

# History of Mathematics in Nepal

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## Introduction

Nepal is one of the nations of South Asia, which is situated in the southern part of the Himalayan region. In retrospect, the ancient history of South Asian subcontinent reveals that it consisted of many kingdoms for several centuries of its history. The later geo-political subdivision of the subcontinent consists of eight nations, and these nations are coordinated by the institution of SAARC established in 1985AD(Schaaf, 1975). Modern India covers major part of the subcontinent. Obviously, the ancient India has influenced the religions, culture, costumes, social practices, etc. of other nations of the subcontinent.

In fact, the histories of the member nations of SAARC have the major influence of ancient India. This trend can be observed in the case Bangladesh, Nepal and Pakistan. The Bagmati civilization of Kathmandu valley and other parts of the country are much influenced by the art and cultures of Gupta Empire, Pala Empire, Mughal Empire and British India. The influences of these periods can be noticed from the different periods of Nepalese history(Robson, 2009). So, the ancient, medieval and modern periods of Nepal can be compared in the following timeline representation of India with Nepal from the aspect of art, culture, costumes, and social values. The features of South Asian nations prevail from its boundaries of Indian Ocean to the Himalayas with the existence of philosophical characteristic of unity in variety and vice versa in these aspects. Moreover, the genesis of art and culture of Nepal besides being unique, has the influence of Indian art and it is the natural phenomenon for whole of South Asian region(Centre, 2017).Education

as a system can be called the brain of any society and it is the backbone of any system. Mathematics is a vast adventure in ideas, an exact science and truly saying the mirror of civilization. According to Perry, mathematical education began because it was useful, it continues because of the usefulness of its results. Most mathematical creations are the result of intuition. The direction of modern mathematics has been greatly influenced by the development of other disciplines(Robson, 2009).

The mathematical sciences have changed significantly during the past few decades. The most obvious change is the enormous growth of mathematics. Even the latest scientific and technological development has extended each branch of mathematics and has proved mathematics as a powerful tool for any scientific achievements. The history of teaching mathematics is as old as human civilization(Jha et al., 2006).

These days the history of mathematics is a powerful tool for the dissemination and understanding of mathematics. We see history as a way of motivating the learner to look at the significance of the area being studied. We have to consider history as a route to help the learner understanding the path of development to a mathematical concept. In the history of mathematics, students will come to know that mathematical sciences are a work of all civilization, and teachers will find more confidence in teaching, the objectives of mathematics education and the innovation of sciences and technology in the society and the existing education status of our country. Mathematics is the most important subject which is taught at all levels of education in

every country in the world. The history of mathematics reflects some of the noblest thoughts of countless generations (M., 1900). Nepalese mathematical system is highly influenced by the development of the world's mathematical system.

### **Historical Background**

Most of Hindu individuals of both the countries can be professed to have existed from the Vedic said. The proof of this situation is the craftsmanship and culture of both the countries from more than 3,000 years of their set of experiences. D.R. Regmi has referenced in his book Ancient Nepal that the old Himalayan realm Nepal was in presence before the hour of researcher Chanakya Kautilya (c. 370 - 283 BCE) of Takshashila, who was the gatekeeper of Emperor Chandragupta Maurya, the originator of Mauryan Empire and the writer of well known book Arthashastra (M., 1900). The concurrence of both the countries from the part of Hindu practices from the hour of Vedic period is likewise upheld from the normal antiquated culture directed by Hindu sacred texts (Miliband, 1970). There are a few normal occasions of strict occasions connected with Hinduism, Islam and Buddhism in the area of South Asia. For example, any Hindu strict occasion starts with an exceptionally normal customary custom goal methodology with regards to Nepal (Jeevan Khanal, Sae hon ParkPh, 2019). The Nepalese Hindu families on the social custom events like Annaprashan (a child's first admission of strong food), Upanayanum (sacrosanct string function) and Sraddha (custom of offering feasts for the sake of diminished), the accompanying strict goal articulation in Sanskrit language is submitted by the lover in presence of cleric preceding start the Vedic promising custom function. The assertion starts with the reciting of the holy solid Om alongside the name of god

