CURRENT RESEARCH JOURNAL OF PEDAGOGICS
(ISSN –2767-3278)
VOLUME 04 ISSUE 09 Pages: 69-73
SJIF IMPACT FACTOR (2021: 5. 714) (2022: 6. 013) (2023: 7. 266)
OCLC – 1242041055
Publisher: Master Journals

Journal Website: https://masterjournals.com/index.php/crjp

Research Article

DIFFERENT APPROACHES TO RATIONAL RECONSTRUCTION OF THE HISTORY OF MATHEMATICS

Submission Date: September 20, 2023, **Accepted Date:** September 25, 2023,
Published Date: September 30, 2023
Crossref doi: https://doi.org/10.37547/pedagogics-crjp-04-09-13

B.N. Alimov
Senior Teacher At "Department At Primary Education Methodology" At Chirchik State Pedagogical University, Faculty Of Primary Education, Uzbekistan

ABSTRACT

This article discusses various approaches to the reconstruction of the history of mathematics from the standpoint of an empirical, conceptual event or the reconstruction of a system of views on a phenomenon, social, economic and cultural development, an exemplary invention.

KEYWORDS

By reading documents, collectively called "evidence", an exemplary invention.

INTRODUCTION

In studying the history of mathematics, we have to deal with two, equally important, fundamental aspects. First, it is some kind of documents, archives, events, etc. from the past, collectively called "evidence" - because they form the basis of such theories of the past, from which modern theories and methods have developed. By reading documents, we try to uncover concepts (systems of views about a phenomenon) in them, so the importance of archives is not only that they clarify the sequence of events, but also that they reveal empirical evidence, as well as theoretical arguments related to the problems of their study and the solution of these problems. In this sense, the concepts form part of the initial data of the history of mathematics.

Second, after collecting evidence, we try to reconstruct and interpret the past. The importance of a particular event or concept depends on how we interpret it, transforming it from mere evidence of the past into historical evidence. These interpretations range from conscious evaluations and attempts to reconstruct events involving historians of mathematics to unconscious interpretations made by practicing mathematicians or mathematics teachers.

In a voluntary program on the rational reconstruction of the history of mathematics, it is necessary to take into account the diversity of approaches to the collection, classification and interpretation of primary data (evidence, opinions and assumptions) and the multiplicity of sources from which these data can be obtained. These approaches fall into four distinct sections: empirical reconstruction; to reconstruct a conceptual event or a system of views on any event; social, economic and cultural development; exemplary inventions.

Each methodology has its own epistemological and logical problems. Inductivism, for example, must reliably establish the truth of "factual" propositions and the validity of inductive conclusions. Some philosophers are so preoccupied with solving their own epistemological and logical problems that they never get to the point of being interested in the true history of science. If real history does not meet their standards, they can boldly propose to start the whole science anew [4].

Empirical reconstruction has long been understood by most people as literally the history of mathematics. Such a history consists of studying the sources, collecting evidence, placing them in chronological order, and then presenting them in order to give an objective account of the historical development of mathematical ideas. Attempts to reconstruct past mathematics, to transform it through the study of documents and to discover its driving force through the critical issues of its time, are largely based on the belief in the "paradigm of progress" described above: that mathematics in the past was less developed, less complete, and less correct than it is today calculated. This is often called the "inductivist" or "internalist" approach. He tries to imagine the development of mathematics in its history, as a result of posing physical and mathematical problems, the emergence of new mathematics as a result of research and its application to physical and mathematical problems, like evolutionary progress, mathematics gets better and better; at the same time, the mathematics of the past is slowly dismissed as flawed, imprecise, and flawed. This approach must be selective by necessity, as there is no point in attempting to report objectively on all evidence [2].

Conceptual reconstruction works equally well with the mathematics of the present and with the interpretation of the past. Modern mathematics expresses the mathematics of the past in the language of concepts accepted today, consciously or unconsciously evaluating whether a given branch of mathematics is important and worthy, and whether a given theorem is correctly proved. Evaluating the past in present terms is dangerous to all aspects of history, not just mathematics; but it is more dangerous in mathematics, and there is no way to avoid it because of the concept of abstract mathematical structure.

The deep philosophical and psychological issues that are important in the study of the history of mathematics are inextricably linked with the structures of mathematics, as long as we deal with them, such as their emergence, expansion and development, which are explained through these structures, as if they were accidental or forced. An example is the dominance of the concept of abstract groups, in which group structures can be seen in past mathematics.

Such an approach is in direct contrast to the empirical-inductive approach, which is limited to discarding the mathematics of the past as incomplete and incomplete.

Each period in the history of mathematics leads to reformation, consolidation, and a fresh start. From a practical point of view, it is accepted that the rapid increase in the total number of written texts leads to

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an increase in the effectiveness of communication, and there is no other choice. As a result, students are separated from the historical environment of mathematics, and it is important that students as well as teachers are aware of this.

