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Journal of Transformative Praxis
Vol. 4, No. 1, 2023, pp. 29-41
https://doi.org/10.51474/jrtp.v4i1.669

Received: Oct 30, 2021; Revised: Feb 23, 2022; Accepted: Aug 23, 2022

Original Article

Rethinking Pedagogy Through Storytelling in School Mathematics

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Abstract

This article focuses on storytelling as an alternative innovative pedagogical approach to teaching mathematics in response to a discipline-based pedagogy in the context of Nepali Mathematics Education. In Nepal (probably worldwide), mathematics teachers rarely teach mathematics for creating mathematics. Instead, they focus on teaching the steps to repeat someone else's creation without exploring how mathematics relates to students' life worlds. As a result, students feel mathematics as a dry subject, mathematics teachers as apathetic human beings and mathematics classrooms as a boring factory of producing passive learners. In this context, this paper explores how storytelling may become one of the many innovative mathematics pedagogies and help mathematics teachers rethink their pedagogical practices for teaching mathematics joyfully and meaningfully. We used autoethnography as a research methodology that portrayed the narratives of the first author extracted from his MPhil research based on storytelling pedagogy and the narratives of the second author based on his experiences of teaching the course at the post-graduate level and conducting teacher professional development training across Nepal. The research inquiry explored the connections of mathematics with students' life worlds through storytelling as a pedagogical approach.

Keywords: *Auto-ethnography, Meaningful learning, Rote memorization, Content transmitter.*

Setting the Context

As teachers, educators, and researchers, we have experienced culturally decontextualized mathematics teaching and learning in Nepali education (Dahal et al., 2019; Luitel, 2009, 2013; Nepal, 2018; Shrestha, 2011, 2018, 2019) due to which many mathematics teachers and students in Nepal feel comfortable to practice algorithmic problem-solving method instead of

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ISSN: 2717-5081 (Print); 2738-9529 (Online)
Journal Webpage:
1. http://www.kusoed.edu.np/journal/index.php/jtp

Published by Kathmandu University School of Education, Hattiban, Lalitpur, Nepal.

connecting mathematics with students' life worlds. In this context, this article aims to explore storytelling as an approach to teaching mathematics that enables students to contextualize mathematical problems. Some of the attributes of storytelling pedagogy are engagement, motivation, and imagination. Likewise, it motivates teachers and students to an effective teaching and learning process. Moreover, students get opportunities to learn mathematics interestingly and creatively in the classroom.

As Kamal (the first author) grew up in a family where senior family members were in the teaching field, he had the chance to observe the teaching and learning activities inside the classroom. Teachers had different methods of teaching the students. In this, Liljedahl (2005) shared that various cognitive tools are used to teach students to improve their knowledge and capacity to think and develop an emotional understanding of the content. Of these, the cognitive tool of the story plays a significant role. We (both authors) also believe that conceptual, emotional, motivational, engaging, interesting, and logical ideas are developed by telling stories in mathematical connection with students' day-to-day activities. This ensures students' meaningful learning, which Kamal is doing in his daily teaching. To the extent possible, he has been creating stories for every possible new problem that comes across his teaching and learning situation.

Kamal remembers the days in Grade One when his Mathematics teacher would write the numbers from 1 to 100 on the blackboard and ask us to memorize them by counting them repeatedly in the classroom. He still remembers how he was helped to learn the numbers from 1 to 100 through rote memorization and writing them on slates and papers many times. Instead of conceptualizing the number facts, he learned the numbers through the practice-and-drill method. The rote-memorization method of teaching and learning during his school education gradually made his mathematics learning tough as if it was very difficult to penetrate. At the time of secondary level, he was in confusion because of the monotonous nature of teaching mathematics by his teachers. At this stage, a question was raised in his mind: Is rote memorization the only way of learning mathematics? This could be very insignificant for experts but a great question for him as a student. Gradually, Kamal realized that "Mathematics facts are important, but memorizing math facts through times table repetition, practice and timed testing is unnecessary and damaging" (Boaler, 2009 as cited in Boaler, 2015, p. 2).

