Recent Advances in Pedagogical Practices for Effective Learning Outcomes

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Abstract

The teacher and their pedagogical practices still form an integral part of education as almost all the learners in the world depend on gaining knowledge from qualified educators. Pedagogical practices typically implies to the methods of teaching taken by the teachers. However, the traditional practices are being criticized due to their enhanced affiliation towards the teachers and not learners. It is time to shift the focus towards learning outcomes, which can behave as check marks for testing the perceived quality of education among students. These pedagogical practices vary from country to country, thereby causes differences in the knowledge gained. Thus, for improvement sake, it is important to understand the difference in the teaching methods of the teachers. Our study aims to review the recent developments in pedagogical teachings of school teachers on the students learning consequences and to identify the best possible measures for improving the current scenario of teaching at the school level. There is an urgent need for these kind of studies, especially for developing countries like India as the quality of education is being perceived to be low compared to others. Our study can be the foundation of understanding interventions in terms of educators, schools, and even governance that can improve quality of education through understanding of learning outcomes. This review will be useful not only to the educationists, but also for policy makers, researchers and other stakeholders so as to integrate useful techniques for the betterment of teaching practices world wide.

1. Introduction

Education forms the fundamental requisite of any individual living in an advanced form of society that works on knowledge-based economics (Robertson, 2016). It also acts as the foundation stone for the pursuit of a successful life. This quest for knowledge begins early in building qualified future workers since their childhood days. UNICEF (United Nations

International Children's Educational Fund) in 2004 construed five measures of quality education, which includes healthy schooling of students in favorable conditions with pertinent syllabus, child-friendly teaching practices and beneficial consequences (UNESCO, 2014). Siraj-Blatchford et al. (2002) considered learning as an 'interactive' experience between the educators, the student and the learning atmosphere. For a majority of children across the world, the primary source of education remains the knowledge acquired from the teacher at the school that they are enrolled in. Teachers form the 'heart' of the multidimensional theory of education systems (Cheng and Tam, 1997; Sherab and Dorji, 2013). Thus, the responsibilities of any teacher include shaping the child's mind in a proper direction of overall enhanced healthy growth, enhancing creative thinking and development of the child into an overall healthy adult (Sherab and Dorji, 2013; Sun et al., 2019). These teaching methods form the foundation of pedagogy. Pedagogy has been defined as the perceptible deed of teaching, along with its associated treatise of educational philosophies, values and reasoning (Alexander, 2009). The Department of Education, Employment and Workplace relations (DEEWR) of Australia (2009) describe it more as a functional art or science using instructional processes. Over a period of time, these teaching practices and their philosophies of the educators have evolved so that the analytical, synthetic, creative skills and problem-solving thought processes gets developed in the individuals (Becker and Ravitz, 1999). This should lead to the overall betterment of the society eventually. Moreover, technological innovations such as the advent of the internet particularly has opened the Pandora's box that has the potential for drastic changes in the scope of teaching and learning processes. At present, the quality of education among children is being questioned across the world and even India (World Bank, 2012; Shukla, Lakhmani and Agrawal, 2017). This also directly puts a question on the quality of teachers and their teaching practices (European Commission, 2014). In this age of global competition and enhanced student performance, the time to time evaluation of the education systems is warranted as this will point out the issues faced by educators and students in the path of acquiring knowledge (Robertson, 2016). Thus, education systems hold profound importance in developed countries. Even developing countries such as India too has realized its significance and the Government has made supporting institutions and strategies that asks for education to be universal for every Indian child, irrespective of their gender, socioeconomic status, caste, creed, culture or religion (Sinha, 2016). Some of these strategies include policies like *Sarva Shiksha Abhiyaan* launched in the year 2001 and Acts such as Right of children for free and compulsory

education (2009), which puts educations as the fundamental right for children ranging from 6 years to 14 years. However, 'education for all' in India is easier said than done due to the inequality in the financial conditions of the Indian population (Shukla, 2017). These differences in the socioeconomic status adversely affect the learning outcomes (Tsimpli et al., 2019). Thus, development of one standard type of pedagogical technique for regular children of any age group itself is challenging. To deal with this, the Indian government, along with its state counterparts has set up governing bodies such as the National Council of Educational Research and Training (NCERT) or state government boards of education that control and support the curriculum at the school levels. Even though these bodies have subscribed to certain formats of teaching and learning outcomes, thereby, providing solutions to some problems faced in education, however, there is a substantial scope for improvement in pedagogical practices (Sinha, 2016). Moreover, it is important to understand that in this modern era, for real advancement in the quality of education, the pedagogical practices of the teachers should also be in tune with the development of technological advancements (Solizhonovich et al., 2020).

