using old experiences to understand and solve new problems" (Kolodner, 1992). Case Based Reasoning (CBR) addresses issues in memory, learning, planning and problem solving (Slade, 1991). Kolodner (1992), explained that the efficient way to solve ill-structured problems is through Case Based Reasoning.

As Jonassen (2011) explains, "Cases, (a) as problems to solve are instances of problems that will be the focus of learning, (b) as worked examples are instances of the process for solving well-structured problems, (c) as case studies are instances of how others have solved ill-structured problems, (d) as analogies are instances of structurally similar problems, (e) as prior experiences are descriptions of previously solved problems that are reminded by the problem to be solved, (f) as alternative perspectives are instances of different perspectives on the problem to be solved, (g) as simulations are interactive instances of the problem to be solved that can be experimented with by learners".

Cases are stories and to solve these Cases certain scaffolds are necessary such as theoretical inputs, prior experiences, worked examples, expert opinions, etc. which create a Problem-Solving Learning Environment.

The researcher is interested to find out whether Case Based Reasoning to foster Ability to solve Classroom Management Problems hosted on a Moodle based virtual learning environment is beneficial to the in-service teacher training of beginner teachers or not? The reason why the researcher chose the Moodle platform is that Moodle has a greater reach and could teach Case Based Reasoning to solve Classroom Management Problems without organizing face to face learning sessions. Therefore, Moodle platform will allow these beginner teachers scattered geographically to access the instructional materials at their own time. Also, teachers need not be taken away from their classes.

The study will focus on these following research questions:

1. What effect does online Case Based Reasoning have on the abilities of in-service teachers in solving the Classroom Management Problems?
2. What will be the attitude of beginner teachers towards employing online Case Based Reasoning in solving Classroom Management Problems?

Jonassen (2011) explains Case Library as, "stories that are made available to learners. The stories in the library are indexed in order to make them accessible to learners when they encounter a problem. Those indexes may identify common contextual elements, solutions tried, expectations violated, or lessons learned. Each experience in a case library represents the experiences that others have had while trying to solve problems". In the present study the Case Library consists of prior experiences as Cases in the form of stories enriched with scaffolds which include cartoons, hint questions, excerpts of underlying theory and expert solutions that help the learner to understand the problem and design their own alternate solutions to the problem.

Cases are instances of anything from a sentence-level or pictorial example to a complex, multi-page case study to a complex simulation of a problem. Problems, worked examples, case studies, structural analogues, prior experiences, alternative perspectives, and simulations are all examples of cases (Jonassen, 2011). In the present study, a Case is a real-world classroom management experience elicited from a beginner teacher and crafted carefully into the structure of an intriguing story snippet.

According to Kolodner (1992), "Case-based reasoning can mean adapting old solutions to meet new demands; using old cases to explain new situations; using old cases to critique new solutions; or reasoning from precedents to interpret a new situation or create an equitable solution to a new problem".

A Classroom Management Problem is the felt difficulty of teachers when they attempt to realize instructional objectives in the classroom, when; (a) a teacher cannot control emotions while students misbehave, (b) a teacher cannot manage a student who misbehaves, (c) a teacher cannot manage students owing to lack of moral development, (d) a teacher cannot manage a group of students who misbehave, (e) a teacher cannot manage students owing to ineffective teaching-learning method, (f) a teacher cannot manage students with psychological problem, (g) a teacher cannot manage students owing to lack of infrastructure.

Methodology

The present study is an experimental study in which pre-test post-test non-equivalent group design is used. The experimental and control group consisted of beginner teachers who were identified purposefully from different schools of the State of Kerala, India. The population for the present study is high school teachers teaching in Government and Government-aided

schools of Kerala, India. To conduct the experiment, 46 teachers with an experience of 10 years or below were selected conveniently. Out of which 20 teachers were in the control group and 26 were in the experimental group.

To develop the Case Library, the investigator interviewed beginner teachers (with a teaching experience of up to10 years) from Aided and Government High Schools of the State of Kerala, India. For this a semi-structured interview schedule was constructed to elicit real life experiences from the beginner teachers that could be turned into Cases of Classroom Management Problems.