Lord Vishnu-Hari multiple times, which is the outflow of high dedication to the Supreme Lords Brahma, Vishnu and Maheshwore. The fan then, at that point, spells about himself as having a place with same progenitor of Indo- Aryans since from the large numbers of years back of this time of Iron Age and safeguarded by white Varaha (pig), the third manifestation of Lord Vishnu (Khanal et al., 2019). He additionally spells that the strict custom occasion that is going to held where he is dwelling is, for example, at the southern piece of Himalayan reach at Nepal Mandala in the locale of Lord Pashupatinath at the holy place that is known for Lalitpur, which is situated at Jambu subcontinent or South Asian subcontinent.

### **Hierarchy of the Mathematics Development in Nepal**

In the Southern piece of the Himalayan area, which is the northern limit of South Asian? Subcontinent, there are as yet neglected civic establishments in Nepal. The human progress of Kathmandu Valley, which is otherwise called Bagmati progress, is only a later human advancement. The investigation of development of the western piece of Nepal is exceptionally difficult. For example, the progress of Surkhet Valley close to Kakre Bihar is to be exhumed. Nepal has not yet had the option to investigate the civilization of the Himalayan district, for example, Mustang Valley, where there are bountiful confirmations of workmanship and culture. These archeologically neglected districts of Nepal might have one more arrangement of native arithmetic. It is chosen by future as it were. Be that as it may, in the unique circumstance of present day world, the improvement of science is the social legacy of humankind. The cutting edge world has the effect of old civic establishments (ERO, 2018). It is my perception of the present world. The presence

of native advancements in the old civilizations can be seen from the craftsmanship and culture created during those periods. The authentic landmarks and others of those days were the results of the native innovation. The landmarks of those days were because of the utilization of native advances accessible during those days (Matsunami & (Dept., 2011). It is an inborn element of the progress and it helped to foster the craftsmanship and culture of those days. These archeological and verifiable confirmations guided the current age to respect its tasteful values and to acknowledge them as the multicultural legacy of the past. For example, the achievement of Neyatapola sanctuary of Bhaktapur, Hanuman Dhoka Palace of Kantipur, and Hiranyabarna Mahabihar of Lalitpur, and so forth are the because of native innovation of those days. There are a lot of models and confirmations about the utilizations of native innovation and math in the human advancements of the world, which displays the presence of these crucial components for the advancement of the progress. It is my last comment that native math and native innovation are twointegral components of the civilizations of the world. Additionally, the chronicled landmarks of the current day world are because of those components (Statista Research Department, 2021). The Taj Mahal of India, the antiquated Taxila city of Gandhara time of Islamabad, Rohtas Fort of Pakistan, the noteworthy Mosque City of Baohat of Bangladesh, and so forth are likewise because of those components.

### **Vedic Era (3000BC)**

It is accepted that education in Nepal was started from Gurukul where religious teachers, Guru, and priests used to teach the various method, techniques, and procedures of education. The purposes and contents, the types of education that a learner

should receive were decided by the teachers according to the nature, interest, and needs of the learners. The different forms of education called Gurukul Shiksha, Rishikul Shiksha were into existence. For example, Brahmans were allowed to study Ved, Vedang, Darshan, Nitihastra, Jyotish Shastra, pitiful Shiksha puja path at jamjars house and temples to protect and to preserve the religion.

The education given to Chhetri was the Sastra Vidya and the methods and techniques of handling weapons that were necessary for the security of the nation. Princes or Kings used to receive Satra Vidya and Rajkul Shiksha needed to govern the nation. The agriculture skills and business type of education were given to Vaishyas and the service-oriented part of education was separated for sudras.

"Ved" were studied and recited in Gurukul and called the Vedic period among them, Rig Ved was concerned with mathematics. Vedic education system mathematics was not studied separately but studied in conjunction with other subjects. At that time astrology was studied and more emphasis was given to astrology and geometry.