Based on this need for understanding pedagogical practices in the modern times, our study aims to capture the recent developments in pedagogical teachings of school teachers on the students learning consequences and to identify the best possible measures for improving the current scenario of teaching at the school level. There is an urgent need for these kind of studies. Moreover, these practices may have both positive and negative consequences, which should be reviewed on a regular basis from time to time (Gemmink et al., 2020). Thus, this review will be useful not only to the educationists, but also for policy makers, researchers and other stakeholders so as to integrate useful techniques for the betterment of teaching practices world wide.

This paper comprises of the following sections. The first section introduces us to the meaning of pedagogical practices, its types, history of development and current practices used within different countries. Along with the various ways of monitoring these practices have been discussed. This is followed by the students' perspectives on the learning outcomes. The next section describes how pedagogical practices of the teachers influence the learning outcomes. Finally, we will conclude this study by discussing the research gap, and any future implications and research opportunities arising from our study.

2. Teachers' pedagogical practices (TPP)

Appropriate teachers' pedagogical practices (TPP) have been considered as the fundamental criteria for the teachers in-making (Solizhonovich et al., 2020). In 1998, Borg described these practices as the understanding of events occurring in the classroom at 'real-time', whereas, Breen et al. (2001) compared these practices to first hand learning experiences. TPP can be exemplified as the coordinated or designed sets of actions as well as communications between educators and learners to support and encourage gain of knowledge (Kozma, 2003). Gemmink et al. (2020) defined this as the verbal cum non-verbal conduct during the intercommunication between the teacher–student causing stimulation of learner's civil, emotional, and ethical growth, generation of a secured learning environment, and encouraging student's psychological requirements for knowledge. Typically, it is a combination of two main components, namely gaining of 'theoretical knowledge' and 'methodological' guidance obtained through rigorous training (Solizhonovich et al. 2020).

2.1 Types of pedagogical approaches

Various theories of pedagogy have been demarcated by the researchers (DEEWR, 2010; Westbrook et al., 2013), such as a) Behavioristic, where the behavior of the learner depends upon the feedback that they receive; b) Developmental, where growth occurs due to environmental, contextual or genetic outlook by exploring and playing with the materials physically; c) Social culturally, where learning occurs through social groups, d) Critical, where learners challenge the already existing concepts, thereby letting them control their own process of learning, and e) Post structuralist, where complicated shift of identities helps the learner to question the knowledge. Table 1 describes the pedagogical practices associated with these theories.

Table 1: Pedagogical practices with respect to pedagogical theories (*Source: Adapted from Westbrook et al., 2013; Whiteside, 2017*)

Sl.	Pedagogical theories	Pedagogical practices
1.	Behaviorist	• Reward system for positive behavior • Classroom teaching using lectures, choral repetitions, etc. • Concentrate on drawing attention of the child
2.	Developmental	• Plan for rich learning atmosphere • Understanding of individual variations within learners
3.	Social-cultural/ social	• Expectations and experiences are taken into account

	constructivism	• Scaffold forms of learning • Application of zone of proximal development
4.	Critical	• Implementation of self-assessment • Role play and visual distinction for learning
5.	Post-structural	• Power play between educators and learners • Use of multiple assessment strategies
6.	Constructivism	• Activity or project based teaching • Child-centric

2.2 Current practices within different countries including India

The teaching interventions seem to vary from country to country according to their status of development and their education policies (Chun et al., 2019; Tsimpli et al., 2019; Glewwe et al., 2020). This variation is typically between the difference in teaching tools, edification, and school administration. Table 2 summarizes the differences in practices, according to each country.

