

THE ARCHIVE OF THE MATHEMATICS TEACHER: MY EXPERIENCE

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ABSTRACT

In an effort to analyze my experience in the field of education (1979–2004), I based my analysis on the archive I kept throughout these years. In short, “my archive” contains journals with conclusions and observations of my daily practice as a teacher, notebooks (each made of 200 sheets of paper, A4 format), containing selected mathematical problems (over 6500 and counting), that have been chosen among many, extracurriculum activities topics that I have taught with detailed lecture plans, reviews of my work; mathematical magazines and books, etc.

Keywords: archive, mathematics teacher’s archive

INTRODUCTION

What’s the benefit from keeping such a record? First, through the archive I realized how I found out my path as a teacher on an intuitive level. I learned how I reached the level of my successful lessons. I found the answer to the question how I managed to succeed in my lessons. Moreover, I found the answer to the question how I managed to reach a notion of the creative work of the teacher of mathematics. My process was simple. Whenever I discovered a hard problem, I instantly wrote down the solution that I had in mind. Putting the solution on a paper was my way to allow myself to stop thinking about the problem and eventually over time to forget the path that I used while writing the solution. Then after some time has passed, I would go back to the problem and try to rediscover it in a new light. I never try to remember the solution that I have made some time ago. I would try to visualize the problem and try another approach. This is how my idea about “Problems with Many Solutions” was born. I have to point out that the process although simple, can be quite hard at times since in certain cases it may turn out difficult to find a solution and extremely hard to find another approach to the problem and a new solution. In this way, I reached the idea of “The Importance of Mathematical Intuition” in the process of formation, development and perfection of the teacher in Mathematics [1].

Of course, these pages would not present my whole experience as a mathematics teacher. The importance of my archive in my professional development however is undisputable and I will attempt to theoretically define the idea of a “Teacher’s Archive” and also present certain ways of its implementation in practical life. By doing this I aim to formulate some guidances that can possibly be helpful and used by freshly graduated teachers in mathematics in their new career.

Before we go on with the further discussion of this issue we have to present however the notion and contents of the very term of “Archive”.

WHAT’S AN ARCHIVE?

The meaning of the term “archive” comes from the latin „*archivium*” and the ancient Greek „*archeion*”. Its original meaning is usually attributed and related to the understanding of a certain place, where something should be kept safe and in systematical order. On this basis, in the course of time a number of relatively autonomous and separate but also certainly interrelated views and concepts about the term “archive” have come about.

Some of them, on the one hand, put the stress on and underline the significance of the Building appointed or the Specialized Departments in the various companies or organizations that have the sole purpose of safe-keeping of a number of documental materials. On the other hand, the term might be viewed with the stress on the Number, the Sum of the safely kept documents that have come out in the process of functioning of one or another company, organization or even - a whole Nation. Other sources may go even further to more concrete and detailed definitions, such as “Collection of Documents”, for example. However, in almost all cases, the common opinion is that the archives have many beneficial functions and a unique value in providing information both for scientific research, analyzing the management and organization of the governmental institutions, the functioning of the various fields of the economy etc.

In a way, every single archive is a peculiar “Noa’s Arch” for things that we want to keep for a longer time or even forever. Every archive consists of different documents, materials or paper trails that we are trying to safe throughout time. Usually many people connect the term archive with the statistical information and classification of documents. This however tends to make the topic almost totally uninteresting for all those who for one reason or another haven’t had any professional or personal experience with it. Such prejudice leads to underestimating the value of the establishing, safely keeping and updating of information that an archive might have for each individual teacher as well. In our opinion, it is very important that not only the archive should be kept safe, but also the interest of the teacher towards it should be preserved, encouraged, nurtured and developed. In this sense the archive turns out to be almost a unique instrument to help fully and authentically reveal the development of each individual teacher and give a reliable account of the cultural, educational, scientific etc. processes and events that had taken place in the time of his/her career-formation.

The information presented so far is in full accord with the research that we had made in the Lovetch's State archive[5], Smoliyan's State Archive[4] and the Sofia's State Archive [3]. There we discover the first attempt to formulate a "Teacher's Archive". The paradigm of the presented archives is related to the preservation of the information bearers such as: autobiography, personal notebook, University student's gradebook, notebooks with lectures, Graduation paper, PhD thesis, certifications for Distinguished Teachers, articles, paperworks, notebook for linguistic questions, books, Russian Educational programs, Thank-you notes, addresses and letters, greeting cards, photos, group photos memories, brochures, letters, thoughts, certifications, exhibitions, documents using Ottoman-Turkish Languages, Decrees, Orders, magazines, Regional researches, Family trees, data for educational studies, unpublished regional stories, language research, Rhodopian Dictionary (1965-1970).

