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Implications of Constructivist Approaches in the Classrooms: The Role of the Teachers

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Authors' contributions

This work was carried out in collaboration between both authors. Author Vaishali managed the literature and wrote the first draft of the manuscript. Author PKM reviewed the draft and given it final shape. Both authors read and approved the final manuscript.

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ABSTRACT

There is popular expectation at the level of society and educational policy makers that teachers' must adopt different approaches in classrooms to prepare learners to meet the needs of 21st century. In this context, it is expected from the teachers to be aware of emerging approaches in learning and use them appropriately in classroom conditions. Constructivist approach of learning is one such emerging approach. Constructivist approaches are slightly different from the conventional approaches of teaching and learning. These approaches emphasize that the role of teacher must be changed from the 'sage on stage' to 'guide from the side'. In fact, it is expected that a teacher equipped with constructivist approaches can encourage the learners to take active part in teaching learning process and foster their critical thinking, creativity and problem solving abilities. Extending these arguments, the present paper describes constructivism and associated pedagogical skills, enlists different constructivist approaches, and discusses the role of the teachers in implications of constructivist approaches in the classrooms.

Keywords: Constructivism; constructivist approaches; learners; classroom implications; teachers.

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1. INTRODUCTION

Constructivism is viewed as an appropriate theory to meet the needs of 21st century learners, as it explores learners' progress by indicating the connection between the previous knowledge and the given information, highlights how an individual can use different types of knowledge to conceptualize and put into real life practice, and helps to keep track of individual's progress in directing specific tasks [1]. It is founded on the belief that one constructs knowledge from one's experiences and mental structures. Constructivism is not a specific pedagogy but it is basically a theory which asserts that through experiencing things and reflecting on those experiences learners construct their own meaning and understanding about the world [2,3]. Simply stating, constructivism is often associated with pedagogic approaches that promote active learning or learning by doing [4]. Taber [5] suggests that constructivist approaches can help the learners to make their own sense by constructing a meaning that matches their existing ideas.

Sridevi [6] argues that constructivist theory equipped with lots of educational ideology and approach to select the most appropriate teaching-learning strategy for attaining the certain objectives, and structuring instructions according to educational demands of 21st century. Hence, constructivist approaches are vital to learner centered education in our system [7]. Considering that teacher is a backbone of any educational system as he/she ensures that teaching-learning progress is running smoothly and efficiently [8] and creates such type of learning environment that welcomes, supports, and entertain students' innovative ideas and problem solving skills [9], the successful implication and effectiveness of constructivist approaches depends on the nature, type of teaching learning situations and on the 'teachers'. Extending these arguments, the present paper:

- Describes constructivism and associated pedagogical skills,
- Enlists different constructivist approaches,
- Discusses the role of the teachers in implications of constructivist approaches in the classrooms.

2. CONSTRUCTIVISM AND ITS INSTRUCTIONAL SIGNIFICANCE

Constructivism, a teaching learning theory based on observation and scientific principles [10] is receiving attention of educationists across the globe [1]. Naylor and Keogh [11] defined constructivism as:

> The central principles of this approach are that learners can only make sense of new situations in terms of their existing understanding. Learning involves an active process in which learners construct meaning by linking new ideas with their existing knowledge (p. 93).

Constructivism is based on the assumption that learners actively create their own meaning and understanding about something from their experiences [12,13]. This theory has roots in both philosophy and psychology. Many philosophers, including Dewey [14], Hegel [15] and Kant [16] rely on constructivist epistemology that stresses on subjectivism and relativism, and the concept that while reality may exist separate from experience, it can only be known through experience, resulting in a personally unique reality. Von Glasersfeld [17,18,19] introduced three essential epistemological tenets of constructivism:

- Knowledge is not passively acquired, but rather, is the result of active participation in learning process by an individual;
- Cognition is an adaptive process that makes an individual's behavior more feasible given a particular environment; and
- Cognition organizes and makes sense of one's experience, and is not a process to render an accurate representation of reality.