Table 2: Pedagogical practices in different countries

Sl.	Pedagogical practices	Country	Reference
1.	Teacher training programs, familiarity with course curriculum, structure of educational systems, extracurricular activities.	Uzbekistan	Solizhonovich et al. (2020)
2.	Learning/ moral oriented and transmission/ qualification oriented based teachers' beliefs	Netherlands	Gemmink et al. (2020)
3.	Own pedagogical practices on robotics education	China	Sun et al. (2019)
4.	Inquiry based learning	Finland	Kuisma and Nokelainen (2018)
5.	New pedagogical practices	New Zealand	Lai (2017)

Traditionally, the teachers are trained in the pedagogical practices that need to be followed using the blackboard chalk method using the classroom for supporting the exam oriented education systems (Chun and Abdullah, 2019). These teacher-centric learnings are nowdays highly denounced (Prøitz, 2010). This was also supported by Chun and Abdullah (2019) where these practices restricted HOTS in students. In India, similar pedagogical practices are used, which revolve primarily around the teacher and the course book (Tsimpli et al., 2019). These practices emphasize on memorization techniques, blackboard techniques, route learning and use of translanguages for explaining educational concepts. However, these do

not cover for higher order skill development. Therefore, to improve this situation, integration of information and communication technologies (ICT) in the Indian education system was suggested as a tool, especially, in the rural areas through various ways such as cloud computing, modular object-oriented dynamic learning environment (MODDLE), massive open online courses (MOOC), wiki, etc. (Shukla et al., 2017).

Law et al. (2003) categorized pedagogical practices into six groups, namely, project work, scientific explorations, media creation, task-based learning, virtual schools and online subjects, and expository learning. Lai (2017) reported that pedagogical practices of e-teachers in New Zealand depends upon support in the form of autonomy, structured infrastructure, teacher-student association and technologies in terms of cloud computing and social media. Moreover, the students were motivated by providing choices and student involvement was increased by flipped learning. In addition, the pedagogical techniques revolved around developing learner agency and building communities, providing academic support and growing teacher-student associations. Progressive inquiry was considered as the pedagogical practice employed for developing geographical skills by Kuisma and Nokelainen (2018). In this process, an autonomous learning cycle is followed, where the context for knowledge is created, then research questions formulated, working theories are built and shared, and then a critical examination is conducted for evaluation. Along with this, a digital game was also designed for the students and the students were exposed to the use of tablets as a digital tool. In a study by Chun and Abdullah (2019), the need for pedagogical practices based on the introduction of Higher order thinking skills (HOTS) used in Malaysian schools were highlighted. It was observed that there were difference of teaching practices, according to the subject being taught. For language subjects, inquiry based learning was most popular, followed by building of thinking maps, conceptualizing problems and solving them. This order varied from subject to subject. However, for subjects like Mathematics and Science, use of problem based and constructivistic learning formed the primary practices. The teaching practices were found to be dependent on teaching experience as well as the beliefs that the teachers followed (Gemmink et al., 2020). In the case of inducing creative thinking, robotic education was introduced into the curriculum in China (Sun et al., 2019). In this study, the pedagogical practices that were observed involved structuring the contents of the syllabus and the class would commence with the predefining the nature of the class. The learners were told to start with the lessons by themselves and the teachers were there for support. The teachers even encouraged peer learning in this case. Even the assessment of the students was done in a

summative manner, based on learning of practical functionality. Solizhonovich et al. (2020) described the various steps from the designed programs that the future school teachers undergo to attain effective teaching practices, starting with observational teaching to educational teaching practices followed by proper educational practices. These practices were considered to be extremely critical for the future of their teaching careers. The educational goal can only be met when the teacher's training also includes psychological readiness and pedagogical orientations. It was also suggested that experienced educators with a minimum of 2 years of teaching experience should be considered for providing training to the future teachers. Use of cluster process for teaching lessons for students was reported to be advantageous. In this method, a substantial amount of information can be exchanged within multiple interested pupils, which leads to active and open participation of the learners. In another recent study, Gemmink et al. (2020) evaluated the perception of school teachers from primary classes about their pedagogical practices that are being followed in the Netherlands. In this study, 215 primary school educators from 115 schools were selected for two phases. The first phase used data collected through convenience sampling method, whereas in the second phase the cluster method of sampling was followed.

