

Open book environment for enhancing the thinking skills in the Indian pre-service social studies teachers

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Abstract

The initiation of Industrial revolution 4.0 has brought the intervention of technology in every field of life. Education is one such field of life where Industrial revolution 4.0 will bring artificial intelligence into forefront. In such a situation the teachers will have sole responsibility to nurture the higher order thinking skills like critical thinking, creative thinking, analytical thinking, problem solving, decision making and effective communication in the learners. In order to develop such higher order thinking skills in the learners, it is imperative that the teachers themselves are groomed to use those skills. This grooming is necessary in the novice teachers who are getting trained to teach in the schools. This study was conducted by the researchers to inculcate higher order thinking skills like critical thinking and analytical thinking skills through the use of open book environment in the classroom for the pre-service teachers. The study was conducted for 6 months on 16 pre-service teachers who opted to learn pedagogy of social studies in the academic year 2021-22. The findings of the study show that most of the pre-service teachers liked to study in the open book environment. The pre-service teachers also expressed that they improved their critical thinking and analytical thinking skills by learning in open book environment and appearing for open book examination. Thus, it can be said that open book environment tool has much potential to develop higher order thinking skills in the pre-service teachers and such teachers would definitely become torch bearers to develop thinking skills in the school students.

KEYWORDS: Open Book Environment, Open Book Examination, Thinking Skills, Pre-Service Teachers, Social Studies.

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and education helps in its manifestation as the perfection which is already within an individual. All aspects of curriculum and pedagogy will be reoriented and revamped to attain these critical goals”.

The overhauling of the curriculum and its transaction needs a reorientation of the teachers and a parallel change in the teacher education curriculum too. Till now students were just considered as the passive takers of the information given by the teachers. But with the arrival of industrial revolution 4.0 in this 21st century, it has become significant to nurture the 21st century skills in the students, like analytical thinking, critical thinking, creative thinking, problem solving, reflective thinking, decision making and effective communication. Developing these skills can be possible well through social engagement. Cooperation, teamwork, and leadership are fundamental capacities for social engagement (National Curriculum Framework of India draft, NCF-2023). Using social engagement activities for teaching learning helps the

1. Introduction

Education should aim at all round development of the learners. According to the New Education Policy of India (NEP of India, 2020):

“The aim of education will not only be cognitive development, but also building character and creating holistic and well-rounded individuals equipped with the key 21st century skills. Ultimately, knowledge is a deep-seated treasure

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students to develop awareness about their own potentialities also. Such individuals with self-awareness about one's own potentialities will be able to survive the challenges of 21st century society. The 21st century society needs individuals who would use the 21st century skills for enhancing their quality of life. Enhancing the 21st century skills is possible in the schools if the teachers are empowered to use strategies to enhance these skills in students. Thus, it is important that the pre-service and in-service teachers should be trained in using strategies and tools to enhance 21st century skills. Open book environment is one such tool which helps to enhance critical thinking, creative thinking and problem solving abilities in the learners. Open book environment provides opportunities to explore new learning resources, collaborative learning and reflect on the content learnt. This paper is a humble effort to see the impact of open book environment (OBEn) on the learning of pre-service social studies teachers.

1.1. Open Book Environment (OBEn)

Open book environment is a pedagogical tool which helps in curbing rote memorisation, reduction of anxiety and prolonged retention of the learning content. It also aims at developing in students higher order thinking skills like critical thinking, analytical thinking and creative thinking skills. Research studies show that students had lesser level of anxiety studying in an open book environment and then attending open book examination (OBE) (Gharib, Phillip & Dominican, 2013). It helps the students to construct new knowledge, modify the existing knowledge, processing the information rather than imbibing it readily, thinking and rethinking about the knowledge, and develops problem solving abilities. One of the components of OBEn is Open Book Examination (OBE). In order to conduct open book examination, open book environment (OBEn) during teaching learning process is needed. If students are given open book examination without teaching through OBEn then the achievement might suffer. Research studies show that only students taught through OBEn and then attempting OBE score have good achievement otherwise they fall short of time for attempting all questions of OBE and also achievement is adversely affected (Jalal, Fadhil & Hasini, 2014; Karagianopoulou & Milienos, 2013).

