Original Article
ISSN (Online): 2582-7472

ShodhKosh: Journal of Visual and Performing Arts
January 2024 5(1), 2549–2557

ART OF STORYTELLING AS A PEDAGOGICAL SCAFFOLDING: A LITERATURE REVIEW

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DOI
10.29121/shodhkosh.v5.i1.2024.5643

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Storytelling has been a tool for teaching and learning across various disciplines, but rarely seen in mathematics. This Paper explores the effectiveness of storytelling as a pedagogical tool in mathematics education. The objective of the paper is to try out the importance of storytelling as a pedagogical approach in mathematics in learning mathematics at primary level and to understand the effectiveness of storytelling in learning mathematics. The litrature reveals that storytelling can be an effective pedagogical tool in mathematics education, enhancing conceptual understanding, engagement among students and with teachers, communicating mathematically, reasoning and problem solving skills, connecting with real-life experiences, collaborative learning, motivation, retention and many more compared to those taught through traditional methods. The review highlights the need for research on a larger scale, exploring the long term effects and potential implementation of storytelling in various educational contexts. The storytelling into mathematics curriculum can make the class more enjoyable, interactive by providing a good learning environment. Ultimately, the Research work has proven to be highly effective by improving the overall education outcomes. The objective of this paper is to try out the importance of storytelling as a pedagogical approach in learning mathematics at primary level and to understand the intervention of storytelling in learning mathematics.

Keywords: Art of Storytelling, Mathematics, Scaffolding, Literature, Pedagogy

1. INTRODUCTION

Famous Hindi story writer Krishna Sobti mentioned that 'The story is not of one person, it belongs to the one who tells it and also to the one who listens. Of this one, of that one, of everyone, of the entire universe. Being the subjects of this world, everyone's story can be written and heard.' The listener says, don't tell the story! Tell me quickly what happened? Every human being has a natural desire to share his experiences and to know the experiences of others, that is, we all want to tell our stories to someone and listen to others. Therefore, it can be said that the basic feeling of writing a story is inherent in every person. It is another matter that this feeling develops in some people and some do not develop it. As far as the history of the story is concerned, it is as old as human history, because story is a part of human nature. Gradually, the primitive art of storytelling started developing. Storytellers used to tell stories. Stories of some incidents-war, love, revenge were narrated. Imagination is also a quality of human nature. While narrating stories based on true

events, imagination also started getting mixed in it, because usually a person wants to hear what he likes. Suppose our hero may lose the war somewhere, but if he is a hero then we would like to hear how bravely he fought and how bravely he sacrificed his life for a good cause. Everyone will praise and reward the narrator who describes the hero's bravery well. The narrator will describe the qualities of the hero through his imagination as per the needs of the listeners. The tradition of oral storytelling is very old in our country and is prevalent in many parts of the country, especially in Rajasthan. In ancient times, oral stories were popular also because there was no other medium of communication bigger than this. For this reason, religious preachers also used stories to convey their principles and thoughts to the people. Not only this, the genre of stories was also used to impart education, for example, stories of Panchtantra were written which are very educative. In this way, the story had been blended with the 'purpose' in the ancient times itself, which further developed later. Just as stories have been an essential part of human culture to convey values, lessons, and emotions, storytelling in mathematics, especially in primary education, plays a crucial role in making abstract concepts relatable. By embedding mathematical problems within engaging stories, students can visualize and understand complex ideas in a practical, memorable way. This narrative approach helps foster curiosity, encourages problem-solving, and connects mathematics to real-life situations. Much like the ancient use of stories for teaching moral lessons, storytelling in math makes learning more enjoyable and effective, making it easier for children to grasp and retain mathematical concepts. We have identified some important elements for mathematical learning through storytelling approaches.