Thus, constructivism acknowledges the learner's active role in the construction of knowledge and gives importance to previous experience (both individual and social) [20]. Similarly, Chibani [22] explains that "learning occurs in a constructive way where new information is always built on and linked to previous knowledge" (as cited in Chibani & Hajal, p. 371) [21]. Further, Chibani [22] summarizes the main concepts of the learning based on constructivist principles in the following words:

> As learning is based on child-centered approach, students have background knowledge of the content, and they build on previous background to construct new ones. Knowledge is perceived only if the person is ready to acquire it as declarative based on tasks, concepts, vocabulary, and other

> information stored in the memory, procedural based on when the learner combine, incorporate or assimilate, and strategic based on when the learner knows how to use the first two knowledge. Remembering is very important in order for new knowledge to be acquired. (p. 67).

Considering all these arguments, it can be concluded that the constructivist approaches to learning contribute significantly on the academic achievement of students and on the durability of the learned [23].

Research shows that students prefer cooperative activities that bring them fun and keep them active instead of passive participation [24]. Similarly, Rushton and Juola-Rushton [25] believe that students' brain stay active and positive and they learn more and comparatively fast when teachers create an open and supportive learning environment. Brooks and Brooks (as cited in Wang) [26] urge that:

> Teachers need to respect and encourage student autonomy and initiative, listen to student responses and teach accordingly, encourage students to ask questions, create opportunities for conversations and communications among students, and promote students to explore uncertainty of knowledge (p. 24) [26].

Constructivism is based on a number of principles, as suggested by Ernest (p. 346) [27]:

- Sensitivity toward the learner's previous knowledge. Attention to metacognition and self-regulation.
- Use of multiple representations and methods.
- Emphasis on the importance of learners' goal.
- Awareness of the importance of social contexts.

These principles have significant implications in the classroom situations. Besides, Brooks and Brooks [28] also suggested five guiding pedagogical principles that are based on constructivism and can be applied in classroom settings:

- Posing problematic questions of emerging relevance to learners with a focus on learners' interests and encouraging them to use their previous knowledge to solve the problem.
- Building lessons around main concepts, instead of exposing students to irrelevant topics.
- Allowing students to explore their reasoning and thinking abilities and in turn allowing teachers to further challenge students to make their learning meaningful.
- Adapting curriculum to address students' suppositions.
- Evaluating student learning in the reference of learning as well as teaching objective.

3. DIFFERENT CONSTRUCTIVIST APPROACHES

Simpson [29] suggested that teachers must use the instructional strategies based on constructivist teaching-learning theory such as "cooperative learning, performance assessments, product oriented activities, and hands-on learning" (p. 352). The instructional strategies based on constructivism are totally different from traditional instruction, are learner centered, give stress on all the aspects of the particular subject matter, beyond memorization of formulas and facts, and related to the application of knowledge for certain purpose [30]. Following learner centred approaches that are based on constructivist principles are helpful to create meaningful learning in classroom settings.

- *5E learning model*- This model uses five phases i.e. engage, explore, explain, elaborate and evaluate to allow students to use their own experiences and make connection between prior and new information [7].
- *Concept Mapping* - Based on Ausubel's learning theory, concept map is a device by which the teacher can present any subject in structure with dimensional form [31]. Different concepts are isolated by the circle or boxes and connected by lines. Concept mapping can be used in different ways in teaching-learning process [32].
- *Experiential learning*- Experiential learning emphasises on importance of critical reflection in learning. It is a method of educating through first-hand experience to help students to learn skills and knowledge out-side the traditional classroom settings [31].

- *Collaborative Learning*- Collaborative learning is an instructional method in which students work together on an assignment as a team [10]. This method is helpful for students to produce the individual parts of a larger assignment individually and then "assemble" the final work together, as a team.
- *Analogies and Summaries*- Analogies help in reforming conceptual change and problem solving, creating explanations, and developing arguments [33]. Summaries are brief notes developed by learner about the information he gained, in other words it is the central ideas of a conversation [34]. Both are helpful for learners to learn in a novel way.
- *Inquiry Strategies*- Inquiry strategy helps students to learn about conducting investigations and apply and evaluate evidences in order to solve problems [32]. Specifically, scientific inquiry can be helpful for students to study the natural world and purporting explanations based on the evidence derived from their work.