In the ancient period, it is believed that Janakapur was also known's as a center for education. The place of education was Rishi-Ashram or Guru Ashram located in a jungle or lonely place, or religious temple Gumba and Gurukul. The education was given to the learner for the protection and preservation of religion and the learner has to stay at Ashram Temples Gumba and Gurukul and to follow the strict discipline of the educational instruction. The medium of instruction has been believed to have the Sanskrit language. The expense of education was received through a donation from people and income from Guthi established by Kings

or people for that purpose.

### **Buddhist Era:**

The education centers of Buddhist education were Bihars, Gumbas, and Buddhist temples, where Buddha Darshan and Buddha Upadesh were studied and recited. The learners have to stay at Gumba Bihars and to follow the strict discipline of the Gumba and Bihar's. The medium of instruction was the Pali language. Methods of instruction were discussion, question-answer, and religious lectures by a Buddhist monk. The purpose of education to produced Buddhist monks for the protection and preservation of the Buddhist religion.

### **Lichchavi Era (143-1243 AD)**

Lichchavi period was concentrated on the development of cultures and arts. People had the belief that education is the religion and religion is education. The people were attracted towards religion and spend more time in worship of god. They were not attracted in Grihastha Ashram and the population was decreased fairly. To increase population and to attract the people towards Grihastha Ashram, the kings of that period made different sexual Asans of woods and stones in the temple to give the impression to the people that the production of children is also one part of life. We can see such Asans in the various temple of Kathmandu, and other parts of Nepal. Mathematics was used to collect taxes from the people. The barter system and money were used in business. The simple arithmetic was used Sumati Tantra and sumati Siddhanta were found useful for astrologers.

### **Lilavati, the Milestone**

The confirmations of Nepalese craftsmanship, culture and the archeological confirmations of compositions accessible in Nepal legitimize the presence of various civilizations in the Southern piece of

Himalayan locale. The legacy of Nepal uncovers that there were Buddhist and Vedic instruction in the Nepalese society during the antiquated times. Indeed, these school systems should be common from the season of Lichhivi period. The continuation of improvement of Buddhist and Hindu societies during

the Malla dynasty(1200 - 1769) is the one of a kind element of history of Nepal. It reinforced the Hindu culture started in the South Asian subcontinent. This kind of pattern can't be noticed from the recorded proof during the Shah dynasty(1769 - 2008). The early Shah Rulers are for the most part engaged with the Conflict undertakings with different realms. In any case, the Vedic practices and Gurukul arrangement of instruction for world class local area embraced during the Malla time frame actually exist in Nepalese culture. In the Vedic culture of training, the idea of Master for educator is an exceptionally

regarded component. He is viewed as the high level staff, who is wellspring of all information on science, numerical sciences, craftsmanship and artistic works. The culture of this tradition is still in practice in our Nepalese society and it is celebrate

annually on 'Teacher's Day', which is one of the Hindu religious traditions of South Asia. The ancient Sanskrit manuscripts written in Bhujimol-Newari scripts preserved in National Archive and other libraries are its evidence. The commentaries of the *Vedas*, *Parnas*, *Upanisads*, astronomical calculations in *siddhantas*, *jyotisa-vedanga*, texts for astronomical computations, geometric models in astronomy including *Lilavati* were done by Nepalese astronomers of earlier periods.

In this context of my writing, it is appropriate to mention the following *shloka* about the discipline of mathematics contained in *Vedanga Jyotissi*. It is very popular among

the Nepali

mathematics community as well. above discussion attempts to clarify that the commentary of *Lilavati*, a treatise of the Vedic traditional mathematics written by Great Indian Mathematician Bhaskaracharya (b.1114), by the Nepalese mathematicians is the beginning of documented Nepali mathematics history. It is noticed by going through the brief life sketches of Nepali mathematician of different centuries.

There were a few Nepalese personalities who have made a significant contribution in the field of astronomy and mathematics. We are proud to mention those personalities from the then kingdoms of Kathmandu valley, Jumla, and Gorkha. It would be relevant to mention some of their astronomical and mathematical works along with their life sketches. These biographical sketches not only give about their life, it is a panoramic view about the entry of mathematics through astronomy in Nepalese society.