2. STORYTELLING AS A PEDAGOGICAL INNOVATION: EFFECTIVENESS OF USING STORYTELLING AS A PEDAGOGY IN MATHEMATICS CLASS

storytelling as a pedagogy in mathematics class can be highly effective in engaging students and making abstract concepts more relatable. By embedding mathematical problems or theories within a narrative, students can see real-world applications and understand the relevance of what they are learning. Storytelling can also encourage creativity and critical thinking, as students may connect the storyline with mathematical patterns or challenges. Additionally, it fosters a collaborative environment where students can discuss and analyze the story, enhancing communication and problem-solving skills. Overall, storytelling helps transform dry concepts into meaningful experiences, making math more accessible and enjoyable. For instance Kamal Nepal and Indra Mani Shrestha (2022), stated that experience is the main pillar of the teaching and learning process, and students get opportunities to learn mathematics interestingly and creatively in the classroom through stories, as the stories provide experience to the students. Stories motivate students to learn mathematics and cognitive development. Their research stated that using storytelling as a pedagogy when students feel bored or unmotivated can help spark their interest in learning mathematics. When children actively participate in math activities during storytelling sessions, it shows how effective this approach can be. Storytelling encourages creative thinking and changes how both teachers and students view the beauty of math that can be seen everywhere in real life, which makes it more enjoyable. The authors believed that storytelling fosters conceptual, emotional, motivational, engaging, and logical thinking by connecting mathematics to students' daily lives. This ensures meaningful learning. Author criticized the rote memorization-based teaching and learning as it made the learning mathematics seem difficult and inaccessible. Many researchers believe that storytelling is an innovative approach that connects mathematical problems to students' prior knowledge and helps explore solutions. They experienced the active involvement of the children in the activities in the mathematics class during story sessions, and students were constructing mathematical ideas meaningfully based on their prior knowledge. This article stated that storytelling can be an effective pedagogy for math because it connects math concepts to students' lives. By making math more engaging and understandable, storytelling can transform math education. Approaches to math education that focus on social interaction and knowledge construction emphasize upon the effectiveness of storytelling. Stories help students understand math concepts by connecting them to the real-world and by providing meaningful experiences and contextualizing mathematical concepts. Through stories, students are encouraged to explore mathematical connections in their day-to-day activities, promoting conceptual understanding and engagement. Author mentioned, Paulo Freire (1970), for his book: Pedagogy of the Oppressed, recommends that teachers support student thinking rather than doing it for them. Friere critiques the banking approach, where the teacher (as banker), deposits knowledge into the student's mind. He advocates for problem-posing education. He emphasizes teaching students to construct knowledge for themselves. Similarly, William Frucht (1999) believes that using mathematics to tell stories and using stories to explain mathematics are two sides of the same coin. They unite what should never have been separated: the scientist's and the artist's way of uncovering truth about the world. The description and elaboration of mathematics become more powerful