Social, economic and cultural progress. Here, history is studied in terms of external forces in relation to mathematical theories and structures. This approach represents the impact of social change on the center of mathematical development; the relationship between the free development of mathematics, the primacy and style, and various forms of patronage; impact on individual research programs; technical and social problems related to mathematics learning; limits and constraints imposed by investor demands and economic conditions. Although such influences do not apply to branches of mathematical theory, they often determine the direction and speed of mathematical development.

Society can also act as a "carrier" of mathematical knowledge; these are various forms of specialized mathematics that are used in everything from commerce to engineering. Theories themselves can be "socially present" in at least two ways: firstly, the consumer makes an important contribution to the development of the theory, and secondly, when they do not make such a contribution, the theory and the various aspects of all mathematics together are important within their private activities.

In addition to people, textbooks, journals, monographs, etc. are the visible carriers of mathematical knowledge. Today, the most common of such carriers is the Internet, as well as movies, videos, and CDs. A mathematical theory can exist, if it is not accepted and used by the mathematical community, this existence is not social, and it cannot have any influence on the further development of mathematics.

Exemplary inventions are studied by philosophers and historians alike, in the sense that historians are interested in what exactly this or that mathematician invented, while for philosophers it is important that there is some logic behind the invention. The difference between historians and philosophers is precisely in the emphasis of their interests: those dealing with the analysis of problematic situations, while philosophers try to understand theoretical systems and critical arguments, the historian himself seeks to reconstruct these problematic situations. While philosophers use historical facts as material, the historian reconstructs these facts. Each of these activities does not negate the other.

We are dealing here with an attempt to build a philosophy of mathematics by investigating the characteristics of individual creative processes; By studying historical achievements of this kind, historical science tries to describe the logic of mathematical invention and the psychology of discovery. This field touches on an important problem with mathematics, namely how to make mathematics generally relevant within all cultures and intellectually accessible to people of all levels. There is no way to solve this problem without philosophy.

A mathematician must be able to distinguish between the problem of understanding a real problem and the problem of understanding a reconstruction of the original problem with a hypothetical reconstruction. The combination of metaproblems and metatheories can lead to extensive debates between mathematicians and historians of mathematics who have dealt with the problem and theory in the past.

G. Bashlyar [1] defined the epistemological profile as an analysis of individual activity, based on the analysis of concepts, and an epistemological obstacle is the same concept or method that resists the individual from

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breaking into a new epistemological state. According to him, the history of science should describe the past in the language of its own concepts and recognize the returned results on an equal footing with the recognized achievement.

Hermeneutics, mathematics and its history. Classical hermeneutics emerged in the nineteenth century as a result of restoration theory, which summarized efforts to improve the interpretation of ancient texts. Hermeneutics works with understanding, and primarily with an understanding of the written text, but a modern text that gives a broader meaning to the original idea than the structure used today can be used. It can also be concerned with a very wide range of issues, from textual analysis to the nature of historical understanding and the philosophy of communication.

Various humanities and natural sciences have traditionally been transferred from hermeneutics. First of all, if we pay attention to the meaning, hermeneutics separated the humanities from the sciences whose working principle is the exclusion of the human factor. As for mathematics, it can be said with deep confidence that the human factor can be removed from it, it is so used to it that it is not even talked about.

However, between mathematical essence and relation, a complex system of symbols has been imposed by people for their own needs, and the meaning of this system of symbols can only be understood by those who want to practice or apply mathematics.

As long as history operates on interpretations, and as long as in the history of mathematics we are always investigating the meaning of the texts we are interested in, the precise achievement of what we want to say is in question. An example of this is the idea of Isaac Newton's "non-mathematical" ideas. In it, the English mathematical establishment I. Newton overruled philosophical and metaphysical ideas that could have led to the formulation of the concept of "forces". Therefore, the formula "" requires interpretation from the hermeneutic point of view.

As already mentioned, mathematics can appear in two ways depending on its relation to historical time. On the one hand, we can see in it a system of interrelated timeless facts. The task of mathematicians is to unravel these arguments and to explain the deductive relationship between them; accordingly, the history of mathematics is “evolutionary progress whereby mathematics gets better and better; at the same time, there is a gradual turning away from the mathematics of the past, which was inconvenient, uncertain and flawed” [3].

On the other hand, we can look at mathematics as a product of human activity dispersed throughout the cultural period. This perspective does not negate the first, but complements it by allowing a logical openness to constructive discussion of mathematization and modeling. And this means to us that there is something in common between the activities of teachers and students who work with already invented and well-known knowledge, and mathematical activities that create scientific innovation, as long as meaningful communication, innovation and creativity are very important elements in the activities of teachers and students.

In the traditional structure of mathematics education, the presentation of basic mathematics courses is carried out separately from its history, and historical information is added to it for the purpose of "expanding the general knowledge", not for the purpose of mathematical education. History of mathematics, teaching methodology of mathematics is taught in the third year of the university.

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