#### **Malla Era (1243-1741 AD):**

In the Malla period, the arts and architects at places, buildings, and temples show that Malla was familiar with the highest form of geometry. At that time hat was used for measuring length. Mana, the path for amount, and dhak for weight. Malla were experts in the making of soil pots. For future prediction and to make calendars easily, astrologers of the Malla era also took the help to sumati tantra and sumati Siddhanta. Many great astrologers made suitable calendars based on surya siddhanta.

#### **Shah Era (1742-1846 AD)**

This period is also called the negligence period in the history of the education of Nepal. Education did not flourish properly because the state was engaged in

battles and wars for the unification of Nepal. However, Gurukul or teachers hired at home for education, or Banaras were the main places of education at that period.

#### **Rana Era (1846-1951 AD)**

The modern education system in Nepal started in 1854 AD. Returning from Britain, Prime Minister Jung Bahadur Rana opened the Durbar school at Gol Baithak, Thapathali and mathematics was taught at that school in English medium. This was the first formal School in the history of education in Nepal. Children from higher class Rana families were allowed to study in this school. Similar School was opened at Hanuman Dhoka Durbar for the members of royal family. Durbar School was affiliated to Calcutta University. Arithmetic, algebra was taught by the Indian and European/ British teachers. British type of education was given in this school. The medium of instruction was English. After the death of Jung Bahadur Rana, Durbar school was shifted to Rani Pokhari and opened for the children of other Rana families.

During the prime-Ministerial time of Dev Shumsher, Durbar School was opened for common people. Many Bhasha Pathshalas were opened throughout the country. Education was made free and stationers were distributed freely.

#### **Mathematics Education after Democracy (1951- till)**

With the advent of democracy in Nepal in 1951, the political situation of the country influenced the education system. Various commission, education boards, advisory committee such as National Education planning commission, 1954, All round National Education committee, 1961, National education System plan, 1971, National Education commission ,1992, Higher level National Education commissions, constituted

in different period have given mathematics a significant place at all levels of school education.

National Education system plan (NESP) was introduced in 1971 in Nepal. It was a revolutionary step made by those people who had some ideas about European and American system of education. Annual examination system was replaced by the semester system. New topics in mathematics were introduced and new books were prescribed. NESP was the milestone and pioneering work in the history of education of Nepal. Mathematics was accepted an essential requirements for literacy. The organization of primary education was made from grade 1 to 3, lower secondary from 4 to 7 and secondary from 8 to 10. In 1981, the structure of education again changed into 5+3+2+2 type of education.

The mathematics carrying at least 100 marks has been made compulsory from class one to class ten and optional in classes 11 and 12.

### Mathematics Education at University Level

Higher education of modern mathematics in Nepal started from intermediate level at Trichandra College in 1918 (Arts) and in 1926(science). Mathematics classes in B.A. and B .sc. were started in 1932 and 1942 respectively at the same college. The mathematics curriculum at Bachelor level at that time included topics from Algebra, Trigonometry, Analytical Geometry and calculus. Classical English textbooks on these subject were taught for many years .However, master level classes in mathematics were started in 1959 which the establishment of the mathematics Department at Tribhuvan University.

Tribhuvan University introduce three- Year master program from the academic

session of 1999. In this way, our country has embarked on a 10+2+3+2 type of education. A drastic change in mathematics curriculum has taken place in different levels from intermediate to post –graduate.

Many new topics in different subjects are included in Bachelor and Master Levels that can corroborated the advanced syllabus of the universities of SAARC countries.

When the establishment of Faculty of education, it has been producing trained teachers for primary, lower secondary, secondary and tertiary levels. Ultimately, FOE also prepares curriculum specialists, evaluation experts, supervisor and administrators for various governmental and non-governmental educational organizations. Faculty of education has been lunching PCL in education, three years B.Ed. one year B.Ed., M.Ed. and Ph.D. Programme with specialization in math education.

### Author's Biography:

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