In open book examination the students are allowed to refer to the prescribed books and learning materials while answering the questions in an exam. It reduces the anxiety of the students during exam. For conducting an open book exam, students should be taught through open book environment. It would help students to develop higher order thinking skills. In this paper the impact of OBEn and OBE has been shown in the pre-service teachers for the subject Pedagogy of Social studies. This subject was taught through OBEn and was assessed using OBE. The questions asked in the OBE

were such where critical thinking and analytical thinking was to be used. Critical thinking is the intellectually disciplined process of actively and skilfully conceptualising, applying, analysing, synthesising, and/or evaluating information gathered from, or generated by, observation, experience, reflection, reasoning, or communication, as a guide to belief and action (Scriven & Paul, 1987). So critical thinking is the ability of an individual to seek information, analyse alternatives and making conclusions or forming opinions. Analytical thinking means breaking down the problem to be solved into parts, finding out the causes of the problem, finding out the solution to solve the problem and evaluate the implemented solution. Thus, it can be said that analytical thinking skills involves gathering information, identify the cause of the problem, breaking down the problem, identifying the logical and factual outcomes based on information, identifying actions to solve the problems. Research studies also show teaching through OBEn and taking an OBE after that, helps in improving the achievement and also helps in developing divergent thinking, logical thinking, content knowledge and comprehension ability (Das, 2015; Maity, 2016; Jana, 2019; Biswal, 2015).

1.2. Theoretical perspective of Open book Environment (OBEn)

The open book environment has drawn its foundation from the Jerome Bruner's discovery learning theory (1961), Multi Store Model of Atkinson and Shiffrin (1968), Badeley and Hitch's working memory model (1974) and Bloom's Revised taxonomy (2002) given by Krathwohl in 2002.

Bruner believed that every individual had a natural ability to discover knowledge by interacting with his or her own environment. The role of a teacher is just to scaffold or provide learner centred environment such that the student discovers the knowledge through various cognitive processes. In this process of learning the learner might manipulate certain objects, address the confusions and questions that arises in the mind, might perform some experiments and may draw some conclusions or analysis from the previous knowledge. The learner does inquiry-based learning using all the above processes or some of the above processes. The only thing needed is a proper environment and learning materials. According to Bruner (1961) language plays a vital role in interacting with the environment. Similarly in the open book environment the learner is provided with a question for which they have to find an answer. The process of finding answers to the questions is collaboratively done in group activity.

Richard Atkinson and Richard Shiffrin in 1968 gave the multi-store model of memory. According to this model, memory consisted of three stores: a sensory register, short-term memory (STM) and long-term memory (LTM). In each memory there is a difference in how the

information is processed (encoding), amount of information that can be stored (capacity), period for which the information can be stored (duration). Any information is first detected by the sense organs and becomes part of the sensory memory which is stored for half a second. If this information got through senses is attended again and again or recalled again and again it enters into STM where it can be stored for about 18 seconds. If the information is rehearsed or recalled/ revised again and again by giving a meaning to it, then the information gets stored in LTM. The control processes like attention, rehearsal, searching and retrieving helps the information stored in sensory and STM to be stored in LTM. In the OBEn the students are given group activities, information searching and retrieving while finding answers to given questions. The students in OBEn are also given concept maps for rehearsing the learnt content. Thus, it can be said that OBEn uses the principles of information storage given by Atkinson and Shiffrin (1974).

Working memory model given by Badeley and Hitch (1974) has three sections in which information is stored i.e. Central Executive system, Visuospatial Sketchpad, Phonological Loop and Episodic buffer (added in year 2000). The Visuospatial Sketchpad processes the visual and spatial information. The central executive system is responsible for monitoring and coordinating the operation of the Visuospatial Sketchpad and Phonological Loop and hence helps in paying selective attention to one task and ignore others. The written and spoken words are articulated and stored in Phonological Loop. The episodic buffer links information from other elements of working memory and stores it in order, with respect to time, prepares the information to be stored in episodic manner in LTM. The problem solving enabled in the OBEn helps the students to use all the aspects of working model memory to solve problems and store the learning in their LTM. OBEn also emphasises on developing higher order thinking skills given in revised Bloom's taxonomy like application, analysis, evaluation and creation (Krathwohl, 2002).