The researcher interviewed 150 beginner teachers from 6 out of 14 districts of the State of Kerala, India. All the teachers were interviewed individually. The average time taken to interview a beginner teacher was around 25 to 30 minutes. The researcher audio recorded the interview only after the consent from the beginner teacher. The interviews were conducted in a closed room where the beginner teachers were given absolute privacy from their co-workers and superiors, so they could without fear share their uneasy experience with the researcher. These cases were crafted into engaging stories without losing the reality of the case but enriching the readability, and often reserving the climax of the problem to appear in the last paragraph of the story.

The researcher after discussions with experts and review of literature understood that for a Case Based Reasoning system to work properly, a Case Library is necessary to store all the Cases (Stories) and its associated paraphernalia. Therefore, the investigator designed this Case Based Problem Solving Learning Environment on the principles and theories put forward by Schank (1982), Kolodner (1992), Aamodt and Plaza (1994), Jonassen (2007, 2011) and others.

After collecting relevant Cases during the first phase, the investigator defined the raw and scattered information given by the beginner teachers into Cases (Stories). Later, the investigator indexed these Cases into several themes and identified teaching moments and associated cases. The investigator identified seven themes on which all the Cases on Classroom Management Problems could be grouped into. The seven themes were:

Theme 1: A teacher who cannot control emotions while students misbehave. Theme 2: A teacher who cannot manage a student who misbehaves. Theme 3: A teacher who cannot manage students owing to lack of moral development. Theme 4: A teacher who cannot manage a group of students who misbehave. Theme 5: A teacher who cannot manage students owing to ineffective teaching-learning methods. Theme 6: A teacher who cannot manage students with psychological problems. Theme 7: A teacher who cannot manage students owing to lack of infrastructure.

All the elicited cases from beginner teachers were unresolved problems. Only experts in the field could give guidelines to solve them using their year long experience and problem solving skills. The case library is incomplete

with solutions. Therefore the researcher interviewed experienced teachers and teacher educators to draw out solutions on the Cases collected from the beginner teachers. The reason for this is, the researcher argues that, during their exceptionally long years of service until now, the experienced teachers may have encountered similar cases earlier and may have been successful in applying the solution. Even if they have not encountered a similar Case in the past, they can use their experience to solve the problem defined in the Case.

We selected connoisseurs with long years of experience (at least 30 years), presidential or state government awardees in teaching, experienced teachers with exceptional repertoire of contributions to the society, one who is or had been involved in the training of in-service teachers, one who has served in various capacities as members of curriculum and textbook development in the State, etc. to hear the cases we elicited from beginner teachers and we sat with them to craft solutions or guidelines to solutions.

These expert solutions were attached to the associated cases, so that the beginner teacher could take insights, inspirations and understand the characteristics of a solution while learning to solve the problem in the teaching moment.

Thereafter scaffolds were added into the Case Library. The scaffolds here are those which help the learner to get acquainted with the teaching moments and the associated cases. It also helps in understanding the problem to be solved. The three scaffolds are:

Hint Questions: These multiple-choice questions were asked after reading the teaching moment where it set the tone for solving it. There were six hint questions which the beginner teacher had to answer. The questions are: (1) According to your viewpoint, what is the nature of the teacher in this Case? (2) How did the problem begin in the Case according to your viewpoint? (3) Were there any symptoms of the Classroom Management Problem? (4) Was there a critical incident which was related to classroom Management? (5) Who is the real problem maker in this case? (6) How did the teacher think to act in this case?

Cartoons: The cartoons should depict the critical situation contained in the problem. They also help the learners to align themselves with the problem situation. A visual, especially comic in nature, makes the problem solver at ease and helps to keep his/her cool while attempting the problem.

Underlying Theories: The underlying theories are those psychological theories that are associated with the teaching moment. While embedding the theories into the Case Library, it was kept in mind that statements were neither technically worded nor were they realistically simple to suggest the solutions straightaway.