The decontextualized nature of the curriculum in our education system plays a role in making mathematics a rigid subject (Luitel, 2009) for all. Nevertheless, Kamal recalls some experiences in mathematics teaching that have motivated students to learn with deep engagement in the classroom. After his father a Nepali teacher retired from his thirty-five years of school teaching, he joined another school for teaching Nepali in Grades 11 and 12. He would engage his students in learning through poems, songs and stories which were based on the themes/contents of the subject to be taught. When his classes were observed by another teacher, he was so impressed that he gave him the title "*Haaso ko Padhaai*" (the teaching of laughter) as his classes were always lively with laughs and cheerfulness. Moreover, such a method of teaching convinces teachers and students as one of the best teaching methods. Kamal thinks that converting subject matter into poems, songs, and stories and teaching students motivates them in learning. They start to learn enthusiastically 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 learners live (Luitel, & Taylor, 2006).

Kamal remembers all the incidents and activities of teaching and learning in his past. Taking his students' reactions, they would feel comfortable in learning when teachers teach lessons by connecting mathematics problems with students' day-to-day activities. Further, they would feel tired and bored when teachers only solve textbook problems on the blackboard. Such realization was enhanced when Kamal started to encounter various innovative pedagogies such as collaborative learning approach, arts-based pedagogy, storytelling pedagogy, project-

based learning approach, inquiry learning approach, etc., during his MPhil study (Nepal, 2018). Moreover, his MPhil research study made him realize that storytelling could be an alternative teaching method for him. In the context of storytelling pedagogy, all knowledge comes in the form of stories (Schank & Abelson, 1995), while Andrews et al. (2012) urged that stories have proven for thousands of years to have a positive instructional effect.

Similarly, Indra (the second author) experienced how storytelling pedagogy can be an innovative pedagogical approach to teaching mathematics when he started teaching the courses at the post-graduate level and conducted workshops and training for schoolteachers across Nepal.

"Tell me a fact, and I'll learn. Tell me the truth, and I'll believe. But tell me a story, and it will live in my heart forever." is a popular adage that may inspire teachers to use the storytelling method in teaching mathematics. Moreover, students' experiences and life worlds are the sources of stories that help them connect the subject matters of mathematics through classroom activities. Moreover, stories can bring abstract principles to life by giving them concrete forms. It helps to convert the abstract into the real and practical lives of the students. In the same way, students can rethink the activities and subject matter connected with stories.

According to Liljedahl (2005), there are several different cognitive tools used to teach students for their improvement in knowledge and their capacity to think as well as develop an emotional understanding of the content. Storytelling can be one of the tools which helps connect the subject matter with their lives. Both of us also believe that conceptual, emotional, motivational, engaging, interesting, and logical ideas are developed by telling stories in the classroom that connects mathematics with students' day-to-day activities and makes mathematics learning meaningful. Kamal shares his experience of creating and using stories of every possible mathematical problem in his teaching practices, as stories encourage students to engage in problem-solving and express evidence for their solutions (Monroe & Terrell, 2018).

Stories in the Cultural Contexts through the Lens of Social Constructivism

There are several ways in which storytelling can enhance intercultural understanding and communication (British Council, n.d.). Stories can explore students' own cultural roots and their diverse cultures. According to Monroe and Terrell (2018), stories should include students' diverse cultural backgrounds as the story is more meaningful to promote the traditional values and wisdom of all students. Moreover, storytelling is important to view the world differently and generate new ideas accordingly. Mathematics is not only about solving textbook problems using steps and formulae, but it should also be viewed and treated as *mathematics as storytelling*, *mathematics as cultural enactment* and *mathematics as language* (Luitel, 2009). Kamal realizes that Luitel's (2009, p. 3) question, "*Can mathematics be compatible with poetry and stories that I have been writing? If not, why?"* pinches him every time while teaching mathematics.

In this context, a social constructivist approach to learning is needed, especially in mathematics teaching, because it focuses on how knowledge is constructed by everyday interactions between people and how they use language to construct their reality (Andrew, 2012). Social constructivists emphasize that learners can be actively engaged in activities, discuss with groups of people, and construct knowledge based on their prior knowledge and experience. Most teachers and students believe that the formulae are only for rote memorization. But the formation of the formulae from the stories and activities of social and daily incidents is more logical, and it helps to generate teaching and learning in mathematics class. Students use stories to conceptualize mathematical formulae in a meaningful way. Therefore, we (Kamal and Indra) realize that students construct creative ideas of mathematics through stories.