1.3. Importance of Open Book Environment for 21st century teachers

The advent of industrial revolution 4.0, every sector of the society will upsurge many changes. Artificial intelligence will become an inseparable part of the education sector. With these changes, it is important that the teachers aim at making the learners equipped with 21st century skills. It would be very important that the teachers inculcate in the students the analytical thinking, critical thinking, creative thinking, decision making, problem solving, people management, emotional intelligence, coordinating abilities, making effective judgement and cognitive flexibility (Biswal & Das, 2021). In order to develop these skills, it is important that teachers are trained to develop these skills during the training program. Providing open book

environment will definitely help the teachers to develop analytic thinking skills, critical thinking skills, reflective thinking skills, decision making and problem-solving skills. If the pre-service teachers are empowered with such skills, they are bound to develop such skills in the school students when they would start teaching in school.

1.4. Open book environment during the study

A culture that encourages people to learn and work together is characterised by trust and respect for all, this is critical to a good school - this is possible in an environment that is open and caring, and where dialogue, collaboration, enquiry, and reflection are embedded practices (NCF draft, 2023). It can be said that a learner centred classroom culture or environment encourages the learners to learn well. Open book environment is one such pedagogy tool which helps in making a learner centred classroom. For the present study all the 16 pre-service teachers were given different learner centred activities under the open book environment. The students were given group activities, presentations, and most of the topics were taught using discussion method. Power point presentations and concept maps were used to teach the students different topics. The students were also given some field activities for which they had to collect data from the field and analyse it to write the report.

The reviewed research studies on the OBE and OBEn show the significant impact of OBEn on the improvement in achievement of the students in OBE. The studies of Das (2015), Biswal and Das (2016), Maity (2016), Biswal (2015), Jana (2019) proved that there was reduced exam anxiety and enhancement in students' achievement and thinking levels when the OBEn was provided to the students. Das and Delwala (2019) through their study suggested that OBEn is a pre-requisite for the success in OBE. Most of the reviewed studies were conducted on the impact of OBEn on OBE in school students. But it is important to understand that teachers can provide OBEn only if they are trained to create an OBEn in the classrooms. This study was planned by the researchers with the intention to provide the OBEn to the pre-service teacher in the pedagogy of social studies class followed by OBE to assess their learning. The study also aimed at analysing the responses of the pre-service teachers in an OBE, observe the changes in their behaviour in the OBEn class and to gather the reaction of the pre-service teachers on OBEn and OBE.

1.5. Objectives of the study

Studying the impact of open book environment in terms of

- I. the responses given in the open book examination
- II. the classroom activities in the class with open book environment

- III. the reaction of the pre-service teachers on open book environment and open book examination.

2. Research Methodology

This was a qualitative study. The sample of the study were all the 16 pre-service teachers who selected to study the pedagogy of social studies in semester II and semester III of the two years Bachelor of Education program (B.Ed. program) in the academic year 2021-22. The study was de-limited to pre-service teachers who opted to get trained in using pedagogy of social studies. The tools and techniques used for data collection were field diary, responses in the open book test paper and reaction scale on open book environment. Data gathered for 6 months is presented as findings of the study. The field diary was used to record the observations of the participation of the pre-service teachers in the open book environment during the teaching learning process in the pedagogy of social studies class. Total three open book exam questions were analysed by the researchers to draw out the findings of this paper. All the three questions were from the final open book examination that the pre-service teachers attempted at the end of 6 months. The Pre service teachers had to respond to three questions in the open book exam. Out of three questions, two questions needed analytical thinking and one question needed critical thinking to be used while responding to them. Apart from analysing the responses to these three questions, a five point reaction scale was also implemented on all the 16 preservice teachers to gather feedback about the open book environment and open book examination administered on them. The reaction scale had 16 items. The first 11 items were related to teaching learning process and classroom activities in an OBE classroom and the last five items were regarding the OBE. The response was collected on a five-point scale ranging from SA-Strongly Agree, A-Agree, U-Undecided, D-Disagree to SD-Strongly Disagree. The data gathered from the five-point reaction scale was analysed using intensity index. The data from the field diary and the responses in the answer books were analysed using content analysis.