Finally, there were seven Problem-Solving Learning Environments (PSLEs). Each PSLE meant one introductory case used as the teaching moment along with scaffolds and three associated cases with expert solutions. According to Jonassen (2011), Problem Solving Learning Environments (PSLEs), "assume that learners must engage

with problems and attempt to construct schemas of problems, learn about their complexity, and mentally wrestle with alternative solutions" (p. xxi).There are seven Problem Solving Learning Environment (PSLEs) based on the seven Themes. Figure-1 depicts one of the Problem Solving Learning Environment (PSLE). "assume that learners must engage with problems and attempt to construct schemas of problems, learn about their complexity, and mentally wrestle with alternative solutions" (p. xxi).There are seven Problem Solving Learning Environment (PSLEs) based on the seven Themes. Figure-1 depicts one of the Problem Solving Learning Environment (PSLE).

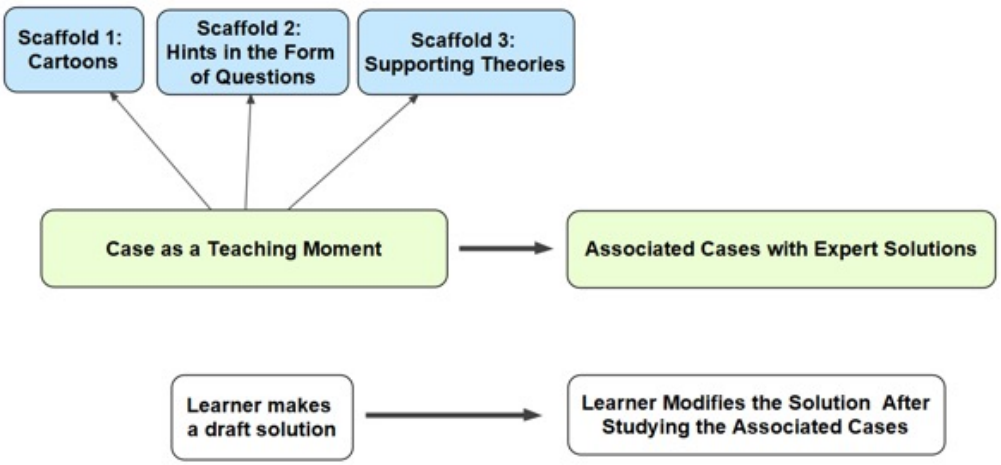

Figure-1: Problem Solving Learning Environment of Theme 1- A teacher who cannot control emotions while students misbehave.

Developing a Module with a Set of Seven Themes on Moodle Platform

Moodle is a Virtual Learning Environment (VLE) that is based on open source principles and the educational philosophy called social constructivism. It is a free learning management system that enables you to create powerful, flexible, and engaging online learning experiences. The Moodle platform lets one assume either of the three roles of administrator, teacher or student. The teacher role allows one to customize the course by adding subject content and other resources. It also allows one to create activities such as assignments and quizzes to evaluate the students.

In the present study, this test was administered as a pre-test to post-test to the beginner teachers to find out their problem solving ability. This test was administered to beginner teachers with up to 10 years of experience.

The beginner teachers were presented with seven Cases from seven different themes on Classroom Management Problems with associated questions. Also, attached to each Case is three associated questions which must be answered by beginner teachers. The first question is 'What is your assessment of the situation?' Here, the expected response of the teacher is to explain how they identify the problem situation,

understand the problem situation and help them think about the situation so that they may be warmed up to answer the next questions. The second question is 'What could have been done to avoid this problem?' The third question is 'What should be done after the problem has occurred?' In the present study, a 5-point Likert Scale to find out the attitude towards Moodle based Case Based Reasoning was administered to the experimental group. This attitude scale contains eight statements to be rated and three open-ended questions to be subjectively answered. The rating is divided into five categories, i.e., Strongly Agree, Agree, Neutral, Disagree and Strongly Disagree.

A rubric was developed to assess solutions of Classroom Management Problems. The criteria of the rubric serve as guidelines to frame and report solutions in a standard format. However, the rubric does not serve as a final say on the solutions to the problem situation in the classroom as common sense is also given importance. The rubric was developed as a guide to assess the solution to the problem and has five criteria. Each criterion hints to assess the solutions to Classroom Management Problems. The hints to assess the solutions to Classroom Management Problems are ranked as Excellent, Good, Satisfactory and Poor. The essence of each criterion has been explained below:

This tool, even though it was for assessment, also served as a template for redefining thought processes towards solving problems. The tool was administered to both the control and experimental group as one of the interventions. The experimental group were administered this tool after completing the Moodle course and while attempting the post-test, to craft their solution. The control group also administered this tool while attempting the post-test, to craft their solution.