by telling contextual stories. So, storytelling can be an essential part of mathematics teaching and learning. In addition, the previous article focuses on storytelling in mathematics, Grace M. Denistone Trochta (2003) shifts the focus to the importance of stories in art education as well for valuing aesthetics in education. Stories and art make the lessons more relatable and engaging, helping students to connect their personal experiences with their creative projects. The article mentions many works on storytelling such as works by Kieran Egan (1986), Sylvia Ashton-Warner (1963), Elwyn Richardson (1964), and Nel Noddings (1984), for making the argument stronger that storytelling emphasizes the personal in learning that is lasting. In addition, the article cites many more examples of successful storytelling implementation in teaching practices. These references show the potential of storytelling to make learning more meaningful and reflective for a student's own life. The article concludes that everyone's aesthetic experience should be recognized and respected, emphasizing the need for reciprocity and interaction. Author calls for a shift in the pedagogy that values personal experiences as central, enriching both teaching and learning in the arts. The article by Sowmya H.S (2022) further explores the mathematical pedagogy stating that Mathematics pedagogy is still facing difficulty with how to teach the subject in a way that transcends its abstract nature. She emphasized the need to connect mathematics learning to real life rather than relying on repetitive drills and uninspiring black and white textbooks filled with numbers and symbols. This approach fails to excite or motivate students to think and learn, focusing instead on merely scoring well in final exams. Mathematics plays a crucial role in education and everyday life. To overcome student bias, improve pedagogy and foster interest in mathematics, the Department of Mathematics at Delhi World Public School, Bangalore introduced Math story writing. The article presents that stories and storytelling to teach mathematics can foster love for the subject. Students enjoy listening to the stories. Since stories are based on real life situations, they help students relate mathematical concepts to their own experiences. Stories foster logical thinking and spatial reasoning, application of concepts to real life, enhance problem solving skills, promote creativity and artistry, and provide opportunities for independent learning, help to visualise, critical thinking, perception, and analysis. Along the same lines, Pooja Keshavan Singh's (2018) research on students' engagement with mathematics using storytelling as a pedagogic resource offers valuable insights into the potential of narrative-based approaches to enhance students' learning experiences in mathematics. Through her study, she explored the reasons behind the students' engagement with mathematics through storytelling, finding that stories create a transactive relationship with mathematics, break dualties, speak to every child in the classroom, enrich the experience of learning mathematics and address the whole child. Her study sheds light on the transformative potential of storytelling as a pedagogic resource in mathematics education. The analysis was done by her with a clear objective of observing motivated behavior in students using indicators- persistence, direction, continuous motivation and performance; she also observed student's emotional engagement and cognitive engagement with mathematics as they are taught mathematics using storytelling having indicators as student's imagination, connection with story, conceptual agency and conceptual understanding. Storytelling not only makes mathematics more enjoyable for students but also instills a sense of agency and empowerment in their learning process. She discusses how using storytelling as a pedagogical resource transformed classrooms from math-fearing to challenge-seeking environments. Indeed focusing upon the role of storytellers in the process of storytelling Rajesh Utsahi (2023), recommended that while using storytelling as a pedagogy, the storyteller should determine the goal or aim of the story, such as keeping children entertained, arousing interest in reading, to overcome children's reluctance to speak. The storyteller must then decide how to begin the story , whether by reading from a book or by recalling a story from memory. Storytelling is an art that requires practice to master voice modulation, facial expressions, and identifying the children's interest. The author mentioned some points to remember while narrating the story. For example, avoid giving direct moral lessons instead let them draw their own conclusions using their own experience in their life, encourage personal interpretation, allow flexible story endings. Mastering storytelling requires constant practice, continuous learning, and experimenting with new methods. On the other hand, Gayatri (2023) discusses the effectiveness of using stories in primary grades, highlighting skills such as listening attentively, speaking freely, describing picturing through observation, sharing and discussing life experiences, questioning, reasoning, comparing, and to developing linguistic skills. Additionally, Mala Kumar (2023) stated that storytelling helps in many ways, such as building children's communication and comprehension skills. A unique benefit is that stories teach multiple-disciplines simultaneously which means it is a multidisciplinary approach, including English, Science and Mathematics. Furthermore, Samantha Junkin, (2019) stated that storytelling is a powerful instructional strategy that contextualizes mathematical concepts and fosters student involvement. Storytelling promotes collaborative learning, enhancing communication skills, development of critical thinking and problem-solving skills and fosters creativity and imagination in mathematics education. Storytelling serves as a vehicle for promoting positive attitudes towards mathematics. The integration of

storytelling into mathematics education offers a transformative approach that enhances student engagement, fosters creativity, and cultivates essential skills for success in the 21st century.