3. Findings of the study

The findings are drawn based on the analysis of field diary, open book exam responses and the reaction of pre-service teachers.

Findings for Objective I

The first objective was to study the impact of open book environment in terms of the responses given in the open book examination. The findings of this objective were found using the content analysis of the answers of the pre-service teachers in an open book examination. The

content analysis of the three questions showed the following results. The results are presented for each question.

The analysis of the responses for the question “select a topic from the social studies textbook of class IX, describe the best teaching strategy that can be used to teach the selected topic. Give justification for the teaching strategy chosen”. In order to respond to this question, the pre-service teachers had to use analytical thinking. Most of the pre-service teachers selected a topic, explained the use of discussion method as the best strategy to teach the selected topic, made a plan to for teaching the topic and justified their choice of method. One pre-service teacher gave a unique response. In the response the pre-service teacher wrote a plan to teach class IX students the topic of economic development through round robin brainstorming strategy. The teacher felt that use of this strategy would help the learners to read about different perspectives of economic development; enhance abilities to discuss, debate and think out of the box to resolve issues economic development.

The pre-service teachers had to use critical thinking to respond to the question ‘Peer teaching leads to better learning than teaching through visual aids. Justify’. According to majority of the respondents peer teaching was better than teaching through visual aids because peers are of same age group so they would give relevant examples to provide better understanding of the topic. There were two unique responses to the above question. One pre-service teacher responded that the visual teaching aids might be confusing if the student doesn’t understand the teacher’s perspective, in peer teaching local language or mother tongue can be used to explain which would make the learning easy. Another pre-service teacher took the reference of Edgar Dale who explained the cone of experiences in teaching aids. According to Edgar Dale one remembers 30percent of what one sees and 70 percent of what one discusses and 95 percent of what one teaches to others. Hence in peer teaching one who would teach would remember 95 percent of the taught content and the learner would remember 70 percent of the learnt content hence it’s a win-win situation for both the friends.

Another question asked in OBE was ‘Timelines are better for teaching history than chronological charts. Justify.’ In order to respond to this question, the pre-service teachers had to think critically. Most of the respondents said that timelines could be shown progressively and regressively so they were better than chronological chart. One unique response to this question was that timelines mentioned the dates of the events and also showed the time that had lapsed between two events; comparative timelines could help compare the national events with international events of a particular era while chronological charts could not give that comparative view and the time lapse between

two historic events. So, timelines were better to teach history than chronological chart.

Findings for Objective II

The second objective was to study the impact of open book environment in terms of classroom activities. The field diary was written for 6 months during the period. There were four open book tests conducted in these 6 months. Two tests were for internal assessment and two tests were semester end assessment. It was observed that out of 16 students only three students interacted in the class in the beginning of the period. After teaching for 1 month in an OBEn class first open book test was conducted. It was observed that after the first OBE, about 10 students started participating by giving their perspectives and viewpoints on the topics discussed in the class. These students actively participated in the classroom discussions and presented points they discussed in their group. At the end of third month there was the second open book assessment. The achievement of students in the second assessment was quite better than the first assessment. The classroom

interaction and the achievement in the pedagogy of social studies improved during these three months. After the second OBE, 15 students out of 16 made several attempts to interact in the classes, by sharing their viewpoints and ideas on certain aspects. They improved their communication skills while interacted with their peers during group activities. They also freely presented their critical thoughts and ideas in the classes. In the fifth month, pre-service teachers conducted activities in the school. The pre-service teachers were divided into three groups, two group had five pre-service teachers each, and one group had 6 pre-service teachers. The first group conducted interviews to find out the apathy of the parents, students and teachers regarding the subject social studies. The second group conducted interview of the school teachers teaching social studies in schools to find out the professional competencies they acquired. The third group conducted bingo games for the school students to develop gender sensitivity and to develop awareness about the luxuries that the school students got in their lives. All the activities for the school students and the