Moreover, the thinking patterns and ways of analyzing the ideas of students are different from one another. Xiuping (2002) also urges that "Learning is not always interesting" (p. 36). In this regard, teaching mathematics through storytelling may not be the ultimate solution, but it can help teachers motivate students and make learning activities more interesting and engaging if stories are created from students' cultural contexts.

A reflective teacher helps children discover and communicate ideas that won't occur spontaneously without an adult's help (Vygotsky, 1978). We (Kamal and Indra) believe that the reflective teacher can connect learning with society's activities and address the learners' problems. We raise questions to ourselves - Is learning connected with our society, and is it contextualized? The problem can be resolved using the lens of social constructivism that learning occurs through the community of mathematical activity and a sharing of mathematics classroom culture. In this regard, even Vygotsky (1978) argues that higher cognitive processes develop from social interaction. The first school of a child is home and society. Children can generate different creative (mathematical) ideas with the help of social activities in the classroom.

" *Stories spark student curiosity, increasing math engagement and motivation*" (Monroe & Terrell, 2018). Students can connect every mathematical problem with their practices in society, and the computation of the potential power of knowledge explores the constructivist roller in society. From classroom practices, students can discuss and develop different ideas and visions towards mathematics and its application through the stories from their activities. The most effective strategy is the selection of students and capitalizing on their knowledge and interests and involving them in determining goals and methods of learning (Levin, 1994, p.760). Kamal shares his experience that the active involvement of the students in the activities in his mathematics classes is helpful for his students in constructing mathematical ideas meaningfully based on their prior knowledge. Windschitl (1999) asserts that "Constructivist teaching is less about the sequencing of events and more about responding to the needs of a situation" (p. 753). Therefore, we believe storytelling can be one of the innovative pedagogical approaches to connect mathematical problems with students' prior knowledge and explore the possible solutions to the problems.

Storytelling as Pedagogy

A story is a beautiful means of teaching religion, values, history, traditions, and customs; a creative method of introducing characters and places; an imaginative way to instill hope and resourceful thinking. Stories help us understand who we are and show us what legacies to transmit to future generations (Schram, 1994). It can be used to elaborate and identify students' cultural practices beautifully and motivate them by addressing their feelings; it is the most powerful weapon. Therefore, telling a story can be one of the pedagogical approaches that a mathematics teacher can use in developing students' conceptual knowledge of mathematics. Egan (1988) has argued for the conceptualization of teaching as storytelling, "the story, then, is not just some casual entertainment; it reflects a basic and powerful form in which we make sense of the world and experience" (p. 2). So, the concept students get from the stories to relate to the subject matter is highly inspirational and motivating.

For a long time, storytelling has been used as a fundamental method for transferring knowledge. While discussing the reason for many cultures retain their storytelling legacy, Zazkis and Liljedahl (2009) state that storytelling, a traditional way of transferring knowledge, provides a unique way of looking at and understanding the world. van Manen (1997) notes that to investigate the idea of teachable moments, in particular storytelling, one needs to adjust oneself to the question of the meaning of teachable moments, and this meaning of the teachable moments needs to be found in the experience of teachable moments. The experience of all

participants in the related context is more meaningful in developing their ideas and knowledge, and the connection of the stories also promotes the right track of meaningful learning.

Mathematics and Storytelling

There are different perceptions of mathematics in the mind of individuals during the learning process. If they cannot connect mathematics with their day-to-day activities, it will make mathematics more complicated and rigid for them. But if the mathematical connection flows naturally from the story (Monroe & Terrell, 2018), it supports teachers and students in mathematics teaching and learning processes. Based on our experiences, students are facing various problems in conceptualizing mathematics and are gradually departing away from learning mathematics. In such a context, the teacher's storytelling improves mathematics in ways that engage a student's 'being' and cognitive faculties (Mgombelo, 2016). It can create a new discourse on pedagogical thoughtfulness.