3. FROM ABSTRACTNESS TO ACTION: STORYTELLING FOR CONCRETISING MATHEMATICS AND REDUCING ALGORITHMS

Storytelling can serve as a powerful tool for concretizing abstract mathematical concepts and reducing reliance on rote algorithms. By embedding mathematical ideas within a narrative, students can visualize and contextualize abstract operations, making them more tangible. Stories provide real-world scenarios where math is applied, which helps students see the purpose behind mathematical procedures instead of memorizing formulas. As students engage with the narrative, they can internalize problem-solving strategies and build a deeper understanding of concepts. This approach fosters critical thinking and reduces the pressure to memorize algorithms, allowing students to approach math with more creativity and conceptual clarity. Such as, according to Kamal Nepal and Indra Mani Shrestha (2022), students' experiences and lives through classroom activities are the source of stories that help them to connect with the subject matter of mathematics. Stories can help in concretising the abstract nature of mathematics. The researchers believe that children are natural storytellers. Students have different experiences and perceptions and they can connect mathematics with every activity. They can share their unique mathematical ideas with their friends, can enjoy beautiful stories and such engagement of students helped them understand the connection of stories with mathematical activities and visualize mathematics meaningfully. Significantly, one of the central themes of Pooja Keshavan Singh's study (2018) is the role of storytelling in transforming students' perceptions of mathematics from a daunting and abstract subject to a relatable and engaging one. By integrating mathematical content into narratives, teachers can provide students with a context that makes the concepts more accessible and meaningful. This approach helps students connect theoretical ideas to real-world situations, encouraging deeper understanding of mathematical concepts and promoting critical thinking skills. Correspondingly Mala kumar (2023) finds that by using stories, the abstract concepts become easy to learn for students with reason instead of just rote memorization of the concept of maths, which allows children to learn organically. Stories help teachers to introduce abstract concepts in relatable and meaningful ways to gain children's attention easily, which can result in lively mathematics class. Similarly, Rangnath (2023) also observed the potential of storytelling activities in math while conducting research across Yergol, one of the education zones in the Yadgir district of Karnataka. He observed the session of a story in which students need to solve the problem and find the solutions by using mathematics operations (addition, subtraction, multiplication, division) and logical reasoning. Students found stories and their problems interesting, they were solving questions and the teacher was providing alternative cues. Students were found to symbolize their abstract thinking in their notebooks for solving the problem. The students were found to be more curious about the next incident of the story and showing their interest in finding the way to tackle it. They were not writing the solution in the traditional way, which means this activity minimized the rigidity that is primary in traditional methods. They solve the question with intuition rather than just following the steps (algorithm). The finding of the articles stated that engaging students in a story through discussions and logical reasoning using real-life contexts arouses their curiosity and motivates them to solve the math problem. In the same vein, Samantha Junkin (2019) stated that stories have a unique ability to captivate and inspire learners, making abstract mathematical concepts more accessible and meaningful. By embedding mathematical problems within narrative contexts, educators can create rich, immersive learning experiences that resonate with students. Stories provide a bridge between mathematical content and real-world applications, helping students understand the relevance and utility of mathematics in everyday life. By situating mathematical problems within familiar contexts, stories empower students to make connections between abstract concepts and concrete experiences, thereby enhancing their understanding and retention.

4. HUMANISING MATHEMATICS: USING STORYTELLING IN MAKING MATHEMATICS RELATABLE WITH CULTURE AND LANGUAGE

Storytelling can humanize mathematics by connecting mathematical concepts to students' cultures and languages, making learning more relevant and meaningful. When math is presented through stories rooted in cultural contexts, it becomes a bridge to students' lived experiences, fostering a sense of identity and belonging. Integrating language, traditions, and everyday life into mathematical narratives allows students to see how math exists beyond the classroom, enriching their understanding. This approach encourages diverse perspectives, helping students relate to mathematical