2.3 Monitoring of pedagogical practices

Once a practice has been determined, it is needed to be evaluated for its pros and cons so as to be incorporated as a permanent teaching method (Gemmink et al., 2020). Through an empirical study, Gemmink et al. (2020) estimated that about 53% of the teachers felt they were under pressure regarding the pedagogical practices that they were following. This was leading to increased amount of stress. However, there are hardly any differences between the groups based on their teaching experiences or teaching beliefs that was based on qualification or moral orientation. Therefore, monitoring of these pedagogical practices is necessary, without which the entire effort of deciding the appropriate practice gets wasted. The teaching practices of schools in Finland were evaluated using a pre- and post- test on the knowledge gained by the students and the level of motivation for studying. To measure the teaching skills of teachers, Yusoff and Seman (2018) reported that it was tested by answering questions based on Socratic questioning, Question quadrant and Bloom's taxonomy. The pedagogical practices used in the improvement of learning outcomes were measured using a pre-test on concepts and practicals followed by a mid-test after 6 weeks of training (Kong et al., 2020). A one month break period was provided and another training period was

conducted, after which a post test was conducted along with a submission of a reflective essay.

3. Learning outcomes

Nowadays, the teaching practices are leaning towards learners instead of the teachers processes (Prøitz, 2010). Therefore, the learning outcomes are critical for the development of any education system. According to Adam (2006), learning outcomes has been defined as a written account of what the successful pupil is anticipated to be capable to do at the completion of the study course, whereas, it has been described as an instrument of 'educational and instructional' arrangement for the development of the course curriculum (Prøitz, 2010). The focus of learning outcomes has varied from country to country too, especially keeping in mind the financial condition of the learner, developmental status of the country and the interventions by the government for educational reforms. In India, learning outcomes as defined by NCERT (2017) under the *Sarva shiksha abhiyan* as evaluation standards that is expected from children to attain after attending the particular academic session. These outcomes typically act as 'check points' for measuring learning at various periods. Moreover, the biggest advantage of this is the uniformity in learning across locations and therefore, needs to be synced with all the stakeholders.

3.1 Types of learning outcomes

Various types of learning outcomes have been incorporated into the curriculum. The pedagogical practices are known to induce skill development in terms of questioning capabilities, understanding of core ideas, formation of associations and deriving of conclusions, drawing similarities, creativity, decision making and increase of analytical capabilities (Solizhonovich et al., 2020). Recently, formation of computational thinking (CT) was reported to be the highly desired learning outcome for school students as the society has become highly dependent on the digital technologies (Kong et al., 2020). Due to this, the knowledge of programming of computer languages becomes an essential skill, useful for the real world. Realizing this, CT education is being offered in about 52 nations (Tang et al., 2019). Other skills inclined towards the building of high-order thinking skills (HOTS) especially creative thinking have been a matter of interest for various researchers (Sun et al., 2019).

3.2 Learning outcomes in Indian education system

As a part of the course curriculum in India, learning outcomes has been made inclusive under the Central Rules of the Right of Children to Free and Compulsory Education (RTE) Act (2009) for all educational institutions irrespective of its type (NCERT, 2017). Moreover, these are being considered as the expected gauge for understanding their knowledge level. Due to economic disparity among the population, Indian children have been reported to be in a sorry state on the development of learning outcomes (Alcott and Rose, 2017). Moreover, these outcomes also vary from school to school, as well as the nature of the school in question. Tsimpli et al. (2019) commented that private schools are far better than the government aided schools. In this study, learning outcomes such as cognitive abilities, mathematical understanding, literacy and oral skills were evaluated using a questionnaire. NCERT report on learning outcomes (2017) highlights that these have been defined for the primary classes for subjects such as mathematics, sciences (general, environmental or social) and languages particularly Hindi and English. This also included necessary learning outcomes for children with special needs.

4. Influence of pedagogical practices on learning outcomes among students

Pedagogical practices are supposed to cause successful learning outcomes. In fact, this forms a fundamental part of successful learning outcomes along with socioeconomic, linguistic, demographical and cognitive factors (Tsimpli et al., 2019). Some of the recent developments in the area of learning outcomes due to pedagogical practices have been discussed below. Table 3 reviews the use of pedagogical practices on learning outcomes and their associated results as reported in the studies.