Storytelling contributes to mathematics education research by focusing on lived and living experiences and contradictions of teachers and students to understand mathematics conceptually. Frucht (1999) believes that using mathematics to tell stories and using stories to explain mathematics are two sides of the same coin. They join what should never have been separated: the scientist's and the artist's ways of uncovering truths 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 this context, Kamal has always made storytelling a part of his mathematics teaching as he believes that children are natural storytellers (Balakrishnan, 2008). Students have different experiences and perceptions, and they can connect mathematics with every activity. They can share their unique mathematical ideas with their friends and generate beautiful stories. Such engagement of students helps them understand the connections of the stories with the mathematical activities and visualize mathematics meaningfully. Above all, storytelling pedagogy falls within arts-based pedagogy that helps teachers and students transform their 'teacher-centric pedagogical lenses" to "student-centric pedagogical lenses" by empowering students in mathematics through their creativity skills. Moreover, students learn mathematics through storytelling pedagogy by translating the essence of procedural and conceptual knowledge and understanding of mathematics into their contextual stories (Shrestha, 2022).

Kamal shares his experience that his students hardly raise questions in his mathematics classroom as they enjoy listening to his lectures and copying texts from the whiteboard. When he started to use storytelling pedagogy to teach mathematics, his students gradually felt comfortable with him and started to share their difficulties in learning mathematics. Moreover, in the context of Nepali education, we (Kamal and Indra) have experienced that students are hardly allowed to engage in critical discourses in the mathematics classroom and hence are unable to raise critical questions about social injustices. In such a context, storytelling pedagogy engages students in learning mathematics using their creative and imaginative thinking skills.

Research Methodology

We employed autoethnography as a research methodology to recapitulate and reconceptualize our experiences in teaching and learning mathematics using storytelling pedagogy. "Autoethnography comprises three words- *auto*, *ethno* and *graphy* which signify the textual representations of one's personal experiences in his/her cultural contexts" (Luitel, 2009, p. 35). Autoethnography is an approach to research and writing that seeks to describe and systematically analyze personal experience to understand cultural experience (Ellis et al.,

2011). Moreover, as collaborative autoethnography, we challenged our personal biases, positioned our research to make sense to a wider audience and had a more significant impact on them.

When Kamal shared different stories with the student, almost all students enjoyed the class. Eventually, they started to discuss how mathematics can be learned through stories. Moreover, they created stories on mathematics and shared them in the classroom. Such student engagement motivated Kamal to use storytelling pedagogy in teaching mathematics.

Kamal's Narratives on Storytelling Pedagogy

Kamal shares some narratives on using storytelling pedagogy in teaching mathematics that he explored during his MPhil research study.

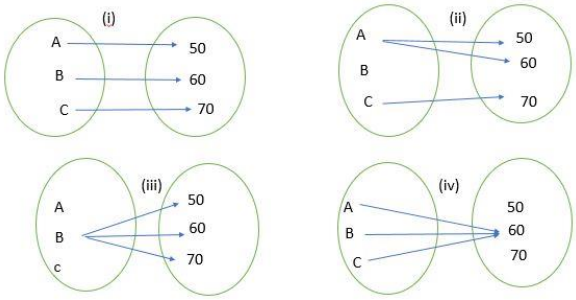
Conceptualizing Function through Story

Kamal used the metaphor of "an eye opener "to refer to the realization of the new trick and method to teach mathematics in the classroom. Storytelling was the most conceptual and meaningful method in his practices. When he got opportunities to participate in workshops at Kathmandu University, he shared my experience of storytelling pedagogy.

It was a day in 2015. I participated in a mathematics workshop organized by Kathmandu University. We were three (friends) in that program participating from my school. There were 30 participants, and the title of the activity in the workshop was "Storytelling in Mathematics Class".

I had no idea about that topic, but observing the storytelling pedagogy with a great curiosity. One of our workshop facilitators shared one short story about the chapter "Vectors". We enjoyed it a lot. Similarly, I learned an exciting story of Karl Friedrich Gauss, who established the formula of the sum of the first n natural numbers. That story was the representation of history as well as the motivational factor.

There were six groups of five members in each group. There was a schedule for sharing stories on mathematics from each group. All the groups presented their own stories. From our group, I shared a story on 'function'. The purpose of my story was to help conceptualize the term 'function', which is as follows:



First, I drew four pairs of circles. In each of the first circles, I wrote A, B and C and 50, 60 and 70 in each of the second circles. Here, A, B and C represent students, while 50, 60 and 70 represent the marks obtained by the students in the mathematics unit test. After that, I started to make pairs using arrowheads as follows:

In the first pair of circles, A was paired with 50, B with 60 and C with 70.

In the second pair of circles, A was paired with 50 and 60 and C with 70, while C was unpaired.