ideas more personally while promoting inclusivity. By humanizing math, storytelling nurtures curiosity and helps students view math as a tool for personal and cultural expression. Specifically, Kamal Nepal and Indra Mani Shrestha (2022), stated that there are several ways in which storytelling can foster cultural understanding and communication. Additionally, according to Monterey and Terrell (2018), the story should include the student's cultural background to make the story more meaningful to promote the traditional values also. By tapping into students' cultural roots and traditional values, storytelling encourages solidarity and generates new ideas, enriching the learning experience. Stories are important to view the world differently and to generate new ideas accordingly. Mathematics is not only about solving textbook problems using steps and formulas, but it should also be treated as storytelling, culture, and language. Social constructivist approaches to mathematics education emphasize the importance of active engagement, discussion, and knowledge construction within a social context. Stories serve as a powerful tool for conceptualizing mathematical formulas and problem-solving, connecting abstract principles with concrete examples from students' experiences. They realized that " Mathematical facts are important, but memorizing math facts through times table repetition, practice, and timed testing is unnecessary and damaging (Boaler, 2009). In any class there should be an interest as well as interaction, and if the subject matter of mathematics is contextualized through the process of adopting the concept of mathematics in relation to the social and cultural values of the place where the learner lives can lead to starting a learning enthusiastically. Likewise, Sowmya H.S (2022) said that, It is more important to apply mathematical thinking to real life, than to apply real life to textbooks. The focus is shifting to life, not a subject or examination. In addition, Pooja Keshavan Singh's (2018) research underscores the significance of creating inclusive and culturally relevant narratives in mathematics instruction. By incorporating diverse perspectives, cultural references, and personal experiences into stories, teachers can make mathematics more accessible and relatable to students from various backgrounds. Thus, using cartoon characters of students' interest as protagonists of the story helps students to connect better with stories. This approach not only enhances students' sense of belonging and cultural awareness but also fosters a positive learning environment where all students feel valued and engaged.

Storytelling helps in developing linguistic skills, demonstrated by Gayatri (2023), that children also learn rules of language by predicting what will happen next. The article stated that storytelling can be a highly beneficial and engaging activity to help children learn to read in the early years as well. Focusing upon the relevance of stories in social context, the article by Susan Butterworth and Ana Maria Lo Cicero (2001) states that children should experience creative nurturing in a setting that encourages free expression of childhood through spontaneous play. They embraced the Reggio Emilia approach, the idea that a successful curriculum grows from the children's own interests. The school experience is the most meaningful for a child if the culture that each child brings from home is connected with activities in the school setting. The children's own stories connect home with the school and invite parental involvement. By including stories in the class, the atmosphere of learning, the excitement of students, and exchanges among teachers, children, and parents are rewarding in themselves. By recalling the ancient time, Rajesh Utsahi (2023) he stated that the time when technology was less evolved, the children loved to listen to stories from their grandparents at night. Children actually waited for this moment of the day. In contemporary times, everything has changed. Now, even the grandparents are narrating stories with the help of mobiles or television. Nowadays, stories are readily available on various platforms on mobile phones. Despite technological changes, storytelling remains a valuable, and effective tool in classrooms. There is demand for professional storytellers for special sessions in school. He mentioned 'NCF 2022' views to make the argument stronger about the elementary stage. 'Stories are the window to the world for children'. Each word becomes an experience itself. Stories are a good medium for learning about social relationships, ethical choices, understanding and experiencing emotions and becoming aware of life skills. It helps in improving the concentration span of children, vocabulary and problem-solving skills. Additionally, Dhruva Desai (2023) by adding personal experiences where he stated that he worked with the people with religious and linguistic homogeneity but diversity in terms of caste and gender in a school located in a village. It was a difficult task to make contact between the groups because it cannot be forced, for this he chose the stories as a medium. By using stories in the classroom, he found a positive result. Story sessions resulting in meaningful conversations and raising important questions. Stories help him to engage consistently with issues such as gender, caste, without children feeling bored. Reflecting upon the need for stories in teaching, Grace M. Denistone Trochta (2003) made an argument upon the limitation of formal knowledge, which often fails to relate with students with diverse contexts. She cites the social learning theory of Lev Vygotsky. She emphasizes upon the significance of the role of students' social environment in shaping their anesthetic experiences and response to art education. The article shows the vital role of storytelling as art in education. It influences teaching and learning, particularly in arts. The article begins with the reflections on the work of Marilyn Zurmuehlen, who used storytelling to impact the teaching. The author