NCERT (2017) clearly describes in detail about the learning outcomes expected from the students, including the ones with any form of impairment and the pedagogical practices that should be followed to attain that. An active participation of all the stakeholders is also expected. This report can very well act as a guide for all kinds of learning practices that the educators need to keep in mind while preparing the pedagogical practices. However, no emphasis has been done for inclusion of the digital medium. These kind of interventions has been reported in other countries. Kuisma and Nokelainen (2018) employed digital medium to incorporate geographical skills in school children from Finland as an intervention. It was observed that there were statistically significant differences between the group that used the digital platform with those of the controls, with higher gained in the ones undergoing the

intervention. The pedagogical practices also led to an increase in motivation levels, therefore, favorable to the children. TPP on developing creative thinking due to robotic education was reported by Sun et al. (2019). In this study, the programming skills required for robotic education were also considered to be responsible for developing problem solving abilities, logical thinking and socializing. Computational technology, though, a much needed learning outcome, is a challenge in terms of teaching delivery. Most of the teachers were incapable of implementation of CT in students as there is a lack of pedagogical practices in this regard (Mouza et al., 2018). Kong et al. (2020) empirically evaluated that the participation of teachers of Grade 4 to 6 from 20 different schools in a particular developmental program from Hong Kong. The results showed that this program was able to highly improve the competencies of the teachers with respect to CT. This was based on the four dimensions of the framework, namely, knowledge in terms of content, pedagogical content, technological content and technological pedagogical content The program focused on designing units based on the school curriculum followed by a series of six learning and teaching activities for a total of 39 h.

There are many studies reporting new and improved pedagogical practices for high quality learning across the world. However, there is hardly any systematic research done to show that the educational outcomes get influenced by these pedagogical practices (Tsimpli et al., 2019). Moreover, most of the studies have been done on perceptions of the teacher, whereas it is important to know whether these pedagogical practices have been beneficial to students in real sense. To the best of our understanding, the concept of the influence of teaching practices on learning outcomes has not yet been explored in the area of academics, especially at the school level where it plays a critical role. Since, today's students are citizens of tomorrow, it is equally important to give impetus to their overall learning process for a better and progressive society as well as development of nations in a positive direction.

Table 3: Studies reporting the influence of pedagogical practices on learning outcomes among students

Sl.	Pedagogical practices	Learning outcome	Type of study	Sample population	Summary of results	Reference
1.	Teacher development program	Computational thinking	Quantitative	76 teachers from 20 schools	Improvement in teaching capability	Kong et al. (2020)

2.	Dutch educational reforms	Moral, social and emotional growth of the students	Quantitative and qualitative	261 teachers from 115 primary schools	Majority experienced pressure due to pedagogical practices	Gemmink et al. (2020)
3.	Self-practices in the area of robotics education	Robotics education and high-level abilities	Qualitative	11 school teachers from 11 different schools	Practices used by teachers were rational and had a positive impact on HOTS of students	Sun et al. (2019)
4.	Progressive inquiry	Geography thinking skills	Quasi-experimental quantitative	75 students as control, 46 students	Improvements in educational level, cognitive learning outcomes, motivational levels	Kuisma and Nokalainen (2018)
5.	Concepts on question form of teaching	HOTS on Science, Mathematics and Malay language	Exploratory Case study	9 primary school teachers	No clarity in HOTS concepts by teachers	Yusoff and Seman (2018)
6.	Detailed suggested pedagogical processes	Mathematics, English, Hindi and Sciences	Descriptive	-	Acquirement of the ability to listen, speak, read, write and think, interpersonal communication skills, logical reasoning, environmental	NCERT report (2017)

				awareness	
7.	Online pedagogical practices	Unspecified	Case study	32 e-teachers	Increased motivation and engagement	Lai (2017)

5. Conclusions

Our study shows that countries have been aware of focusing on learning outcomes to improve the quality of education. India too has incorporated detailed pedagogical practices that will lead to attainment of various skills. However, this is difficult to implement due to the economic disparity present in the population. Moreover, the learning outcomes mandated in India are more focused on traditional outcomes and not on the use of modern tools and technologies. There is a need of urgent need for the introduction of digital media in the education system of India so that the individuals match global standards and are able to be compatible with the rest of the world. Our study contributes to the existing literature on the pedagogical practices by providing practical ideas for a faster and easier process of upscaling the quality of education in a 1cost effective manner. Moreover, there is a need to understand the relationship of the teachers with the learners and the pedagogical practices that are used. Our study can be the foundation of understanding interventions in terms of educators, schools, and even governance that can improve quality of education through understanding of learning outcomes. Teacher monitoring as well multidimensional pedagogical practices need to be introduced on a regular basis.

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