In the third pair of circles, B was paired with 50, 60 and 70, while A and C were unpaired.

In the fourth pair of circles, all A, B and C were paired with 60.

After drawing these figures, I started telling my story to all the participants in the workshop: There were three students, A, B and C. When they appeared in four mathematics examinations, they scored 50, 60, or 70, as shown in the four figures. The first circles in the four figures

represent the sets of students, while the second circles represent the sets of marks obtained by the students in the four examinations.

I asked all the participants to discuss in their groups whether every element of the first set is associated with a unique element of the second set or not. After discussing for about half an hour, the following conclusions were drawn:

The relations in figures (i) and (ii) represent functions, while the relations in the other two figures are not functions.

In the above story, we can see how mathematics can be taught using storytelling pedagogy. Moreover, instead of just explaining and writing the definition of a function, a mathematics teacher can connect it with students' life worlds, which will help them conceptualize mathematics.

Sakuni[1] *and his Confidence Vs Probability*

After sharing the story on function, I was excited to share another story on probability. I began my story as follows:

Once, I was preparing to teach the chapter probability in grade 9. I connected it with the game played by *Pandava.* The main objective of this story was to illustrate that the probability of an event lies between 0 and 1.

According to the Hindu mythological story Mahabharat[2]*, when Kaurava and Pandava were going to play the game "Pasa"*[3]*, Sakuni, who is the mama (maternal uncle) of Kaurava to design a special type of Pasa convinced his Bhanjas (nephews) as they would definitely win the Pasa. They were surprised but believed. There were only five dots printed on all four faces of the Pasa. When they started to play the Pasa, Kaurava chose '5', but Pandava chose 4. When Sakuni rolled the Pasa, only '5' was drawn. In every turn, Kaurava won the game and Pandava lost. The probability of getting '5' is sure because of the probability of all the faces represented '5' only. But the '4' was impossible because it was not in the Pasa.*

So, the probability of winning is sure for Kaurava, while the probability of winning is impossible for Pandav.

From this story, we can draw one important concept of probability which is P (E) $=\frac{4}{4}$ = 1, which is sure to happen and P (E) = $\frac{0}{4}$ = 0, which is impossible. From this, we can make one of the relations of the probability: $0 \leq p(E) \leq 1$

Again, almost all my friends enjoyed and thanked me for the story. As a story plays a role as a cognitive tool, it supports the power of the internal perception of the students (Balakrishnan, 2008). Mover, students enhance their ideas through stories. Moreover, the workshop changed my perception of teaching mathematics in the classroom. I realized that stories help students learn mathematics meaningfully and change their negative to positive perceptions of mathematics. Zazkis and Liljedahl (2005) categorize stories according to their *function in the classroom and their potential for imaginative engagement.* Stories can enhance the label of the students and raise their cognitive ideas.

This Sugar was from Switzerland

I developed this story to teach "Percentage" in Grade 9. Before going directly into definitions and procedures, I informed all students who were excited to listen to my story.

[1]According to Hindu mythology "Mahabharat", one of the negative character

[2] Hindu mythological story

Rectangular dice[3]

There was a neighbor in my village called Sayakada Lal, who was a retired Indian Army Officer. We were very close friends. He was an interesting character. He was a very funny and talkative person. This story is related to his name, "Sayakada" (Hundred). He loved mathematics very much and often tried to connect mathematics with his daily activities. He would be very happy if he got a chance to play with the children.

He had a small shop in his own house. Whenever I would go to his shop to buy some items, he always talked with me about various funny things. One day, I went to buy sugar in his shop. The price of sugar per kilogram was 3 rupees more than in other shops. When I asked why, he said that the sugar was brought from Switzerland and was 10 percent expensive. I couldn't understand the calculation in percentage. But he had a habit of calculating every possible thing in percentage. He would convert all fractions into the hundred. He also calculates any number in the percentage. For example, there were five members in his family. He said that he was twenty percent of his family. Moreover, he multiplied 5 by 20 and 1 by 20 and calculated his percentage as follows: $\frac{1}{5} = \frac{1\times20}{5\times20} = \frac{20}{100}$

Moreover, he would encourage students to calculate the percentage similarly. He would often encourage them to convert the related day-to-day activities into a percentage. His students gradually learned to calculate the percentage of a number out of a given number. The story helped students cognize the concept of percentages. Garrety (2008) also claims that storytelling has a variety of functions within human thought and memory. It is a tool for motivating students to conceptualize mathematics.