mentioned Zurmuelen's autobiographical stories, which includes real life experience and engages listeners to think about the aesthetic experience. These stories enrich student's understanding of art and life and highlight the importance of personal connections in education by incorporating human experiences. Notably, according to Samantha Junkin (2019), story is not the content but the scaffolding in which the content is being described so that one needs to see the context and relevance in order to believe that they have reason to learn. Importantly, storytelling encourages students to develop their communication skills and articulate mathematical concepts in their own words. By engaging with narratives, students are prompted to explain their reasoning, justify their solutions, and communicate their ideas effectively. This emphasis on communication not only enhances students' understanding of mathematical concepts but also equips them with essential skills for success in academic and professional settings. As students engage with narratives, they are encouraged to discuss, analyze, and reflect upon mathematical concepts, fostering a collaborative learning environment where ideas are shared and explored.

5. FROM CHALK TO TALES: STORYTELLING AS A TEACHER'S TOOL FOR TRANSFORMING MATHEMATICS

"From chalk to tales" highlights the transformative power of storytelling in mathematics teaching. By shifting from traditional, lecture-based methods to narrative-driven instruction, teachers can make math more engaging and accessible. Storytelling moves away from abstract formulas and static lessons, incorporating characters, real-world scenarios, and problem-solving challenges that capture students' imaginations. This approach not only humanizes the subject but also encourages critical thinking and deeper understanding. When math is woven into stories, students connect with the material on an emotional and intellectual level, helping to break down barriers and foster a love for learning mathematics beyond the classroom. The role of a teacher is very crucial in making the transformation effective, such reflections can be seen in the study by Kamal Nepal and Indra Mani Shrestha (Aug 2022), that while storytelling, a teacher should ask all the students to write a reflective journal on their learning process at the end of the class. Moreover, such reflections help students recapitulate their learning and contribute to their cognitive development. Also, after telling the story, a teacher can engage students in group activities. A popular adage that can inspire teachers to use a storytelling method in teaching mathematics is "Tell me facts and I'll learn. Tell me a truth and I'll believe it but tell me a story and it will live in my heart forever". Additionally, Susan Butterworth and Ana Maria Lo Cicero (2001) also talk about the teacher's role while using storytelling in the curriculum is to look for opportunities to turn children's stories into word problems. She must listen, understand the child's thinking, guide, intervene and provide concrete examples to encourage mathematical thinking. Mathematics stories can be used daily; they should grow from children's lives itself. The researchers hoped that teachers would be the ones to begin encouraging mathematics problems through stories. But, they found that no guidance was necessary. This also supported by the research conducted by Pooja Keshavan Singh's (2018), where she finds that, by using storytelling as pedagogy, teachers can inspire students to overcome math anxiety, develop a growth mindset towards learning, and cultivate a deeper appreciation for the beauty and relevance of mathematics in their lives. Moreover, Rajesh Utsahi (2023) mentions Krishna Kumar, an eminent educationist, for writing an essay on the 'Art of Storytelling'. In which Krishna Kumar writes about solving the problem of retaining students in school by including storytelling sessions every day. He mentions that every primary teacher needs to master at least 30 traditional stories. Storytelling should be a part of the everyday curriculum. Another perspective by Dhruva Desai (2023) talks about the prejudices in school between teachers and students. He stated that he saw a big difference between the statement to reduce these prejudices, such as gender inequality and caste discrimination, and its implementation in reality. There is also a cultural reproduction in society when people become passive recipients of those beliefs. It is the teacher's responsibility to learn to question and then eradicate the prejudices from which these behaviors stem. The author took the reference from the work of Gordon Allport, which indicates that contact between members of different groups, under certain conditions, could go some way toward reducing the prejudice that the groups hold toward each other. The author finds that the selection of story is important along with relatable experiences, age-appropriate and level-appropriate language, and good content and context. Teacher is the one who is required to encourage the students to think critically, question, and make dialogues and reflections. Focusing upon the teaching through storytelling, Grace M. Denistone-Trochta (2003) mentioned John Dewey for his work on laboratory schools' experience with learning, which stated that lived experiences are long lasting. Dewey's work emphasizes the need for teachers to gain the inner attention of the students, as children process information based on their own personal experiences. With this understanding, she stated that teaching through storytelling bridges the gap between student's