As noted, this is the classical, most popular and causal understanding of the archive and its functions. All this, of course, is a subject of detailed research for various practical or scientific purposes on the side of a number of specialized disciplines generally called "archival science". The archival science has its own requirements, criterias and procedures, which we do not intend, of course, to discuss here in detail.

What is really important for us however is to try to correlate this basic term of "archive" towards the processes of self-knowledge, establishment, formation and recognition of the successful teacher in: Mathematics [5] on a High school level and consequently, the ways in which they can be adequately formulated and discussed.

WHAT DO WE WANT TO OFFER?

A certain main objective of this article is to develop a new concept of the mathematics teacher's archive. In short, it consists of the idea: that the archive is a project of the working teacher him/her-self. The development of such an archive is a matter first of all of a certain degree of Self-Perception and Realization by that very Individual Teacher of the value of knowledge and experience as such. After that comes the desire "To Leave Something Behind" that will possibly "Survive Time" and present certain contributions that may turn out to be of value to current and future processes of human, individual, professional and spiritual formation, development and perfection.

In this sense, the archive of the successful teacher in Mathematics has a logic of its own. This logic is changing in time, it is not something constant. One of the challenges in determining the logic of the archive is to formulate the basic components that the archive will consist of and that it can be described with. In the course of time, on the basis of this, firstly formulated logic, the archive may develop and expand finding its own individual new priorities. This growing-up archive will then face another challenge going to a necessity to incorporate in itself

the tendencies of the developing experience of the teacher who is making it [5]. In such a way, the archive can be used later on to follow the development of the successful teacher, so that there would not be any substantial gaps in documenting his/her own experience. Such an ideal archive of the mathematics teacher will contain the pedagogic, psychologic and scientific problems, observations, conclusions, problems with solutions of the teacher as well as of his/her colleagues and students.

The creation of the archive is a subjective moment in the pedagogic practice of the successful teacher. Hence, the archive is vastly dependent on the personal interests and preferences of the teacher who is developing it. The direction that the archive will be moving on will be to more fully incorporate in itself the professional and personal experience of the teacher as an effort to save and present both to other colleagues and possibly, to interested societal institutions as well, all that Meaningful and Valuable components that his/her teaching practices may well turn out to contain. The archive, of course, allows the expression of different points of view and is based on the evaluations of a vast variety of experiences.

One of the tasks of the archive, on the one hand, is to preserve a full and true account of the various rules and “teaching tricks” that have proved successful and useful in the course of his/her professional experiences. This implies also a kind of a due presentation of the teacher’s understanding of the various tendencies of the educational practices at the given period of time and the personal interpretations and ways of applying them that had been made in the course of their own findings, ideas and projects. More than that, the experimental work of the successful teacher also has its place in the archive. The archive sets up a certain mental framework of the development of the teacher that is positioned with coordinates of time, place and authorship. Therefore, an archive can well be considered also as a kind of a due presentation of a variety of facts of one’s pedagogical practices, overall experiences and work-style.

DEVELOPMENT OF THE ARCHIVE OF THE SUCCESSFUL MATHEMATICS TEACHER

An excellent view of how a teacher is developing in his/her attempts to reach his/her’s goals can be established while using the archive of the successful mathematics teacher. This practical perspective is especially valuable for the amount of knowledge it contains and specially, as a kind of an extra-source of ideas and experiences, helpful to the processes of self-knowledge of the freshly graduated teachers. They can possibly help them more fully see, understand and evaluate the whole entity of the practices, circumstances and development characteristic of one’s personal career.

This development is shaped and can be expressed through the accumulation of both curriculum and extracurriculum teaching hours throughout the years. Collected information about selected and presented packages of problems for both controlling

and final examinations, as well as problems and topics for extracurriculum activities, can also present reliable information about that. Moreover, the enlarged and expanded archive can contain research on existing bibliography of topics and reports of the work results by terms and years. Finally, documented problems and their solutions in mathematics and pedagogics can also be included in the archive.

The archive can contain selected problems, ideas, methods, names, topics, references by topics, books, observations, finds, questions, conclusions, lessons, hypothesis, experience, formulations, principles, articles from contemporary magazines, plans and functions, projects.

In this sense the teacher's archive can be also regarded as a kind of a source of data of the "ways and means" in which his/her way of thinking had been developing themselves while using and applying them for the sake of enlarging, improving and perfecting the individual personal archive.

ESTABLISHING THE ARCHIVE OF THE SUCCESSFUL TEACHER

The establishing of the archive of the teacher begins with his/her first employment in school and therefore consists of his/her first employment documents. Through the years it will continue to enrich itself by the gained experience. The now establishing archive must also contain the annual hours and the distributions of topics through the terms. The archive should also include the textbooks, methodical handbooks, supplemental materials, books, magazines that the teacher intends to employ in his work through the year. Moreover the archive must contain the options and types of control examinations and finals through the year. The value of the final examination is important in relation to determining the hardships and oversights that the students had made. The conclusions from the finals can be used to evaluate the weak topics that need to be re-taught.