After completing the story, I illustrated some examples of calculating the percentage of a number out of a given number. I also gave examples from students' life worlds. However, a student asked a question, "How can we convert the denominators which are not the factors of 100?" It was a very good question, and I asked them to discuss it with their group members. After a while, almost all came up with the idea that in such a case, both the denominator and numerator must be multiplied by 100 and calculate the percentage.

Moreover, students can construct meaningful concepts of their lives. To understand the formulas and find the percentage of a quantity, students can use their methods or what their teacher taught, but a more logical and exciting way can be storytelling. We (Kamal and Indra) agree with the opinion of the Zazkis and Liljedahl (2009), who advocate that story is an effective instructional tool in teaching mathematics.

Indra's Narratives on Storytelling Pedagogy

Indra shares his narratives on storytelling pedagogy in teaching mathematics, which he explored while teaching at the postgraduate level and conducting Teacher Professional Development programs across the nation.

Story 1: Teaching Counting Addition, Subtraction and Division Through Storytelling

While teaching counting, addition, subtraction and division at the primary level, a teacher can start with a story as follows:

Once upon a time, there was a couple with two children, a daughter Atithi, and a son Apurva. It was a beautiful Saturday morning. All the family members were sitting on straw mats on the lawn. The mother asked Atithi to bring some snacks from the kitchen for morning breakfast and Apurva to bring some vegetables from the vegetable gardens for lunch.

Atithi brought 10 homemade wheat bread, 6 bananas, 2 apples, and 44 grapes from the kitchen, while Apurva brought 2 cucumbers, 1 pumpkin, 2 onions, 10 tomatoes and 5 green chillis from the vegetable garden.

When the father and mother of Atithi and Apurva were about to serve the fruits, their pet dog came nearby, and birds came around. The father made pieces of 1 bread and gave them to the dog, while the mother gave 10 grapes to the birds.

After that, the mother divided the bread, bananas, and apples equally among the four family members, while the father divided the cucumbers and grapes equally among all the family members for morning breakfast. While taking breakfast, they prepared the ingredients for lunch curry from the pumpkin, onions, tomatoes, and chillis.

At this stage, the teacher can engage students in counting, addition, subtraction, and division as follows:

Engaging students in both counting and addition activities: Form different groups of students and engage them in the following activities:

Activity 1 on Counting:

Activity 1(a): Count how many different items Atithi brought from the kitchen.

Activity 1(b): Count how many different items Apurva brought from the garden.

Activity 1(c): Count how many fruits Apurva brought from the garden.

Activity 1(d): Count how many lunch items Apurva brought from the garden.

Activity 2 on Addition:

Activity 2(a): Find the total number of fruits using the addition method.

Activity 2(b): Find the total number of vegetables using the addition method.

Activity 3 on Subtraction:

Activity 3(a): Find the number of bread left after giving the bread to the dog using the subtraction method.

Activity 3(b): Find the number of grapes after giving the grapes to the birds using the subtraction method.

Activity 4 on Division:

Activity 4(a): Find how many whole breads each family member got from the remaining breads after giving the bread to the dog. Think critically and discuss in your group how they can equally divide the remaining bread with all the family members.

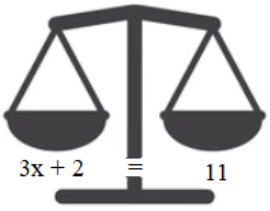
Activity 4(b) Find how many grapes each family member got. Think critically and discuss in your group how they can equally divide the remaining grapes with all the family members.

Given the context of the story, a teacher can creatively engage students in different activities depending on the primary-level classes.

Story 2: Teaching Algebra Through Storytelling

Many students dislike mathematics and have math phobias. When solving algebraic equations, students are not open to entertaining solving them. A teacher can use a "Balance Story" in teaching a linear algebraic equation as follows:

Once upon a time, there was an unknown variable 'x' trapped in equation 3x + 2 = 11. The 'x' was furious to know its own value, as all the constants knew their values. The equal sign was eager to see the action of 'x' as the equal sign always wants a balance between its left and right sides. The equal sign further said to the 'x', "You should take all the quantities on the right side so that you are alone on the left side."