real life experience and the curriculum. Additionally, Gayatri (2023) suggests some effective methods and perquisites for using storytelling in mathematics; by using questions after and during storytelling, teachers can aid student's thinking. The main challenge for the teacher is to determine when and how to use storybooks, as they are constantly under pressure to complete the syllabus. There are some prerequisites with this method, storytelling should be inclusive, every child must listen to and participate. She suggested discussing the related issues of the story before beginning, so that the discussion becomes more effective later. After introducing the story, she would show the picture and ask the students to describe it to initiate the discussion. This class became both interesting and interactive. Stories help discuss numerous topics at one point in time. In addition, creativity of a storyteller also matters. For instance, Mala Kumar (2023) discusses the creativity of storytellers in storytelling, which brings fun into the class. In this article, the story of "The Thirsty Crow" was adapted to involve mathematics. Here, teachers, as the storytellers, pushed the boundaries of the established story to make it both audience-oriented and purposeful. Using this approach, children can accept changes in those stories and avoid the rigidity of the established stories. Mala Kumar stated in the article that whenever a teacher decides to use storytelling as a tool, it is important to keep the end goal and learning outcomes in mind. She shared her experience as a storyteller and noted some misconceptions. Some concepts can be taught through stories, and some stories can lead into effective teaching. For example, some stories involving violence should be avoided. Real stories around us can be used as a pedagogical tool. The article concluded that time, work and dedication are required by the teachers to create lesson plans that include stories with the concept. Extending on describing the teacher's role, Rangnath (2023) stated that during a story session, teacher as a facilitator, it is his/her responsibility to observe the problems students face when they encounter situations where they need to apply logic and derive answers. Overall, he justifies that scaffolding should be provided to students according to their needs, such as simplifying the language of a problem or suddenly that they focus on and eliminate unnecessary information from the problem. In addition, Samantha Junkin (2019) discusses the teacher's Role in using storytelling as a pedagogical tool. Central to this transformation is the integration of the arts into STEM subjects, giving rise to the STEAM framework. By incorporating arts-based strategies, educators can provide students with a more holistic and engaging learning experience. Through stories, students are encouraged to apply their mathematical knowledge to predict outcomes, solve problems, and engage in critical thinking. By presenting mathematical problems within narrative contexts, stories challenge students to analyze information, make connections, and apply their knowledge in novel ways.

6. FROM PASSIVE LEARNERS TO ACTIVE LEARNERS: STORYTELLING, A CHILD CENTERED APPROACH, EMPOWERING STUDENTS TO CONNECT, CREATE AND SOLVE

Storytelling as a child-centered approach empowers students by placing them at the heart of their learning experience. Through stories, students can connect with mathematical concepts in a personal and meaningful way, often through characters or scenarios they relate to. This method encourages creativity, as students are invited to create their own narratives or solutions, promoting critical thinking. By embedding problem-solving within a story, students engage more actively and see the practical applications of math. Storytelling fosters a collaborative, dynamic environment, where students feel empowered to explore, question, and solve, making mathematics a more accessible and enjoyable subject. As demonstrated in the work of Ms. Sowmya H.S (2022), author found that students who were slow learners or not interested in learning gradually began to show progress. Some of them came up with the solutions. They started gaining confidence in solving math problems. Students used their imagination to relate mathematical concepts to their daily lives. Here, the students were encouraged to write stories as an assignment which was planned according to the concept taught in the classroom. This fosters the idea of mathematical thinking that is essential for solving problems. At the first attempt, stories lacked mathematical thinking. Then, it was discussed with the English department, they suggested that stories must have a conflict and solution, which leads to mathematical thinking. When this Introduced in the whole class, children's responses were appreciative. One student was able to connect math with real-life situations, such as relating geometry to patterns in nature like flowers and shells. Another student, who was fascinated by architecture, was able to connect architecture with math while learning practical geometry. Their way of looking at math has changed, and now they relate math with real-life problems. The problems on blackboard give students little time to think, but stories help students begin by reading and analyzing the question before solving it. The students love cartoons, and they incorporated them in their stories. They create stories using their favorite cartoon as a character, combining them with their own experiences and mathematical concepts. This approach encourages students to think and apply mathematical concepts in a fun way. In addition, Kamal Nepal and Indra Mani Shrestha (2022) state that there are