4. ROLE OF THE TEACHERS IN IMPLICATIONS OF CONSTRUCTIVIST APPROACHES IN THE CLASSROOMS

In a constructivist classroom, the role of the teacher changes from 'transmitter' of knowledge to 'facilitator' of knowledge construction [31]. To make this happen, the teacher must know the previous knowledge of learners and help them in clarifying ideas, providing rational explanations, challenging misconceptions, guiding experimentation, predicting results and drawing inferences [6]. Singh and Yaduvanshi [7] believe that teachers should ask questions which test students' ideas, provide feedback, explore new ideas, and encourage them to comment on answers and explanations provided by other students. Teachers may ask students to: use evidences to explain ideas, apply their conceptions to phenomenon, summarise results, and present them symbolically. Teachers are also supposed to encourage students to think independently, provide logical explanations, and test hypothesis. Thus, the teacher's main focus should be on guiding students by asking questions that will lead them to develop their own conclusions on the subject.

Parker [35] suggests that good teachers encourage students to create knowledge on the basis of prior one and relate it to the environment they live in. He further adds that constructivist teachers teach from an integral and undivided self and evoke a capacity for connectedness among their students. In contrast, in a traditional classroom, the teacher is the controller of the learning environment. He/she plays the role of instructor, dictator, and lecturer and works for predefined and specific outcomes. The teacher views learners as 'knowledge holes' those need to be filled with the information (Novak, p. 24-25) [36]. Accordingly, the teacher views the lesson content as the most important way of gaining knowledge and makes every attempt that learners' get mastery over content through drill and practice and rote learning.

In traditional classrooms, learning environment is often competitive and the most common seating arrangement is in rows and teacher acts as controller of the class, whereas, in constructivist classroom, the teacher acts as mediator, facilitator or coach and focuses to assist learners to develop and assess their own understanding and learning. Teachers strive to create the best possible conditions for learning and continually endeavour to make learning as easy as possible for learners (Ayers, Sawyer & Dinham as cited in Killen) [37,38]. In constructivist approach to learning, the teacher is expected to produce a classroom environment that is helpful in providing meaningful learning experiences, and allows learners to hypothesize, manipulate, pose questions, investigate, and imagine. In return, learners are expected to use their experiences, information and perceptions to construct knowledge and meaning [39]. Jonassen (p. 34-37) [38] and Brooks and Brooks (p. x) [40] outlined the major differences between the activities of teacher in traditional and constructivist classroom. These activities are outlined in Table 1.

Jonassen [41] also identified three major roles of teacher (as facilitators) to build constructivist learning environment (CLE) in classrooms. These roles are:

> **Modeling** – Modeling, the most popular instructional strategy in CLEs is of two types: behavioural modeling and cognitive modeling. Behavioural modeling demonstrates how to perform the activities in the particular structure. Cognitive modeling articulates the reasoning and reflective abilities that learners should use while engaged in the learning activities [41].

Table 1. Comparing the activities of a teacher in the traditional and constructivist classroom

Focal point	Teacher in traditional classroom	Teacher in constructivist classroom
Learner	Teacher assumes that learner is a blank slate and tries to fill up his/her mind with lots of information.	Teacher sees learner as a knowledge constructor or a thinker.
Classroom activities	Teacher abides by fixed curriculum and expects a correct answer by utilizing a standard method.	Teacher believes that asking questions by learner is extremely significant and values the learners' point of view.
Learning activities	Teacher emphasises on learning activities that are based on textbooks and workbooks.	Teacher emphasises on learning activities based on primary sources of data and manipulative materials and asks the learners to work in small groups. Teacher constructs learning opportunities through posing contradictions, presenting new information, and questions.
Teachers' behaviour	Teacher behaves in a monitory approach, usually stands at the front of the class and directly distributes the information to learners.	Teacher moves around the classroom, seeks learners' point of view, and interacts with them before introducing the particular concept.
Learner response	Teacher usually expects direct and correct answers from the learners.	Teacher asks learners for opinion and views after reading the certain content.
Assessment of learning	Teacher considers that assessment of learners' learning is separate from teaching, and prefers to make an evaluation at the end of year/course.	Teacher considers that assessment of learners' learning is intertwined with teaching, and regularly observes learners' working through their presentations, projects and portfolios.
Classroom environment	Teacher emphasizes that learners must work alone to learn, and gives little attention to their social development.	Teacher emphasizes that learners prominently work in pairs or groups, and gives proper attention to their social development by promoting teamwork, establishing interpersonal relationships, working in collaboration.
Learner grouping	Teacher groups learners according to their age and assigns the projects randomly.	Teacher groups learners according to their interests and abilities to conduct different projects.
Teaching learning methods	Teacher prominently uses teacher-centric methods such as lecture and demonstration.	Teacher uses learner-centric methods such as concept mapping, experiential learning, and collaborative learning.