The statistics of the results of the examinations and the actual final grades for the term and the year can also find their place in the archive. It is valuable to establish and preserve reports for the grades by classes and terms/years. Moreover, the archive may contain plans and topics for extracurriculum work as well as the presented topics in details, the collection of selected problems and their ingenious solutions. The conclusions and observations made throughout the year can also find their expression in the archive. Finally, materials from Olympiads and contests held at the school can also be presented in the archive.

An important moment is the gathering of problems from the school's, municipality's and the regional's level as well as those from the national level of the Olympiads and their solutions. The archive can be further expanded and to contain problems or tests for students who are applying to different schools after 7th grade and to universities after graduation from High school.

Based on the interests of the teacher in mathematics and on his/hers availability to magazines or the internet, the teacher can determine which one of them or even

both will be of interest and value for his classroom or extracurriculum work and what to incorporate in his/hers archive. It is also essential that successful open-classroom lessons be included as well.

Continuous nurturing and developing the archive is highly advisable to become another constant activity and occupation of the teacher since this is the way in which the very model of his/her archive is to be possibly developed.

The goals and objectives in the archive can be structured in the following matter:

A. Educational stage – development of the work’s philosophy, graduating from University, establishing contacts with colleagues and lecturers.

B. Adaptive stage: self-knowledge, introduction to the school’s documentation and the educational requirements for the different classes, introductions to the students, developing experience in teaching.

C. Independent stage: setting specific goals and archiving them; establishing long term goals (qualifications, enriching experiences, experiments).

D. Creative stage – the teacher describes his/her own experience, documents his/hers publications, passing on their experience.

FUTURE GOALS OF THE ARCHIVE IN THE DEVELOPEMNTN OF THE SUCCESSFUL MATHEMATICS TEACHER

The archive begins with the initial gathering of documents and materials with different perspective: personal, biographic, professional, pedagogic, psychologic, historical, etc.

Then a process of further setting-up, re-organization, specifying and modifying the archive towards the specific characteristics of one’s individual practices is going on.

In this way, the archive begins as a deposit bank of ideas, questions and/or problems, solutions, practices and grows into a kind of a pattern and model that synthesizes all available components and variables of the professional and life experience concerned. Further on it develops into a specific “looking glass”, reflecting the whole process of the overall realization of the teacher and a “handbook” that can be useful to the process of training future professionals in the field.

I believe the following examples out of my archive may well turn out useful to bring about some more light and a kind of a better understanding of the necessity to turn it into a kind of a more widespread and helpful professional practice :

1. I look through the controlling and final examinations from the previous year, while attempting to structure such for the following year. I render the problems that had been used and the difficulties that they presented to the students.

2. I write down notes from my direct impressions of certain topics. Here I usually use such criteria as :: usefulness, failures, conclusions.

3. Gathering different solutions to one and the same problems is an important process, since it enables me to see and formulate things that are not only of a merely pedagogical but also of a much broader value of scientific methodics and methodology.

4. The archive can be interpreted as a draft in the preparation of different elaborations, official reports, scholarly essays and articles.

5. My personal archive consists of over 6 500 problems which are classified and named after the ideas that help solve them.

6. I expand the archive with a record of the topics that are discussed in the extracurriculum hours at school or in the preparation of students for Olympiads and University entrance exams.

These are some of the main points that make me quite convinced to think that the archive may well turn out to be a most valuable and useful means and helpful tool for the process of upbringing, formation and development of a successful mathematics teacher. In short, on the one hand, this helps the experience that has been gathered throughout the years of teaching be kept in the course of time, and, on the other – the archive helps the newly graduated teachers better plan, structure and realize their professional careers.

A future goal will be, of course, the development of the electronic archive of each teacher, which is also both realistic and urgent in view of the really dynamic development of the informational and communication technologies.

In conclusion, we have determined that several guidelines should be followed to ensure the value of the archive for educational purposes of newly graduated teachers. The teachers should try to personalize their archives so that the archives contain not only the educational certifications and employment records of the teachers or thank-you notes and addresses. This can be easily achieved by employing personal preferences in certain areas of Mathematics or, say, by expressing opinions to one or another mathematics magazine. In this way, the generations to come will be able to rely on the archives as a way of studying and following up the processes of personal and professional development of the nowadays teachers. Among other useful things, this may also help such a development that in the future the phenomenon of drastically incomplete archives, commonly seen today, will be hopefully extinct.

So, if an archive is to be set up and started, it has inevitably to be purposefully developed in a strict and consequently followed and applied accord with a number of fixed criteria, such as place and time of realization, thematic areas, personal and other interests and objectives and others of the kind if adequately required or needed.

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