The Research Design

A flow chart describing the steps of the research design is given in figures-2 and 3.

Figure-2: The symbolic representation of the study

G1	O1	X	O2
G2	O3	C	O4

O_1 , O_3, - Pre tests
O_2 , O_4, - Post tests
O_2 - O_1,- Gain Score
O_4 - O_3 ,- Gain Score
G_1 - Experimental Group
G_2 - Control Group
X -Application of Experimental Treatment
C -Application of Control Treatment

The researcher conducted a pilot test before entering the actual intervention. The pilot test was conducted on 10 beginner teachers. The researcher found that giving seven Cases in Classroom Management Ability Test took a lot of time for the beginner teachers to answer in a day. Therefore, the investigator decided to reduce the number of Cases from seven to four. In the first stage of the experiment, the beginner teachers were given a Classroom Management Ability Test. The pre-test included four Cases and were given to teachers over two days. The experimental group was taught through a Moodle Based module employing case-based reasoning. The intervention was only through online mode. The control group was not given any online course or face to face courses on classroom management. The control group was however, given a Rubric to think how to solve Classroom Management Problems. The Rubric was given when they were attempting the post-test. The Classroom Management Problem Solving Ability Test was re-administered after the completion of the treatment period.

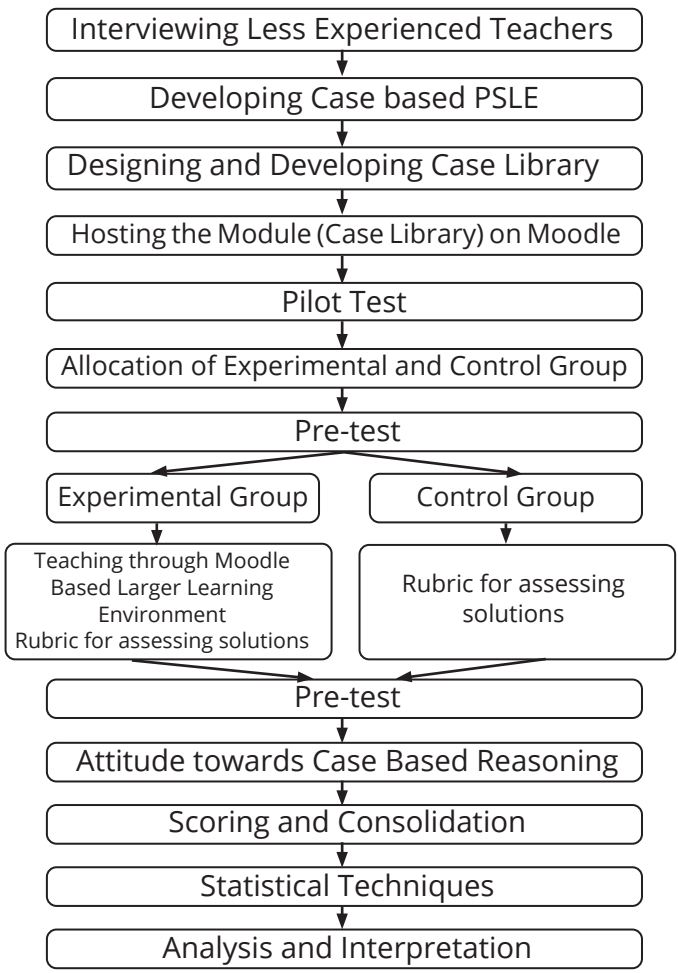

Figure-3: Design of the Study

Statistical Analysis, Interpretation and Findings

The effect of the Case Based Reasoning on the ability to solve Classroom Management Problems was tested using t test. A t test for small sample was performed to determine if a statistically different significance existed between the experimental group using a Case based Library and the control group with no case-based reasoning strategies on Ability to solve Classroom Management Problems. Table-3 shows the result of the t test performed for the total sample.