different perceptions of mathematics in the mind of an individual during the learning process. If mathematical connection flows naturally from the story, it supports the teacher and the student in mathematical teaching and learning processes based on their experience . Students who are facing various problems in conceptualizing mathematics and are gradually departing away from the learning of mathematics, teacher's storytelling can improve mathematics in the way it engages students and their cognitive faculties. Similarly, by using the project to create a curriculum by listening to the child, telling and retelling stories, and documenting the process, Susan Butterworth and Ana Maria Lo Cicero (2001) seek to create a common culture for children as a group by working from the stories that each child brings from the culture of his or her home. The project is called The Market Project, where they encourage community participation in the curriculum. Each student's family was asked to take their children to the supermarket and later to talk with the child about the experience to write a story for them along with a drawing that should be made by the children. Then, these stories were presented in the classroom, where children engaged in exchanging their ideas, enhancing meaning, reflective thinking and encouraging clarification. Later, these stories turned into dramatic play, where children enacted the story involving counting, seriation, etc. Through dialogue, they reached addition, division and more. Emphasising upon the use of picture books, Dhruva Desai (2023) said that picture books make it easy to compare situations by moving back and forth and discussing the things in a deeper way. The author observed that children were able to relate with the incidents, which helped the teacher understand the classroom dynamics and helped children accordingly by providing students with a comfortable environment to boost their overall performance. Stories help bring experiences and emotions that impact a child's life. They help open up students to talk about various social topics relating to their own experiences, which results in pedagogically rich conversations too. Furthermore, as per Gayatri (2023), stories allow children to speak up in their own words which helps with language acquisition and participate in the classroom. Along the same lines, an article by Samantha Junkin (2019) finds that by presenting mathematical concepts in a compelling and engaging manner, stories help dispel the notion that mathematics is dry or inaccessible. Instead, stories invite students to approach mathematics with curiosity, enthusiasm, and a sense of adventure, fostering a lifelong love of learning. Storytelling encourages students to think outside the box and explore multiple solutions to complex problems. This collaborative approach not only enhances student engagement but also cultivates essential skills such as teamwork, communication, and problem-solving. By embedding mathematical problems within narrative contexts, educators can create rich, immersive learning experiences that resonate with students and empower them to become active, creative, and critical learners.

7. CONCLUSION

Incorporating storytelling into mathematics education offers a dynamic, child-centered approach that transforms how students engage with the subject. By integrating narratives into math lessons, teachers humanize abstract concepts, making them more relatable and accessible. Storytelling helps students connect mathematical ideas to real-world scenarios, cultures, and their personal experiences, fostering deeper understanding and relevance. It encourages creativity, as students are invited to explore, create, and solve problems within the context of a story. This method not only reduces the reliance on rote memorization of algorithms but also promotes critical thinking and problem-solving skills. Through storytelling, mathematics is no longer seen as an isolated, abstract discipline but as a tool for exploring patterns, relationships, and solutions within a meaningful context. Students begin to see the purpose of math in their lives, as it becomes intertwined with narrative and culture. The storytelling approach also nurtures collaboration and communication, as students work together to understand and solve problems. Ultimately, storytelling empowers students to connect, create, and solve, transforming mathematics from a set of rules to a powerful, engaging tool for learning and discovery. It makes math more approachable, enjoyable, and relevant, fostering a deeper connection between students and the subject.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

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