Sr. No	Items	Intensity index
1.	It was interesting to learn the subject pedagogy of social studies through open book environment	4.06
2.	Teaching pedagogy of social studies in open book environment helped me in better learning of it.	3.69
3.	I liked to work in the groups when the tasks were assigned to us.	3.56
4.	The home assignments given to me stimulated my thinking.	4.25
5.	The group activities given to us helped improve the communication skills with each other.	4.00
6.	Power Point Presentation used while teaching the Pedagogy of social studies in open book environment helped us learn better.	4.06
7.	The use of Power point presentations and the teacher's explanation in the open book environment enhanced our understanding of the topics taught.	4.00
8.	The type of examples given to us by the teacher while teaching pedagogy of social studies during an open book environment helped in better grasping of the content.	4.13
9.	I liked the freedom given to share my experiences while teaching Pedagogy of social studies open book environment.	4.44
10.	I liked the freedom given to ask questions and clarify the confusions while teaching Pedagogy of social studies through open book environment.	4.44
11.	Freedom given to me during teaching through open book environment helped me to increase my confidence level.	4.38
12.	Giving an open book examination has reduced my rote memorization and has improved my understanding of the topic.	3.81
13.	Attempting for open book examination improved by decision making ability	3.88
14.	I liked answering questions in the open book examination.	3.63
15.	Attempting an open book examination helped me reduce fear of examination.	3.69
16.	The open book examination is a better alternative to develop thinking skills than the conventional system of examination.	3.94

Table 1 - Intensity Index showing the reaction of respondents to different components.

interviews with parents, school students and teachers were planned and executed by the pre-service teachers. The researchers could observe that the communication skills, critical reflection skills and analytical thinking skills of almost all students improved during this period. Four students, who hardly paid attention in the classroom, started improving the attentiveness.

Findings for Objective III

The third objective was to study the impact of open book environment in terms of the reaction of the pre-service teachers on open book environment. The following five-point Likert type scale was analysed to find the intensity index for each of the 16 statements with the following findings.

The intensity index was found for the responses of the pre-service teachers on the OBEn and OBE. Majority of the pre-service teachers liked the freedom given in the OBEn classes to share their experiences and express their ideas and thoughts. The home assignments given stimulated the thinking of majority of the pre-service teachers. Majority of the pre-service teachers felt that the group activities in the OBEn classes improved the communication skills. Majority of the pre-service teachers felt that the coordination of power point presentations and the teacher's examples while explanation in the OBEn classes, helped in better grasping and enhancing the understanding of topics related to pedagogy of social studies. Most of the pre-service teachers felt that OBE reduced the rote memorisation and improved the understanding of the topics taught by the teacher. After attempting the OBE most of the pre-service teachers improved the decision-making ability. Most of the pre-service teachers liked to answer the questions in the OBE. Fear of examination was reduced due to OBE in most of the pre-service teachers. Most of the pre-service teachers felt that the open book examination was a better alternative to develop thinking skills than the conventional system of examination.

4. Conclusion

It can be said that in the age of Industrial revolution 4.0, which is bound to be ruled by digital machines, it is imperative that the learners are equipped with higher order learning skills. The policy makers also demand the learners to be made abreast with the new knowledge and technology and to empower them with the higher order thinking skills such that they become knowledge creators and not just knowledge seekers (NEP of India, 2020). In this regard it is important that the next generation teachers be educated in the use of such higher order thinking skills. The present study aimed at enhancing the thinking skills of the pre-service teachers by the use of Open book environment and open book examination. The reaction scale show that most of the

pre-service teachers felt that their decision making, grasping ability and thinking skills improved due to the open book environment and open book examination. While it is to be understood that open book environment in the classrooms is a pre-requisite if the learners have to perform well in an open book examination. Researches show that achievement of the students in open book exam has improved only when they were given open book environment for learning (Jalal, Fadhil, & Hasini, 2014; Karagianopoulou & Milienos, 2013). The findings from the analysis of the field diary of the researchers also prove that since the pre-service teachers in the OBEn classes, were given opportunity to do field work in group, do presentations, raise their ideas and thoughts, most of them have positively reacted to the improvement of their thinking skills. The unique responses for the questions asked for having analytical thinking and critical thinking in an open book exam also reveals that learning through open book environment helped the pre-service teachers in thinking differently while answering those questions in the examination. Thus, it can be said that exposing the pre-service teachers to the innovative tools like open book environment will help them create such an environment in their classrooms when they go to schools for teaching. This in turn will help the learners to develop critical thinking, creative thinking, analytical thinking, decision making and problem-solving abilities.

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