Now, the 'x' wondered and said to the equal sign, "But how?"

The equal sign said, "You should add equal quantities on both sides if the constant is negative and subtract equal quantities from both sides if the constant is positive. Similarly, you should divide both sides by the same quantities if the constant is in the product form with you and multiply both sides by the same quantities if the constant is in the quotient form with you."

The 'x' replied, "Amazing! It means, first, I need to take away positive 2 from the left side. So, I should subtract 2 from both sides. Am I right?"

The equal sign said, "Wow! That's right. Please move ahead."

The 'x' did it as follows: 3x + 2 – 2 = 11 – 2 or 3x = 9, and said, "Oh, I have got only 3 with me in the product form on the left side."

The equal sign said, "What do you do now?"

The 'x' said, "I know what to do. I divide both sides by 3."

The equal sign said, "Why do you divide, and why not multiply?"

The 'x' said, "3 is with me in the multiplied form. That's why; I need to divide both sides by 3 so that I will be alone on the left side."

The 'x' solves as follows: $\frac{3x}{3} = \frac{9}{3}$ *or x = 3.*

"Oh, I got my value! It's 3.", said the 'x'.

After telling the story, a teacher can engage students in group activities such as writing the algorithms (rules) of solving a linear algebraic equation and solving other equations depending upon the class. Finally, the teacher can summarize the whole learning activities and ask all the students to write their reflections on their own learning.

Final Remarks

Our experiences of using storytelling pedagogy showed one of the possible innovative pedagogical approaches to teaching and learning mathematics. Moreover, in the context of Nepali education, most teachers are found to be comfortable with the same lecture and drill-and-practice methods of teaching mathematics. Such practices help students develop their "procedural knowledge and skills of mathematics" (Rittle-Johnson & Schneider, 2015), thereby neglecting and/or subordinating "conceptual knowledge of mathematics" (Rittle-Johnson & Schneider, 2015). If a teacher uses storytelling pedagogy whenever students feel bored and are not motivated to learn mathematics, it can help students develop their interest in learning mathematics. Moreover, storytelling pedagogy can be a transformative pedagogy (Shrestha et al., 2020) that helps both teachers and students transform their ways of teaching and learning mathematics from the "Banking Concept of Education" (Freire, 1970) to "The Democratic Conception of Education" (Dewey, 1916), and hence, instead of depositing procedural knowledge and skills in their head as a bank, students will practice the democracy while learning mathematics through interaction and negotiation.

Experience is the main pillar of the teaching and learning process. It can change the perception and belief of a student as well as of a teacher. Our long-year experiences teaching mathematics in schools helped us transform our ways of knowing, as Taylor (2013) suggested five distinct interconnected ways of knowing - *cultural self-knowing, relational knowing, critical knowing, visionary and ethical knowing,* and *knowing in action.*

Further, stories motivate students to learn mathematics to increase their cognitive level. When students are motivated to learn mathematics, they gradually understand the beauty of mathematics and find mathematics everywhere in their life worlds. Moreover, stories help students increase their imagination power leading them to analytical and logical thinking. Modi (2012) also asserts that "the value of story to teaching is precisely its power to engage the students' emotions and also connect their imaginations in the material of curriculum. Therefore, a self-motivated student can learn the subject matters of mathematics meaningfully. Ernest (1986) also argued that if students become motivated, they engage themselves in different mathematical activities to encourage them toward a good teaching and learning environment.

Our autoethnographic research studies helped us portray feelings and experiences of teaching mathematics through our narratives on storytelling pedagogy. We have felt that by using storytelling pedagogy, a teacher can motivate students to learn mathematics meaningfully

and transform their ways of thinking, knowing, and acting in mathematics. Most importantly, we also experienced that a teacher should ask all the students to write a reflective journal on their learning process at the end of the class. Moreover, such a reflection helps students recapitulate their learning and contribute to their cognitive development. Concludingly, our autoethnographic reflections on our experiences of teaching mathematics through storytelling transformed us into rethinking our pedagogical practices from the perspectives of storytelling as an innovative approach to teaching mathematics in school education.

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Suggested Citation:

Nepal, K., & Shrestha, I. M. (2023). Rethinking pedagogy through storytelling in school mathematics. *Journal of Transformative Praxis, 4*(1), 29-41. https://doi.org/10.51474/jrtp.v4i1.669