Table 2. Useful guidelines for converting a classroom into constructivist classroom

Following guidelines from Brooks and Brooks [28] are quite helpful for any teacher of any subject to convert a classroom into constructivist classroom:
• Accept and welcome student autonomy and initiative.
• Use raw data and primary sources, along with manipulative, interactive, and physical materials.
• Use cognitive terminology such "classify," "analyze," "predict," and "create" while framing tasks.
• Allow student responses to drive lessons, shift instructional strategies, and alter content.
• Inquire about students' understandings of concepts before sharing their own understanding of those concepts.
• Encourage students to engage in dialogue, both with the teacher and with one another.
• Encourage student inquiry by asking thoughtful, open-ended questions
• Encourage students to ask questions of each other.
• Seek elaboration of students' initial responses.
• Engage students in different experiences and encourage discussions.
• Allow significant wait time after posing questions.
• Provide time for students to construct relationships and create metaphors.
• Nurture students' natural curiosity.

Coaching – Signifying the importance of coaching, Laffey, Tupper, Musser, and Wedman, [42] argue that coaching basically and necessarily involves help and responses that are related to the learner's task performance, while, Jonassen [41] suggests that a good coach motivates learners, analyzes their performance and advice on the same to improve, provides feedback and provokes reflection of what was learned.

Scaffolding – Scaffolding is a systemic approach to support the learner which focuses on the task, the environment, the teacher, and the learner. It provides temporary frameworks to support students' learning and performance to go beyond their capacities and learn more. The concept of scaffolding represents any kind of support for cognitive activity that is provided by an adult when the child and adult are performing the task together [43].

5. DISCUSSION AND RECOMMENDA-TIONS

Review of literature makes it clear that constructivist approaches are seldom used by teachers in the schools. Therefore, attempts need to be made to facilitate teachers to start using constructivist approach in their classrooms. Ernest [44] argued that "An awareness of the social construction of knowledge suggests a pedagogical emphasis on discussion, collaboration, negotiation, and shared meanings..." (p.485). Considering this argument, teachers should be helped to realize that the learners have background and prior experiences to build or gain new knowledge and their main role is to help and guide these students. As another measure, schools and educational organizations must come forward to organize professional development programs to make school teachers competent and skilled to use constructivist approaches in an effective and efficient manner. Organization of training courses, workshops, and seminars on theoretical and practical aspects of constructivism will also be helpful to encourage teachers to adopt constructive approaches in the classroom settings [21].

Titus [45] suggested that the present educational scenario demands to shift the paradigm from "knowledge for practice" . . . to . . . "knowledge of practice" (p. 13). This observation is particularly relevant for teacher education programs. Yip [46] suggested that, teacher education programs should aim at equipping teachers with knowledge and skills to designing instructional strategies, planning and structuring curriculum materials and learning activities, and using the constructivist approach that aims at promoting conceptual changes and development. Considering this, both pre-service and in-service teacher preparation programs need to be restructured to align with constructivists principles of learning. In addition to restructuring of the programs, curriculum(s) of various teacher preparation programs must also be revisited to accommodate different components of constructivist approaches for learning and practice of new teachers. Besides, schools and policy makers should also come forward to provide infrastructural, organizational and social support to facilitate teachers to practice constructivist approaches with zeal and ease in their classrooms.

6. CONCLUSION

To make pace with learning demands of 21st century, there is a need to shift our education system towards constructivist classrooms [31]. The constructivist classrooms need to be based on active learning and adopt the new pedagogical skills or teaching approaches such as the constructivist approach [3]. On the basis of reviewed researches related to constructivist approaches, it can be safely assumed that constructivist approaches are very useful in learning and helpful to improve the academic achievement in different subject and to make teaching-learning more effective [6,31,18]. Researchers hope that presented discussion will be quite helpful for teachers to understand the concept and principles of constructivist approaches and play an active role to implement these approaches in the classrooms.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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