Table-3: Summary of t test on the gain scores of Ability to solve Classroom Management Problems

	Group						95% CI for Mean Difference		
	With Case based Reasoning			Without Case based Reasoning					
	M	SD	n	M	SD	n		t	df
Ability to solve Classroom Management Problems	6.98	4.32	27	0.10	1.94	20	4.79, 4.98	6.63*	45

* $p < .01$.

There is a statistically significant mean difference in Ability to solve Classroom Management Problems between experimental and control groups. The 27 beginner teachers who received the case based reasoning intervention (M = 6.98, SD = 4.32) compared to the 20 participants in the control group (M = 0.10, SD = 1.94) demonstrated significantly better ability to solve Classroom Management Problems, $t(45) = 6.63$, $p = .003$.Results show that (Figure-4) beginner teachers who received the case based reasoning intervention tend to have a higher Ability to solve Classroom Management Problems than do beginner teachers who did not receive the case based reasoning intervention.

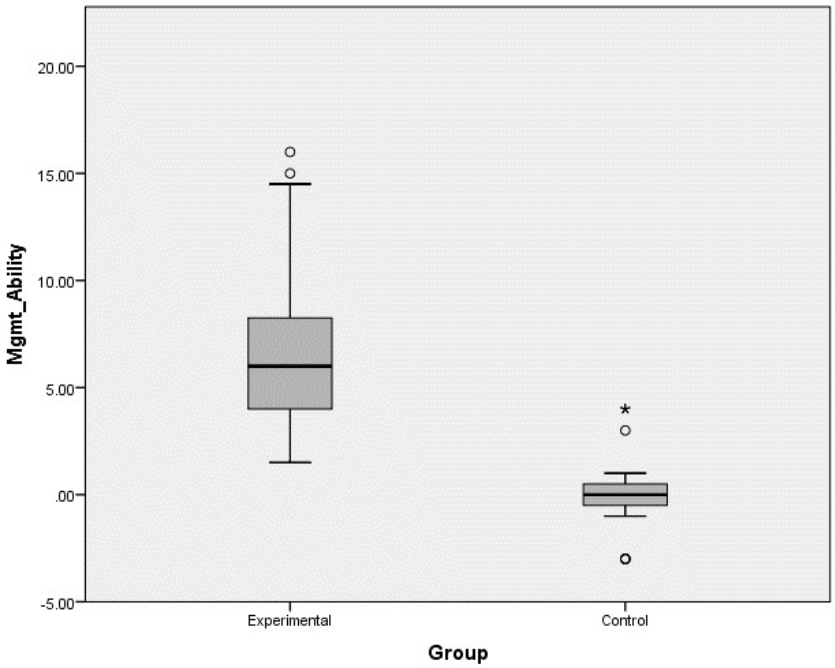

Figure-4: Categorized Box Plot for the experimental and control groups for the dependent variable: Ability to solve Classroom Management Problems

This result reveals that Case Based Reasoning is effective in increasing the ability to solve Classroom Management Problems among beginner teachers at high school level. The box plot with very few outliers in both groups reveals the obvious advantage of the experimental group who used case based reasoning by a higher mean on gain-scores of ability to solve Classroom Management Problems.

Conclusion

The study aimed to find out the effect of Case Based Reasoning on the ability to solve Classroom Management Problems among beginner teachers at high school level. The findings of the study revealed that, there was a significant mean difference in Ability to solve Classroom Management Problems between experimental and control groups. Also, there were no significant main or interaction effects of gender and attitude towards using Case Based Reasoning on the ability to solve Classroom Management Problems among beginner teachers at high school level.

Educational Implications

The present study suggests the use of Case Based Reasoning instructional module for solving Classroom Management Problems. As we are in a digital era and as computer facilities become more and more available, it is necessary to offer courses through the internet. More and more learners are joining online courses in India. As of today, India has the third largest online learners in the world (Businessworld, 2020). Therefore MOOCs based on case based reasoning to support the teacher

community to equip them to solve classroom management problems are a must in this era of multiplicity of classroom management problems. This study also suggests teaching of classroom management with case based reasoning in teacher preparation courses as real life problem solving is the need of the hour in pre-service teacher education.

(Acknowledgement: The investigator acknowledges ICSSR for providing funding for this research project vide F. No.- 02/135/2017-18/RP/Major Dated 29-12-2017)

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