Anthropology of student research activities

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\textbf{Abstract}. The purpose of the article is to identify problem areas of students' research activities and to show ways to improve this activity. An anthropological analysis of the professional training of students shows that an imitation of research activities prevails at present. The issues of tutoring and mentoring support not only of a particular student's research activities, but also of the entire process of his education are still relevant. The tutoring system has been adopted in Russia, but it still does not work fully: students lack basic training to conduct full-fledged research. The article analyzes the experience of basic training of outstanding scientists, a two-stage structure of immersion in knowledge.

\textbf{Keywords}: anthropology, research, activity, student, imitation, conformity to nature.

1. Introduction

Modern pedagogical work affects different aspects of the anthropology of students' research activities: the development of their productive thinking \cite{1-3}, the organization of research activities \cite{4-6}, continuity in the development of research competencies \cite{7-8}, the organization of project activities taking into account age characteristics of students \cite{9}, etc.

The anthropology of student research activity can be expressed in two meanings:

1) when a student is naturally curious and shows interest in everything around him, he asks questions, gives the impression of an erudite and knowledgeable person (even though he does not achieve a result) - the interlocutors may make an erroneous conclusion that he has highly developed research competencies (this is nothing more than an imitation of research activities);

2) when a student by nature is outwardly inactive, does not ask many questions, thinks a lot, thinks slowly, decides, does not have high communicative activity, does not give the impression of a person with research competencies, but at the same time he is the person who finds the desired result (this is a real research activity).

Unfortunately, at the university, just like in secondary school, there are more students with imitative research competence than with real competence.

2. Results and discussion

In 2018-2020, one question had been asked in the poll among teachers of natural sciences at Kazan University of Architecture and Engineering and Kazan Federal University (367 people answered): “how many students, in your opinion, have real research competencies”? It was found that:

- They attribute 71% of students to the first category, that is, to students who are dominated by imitation of research competencies (ostentatious erudition), which is necessary to overcome test, examination "obstacles";

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Graphical representation of the results of the survey.}
\end{figure}
- They classify 18% of students as an intermediate category: somewhere they have a real research search, and somewhere only an imitation of it;
- 11% of students belong to the second category - to the group capable of doing real effective research activities.

Similar surveys were conducted in 2019 and 2020. The results are presented in Table 1 (see Table 1)

**Table 1. Types of research competencies among students of natural science profiles (through the eyes of teachers) (in%)**

| Types of competencies | Imitative research competence | Real research competence | Intermediate (mixed) research competence |
|-----------------------|-------------------------------|--------------------------|------------------------------------------|
| 2018                  | 71                            | 18                       | 11                                       |
| 2019                  | 74                            | 13                       | 13                                       |
| 2020                  | 78                            | 10                       | 12                                       |

As you can see, within three years (2018-2020) there is an increase in imitative research competence (from 71% to 78%), a decrease in real (from 18% to 10%) and a relative equilibrium of mixed competence (11, 13, 12%).

This situation, of course, causes concern among teachers. However, in modern conditions of normative funding per capita, teachers are forced to close their eyes to this (if you expel imitators or unscrupulous students, there will be no load on the teachers themselves), they have to put up with the fact that real researchers are becoming fewer every year. On the other hand the number imitators, that is, students who are able to successfully overcome intermediate and final certification, but are not able to conduct a real research, continuously increase.

The students themselves are not always satisfied with their lack of full-fledged research abilities as well. Many of them are forced to earn extra money, skip certain classes, underestimate something, etc. As a result, many students develop a complex of misunderstanding of the new. Sometimes a teacher’s new lecture (with new knowledge, solutions, explanations) is not understood by anyone, and the teacher’s referral to digital resources that can help to figure it out on their own is also not always perceived as an incentive to action.

The anthropology of research competence defined as the ability to research is associated with two stages of learning:
1) immersion in the educational material or in the problem, and thus a thorough (fundamental) study of the problem and all aspects of its expression;
2) the birth of creative initiatives regarding its solution and the implementation of the research itself.

It is clear that the second stage is impossible without the first: creative activity on the subject is possible only with a good knowledge of the subject.

However, most methodologists, without delving into the specifics of immersion, immediately recommend the second stage, developing creative, game-like, project-like, individualized, and other technologies for students in both traditional and digital formats. They are offered to immediately engage in research (you can always download something on the Internet), participate in conferences, seminars, competitions, etc. As a result, erudite amateurs appear, which only harm real research.

The first stage, i.e. the immersion stage, is the most uninteresting for methodologists, while in fact, it requires special attention. In the past, this stage was overcome by cramming, hard academic work and was supported by a rigid authoritarian system of requirements from the teacher and the school. The alternative was an informal tutoring system. Therefore, modern methodologists focused on innovation (external effect) rarely propose any effective immersion scenario.

How, then, to ensure a real immersion in the educational material, in the problem under study?

After all, only a deep immersion in the educational material, the problem posed, can provoke the birth of creative initiatives and motivation for research. To create, invent and even think critically
without having a fundamental basic training is dangerous and malevolent both for the future specialist and for the development of science.

In the history of the development of science, there are many examples of immersion in theory, examples that do not fit into modern generally accepted standards of education.

**Thomas Alva Edison** (1847-1931), the American inventor of the phonograph, voice recorder, iron-nickel battery, carbon microphone, kinetoscope, etc., was very weak in childhood, could not go to school and was educated by his mother. At home he mastered educational material at the pace at which he could master it from nature. That is, his mother provided him with an individual immersion in knowledge. As an adult and receiving recognition, he said: "Genius is 1% inspiration and 99% sweating" and was grateful to his mother all his life.

Modern educational standards are more focused on inspiration (motivation and creative activity), and not on hard work ("sweating"), they do not take into account the specifics of immersion and creative activity.

**Albert Einstein** (1879-1955), Nobel Prize winner in physics, who predicted gravitational waves, quantum teleportation, lagged behind in development in childhood, began to speak only at the age of seven, his parents were afraid if he could go to school at all. Einstein was not the first student in the school and suffered from the flourishing cramming and authoritarian teachers there.

However, based on the facts of his biography, we can conclude that the immersion in knowledge, educational material, scientific problems, young Einstein went through the now rejected method, which is the method of cramming; and under the control of authoritarian, not humanistic teachers.

**Sergei Pavловich Korolev** (1907-1965), academician, a key figure in the study of space, the creator of the first ballistic missiles, at school he was a “C” in all subjects, managed to enter a higher educational institution, having been trained at home (with the help of his mother and stepfather, without attending school) and already at the age of 17 he defended the project of a non-powered aircraft (1921), later became the creator of the first manned spacecraft (1961).

From these facts it can be seen that young Korolev also did not get immersed in the educational material at school (he was a C grade student in it), but at home with his parents, who were able to provide him not formal (as in school), but real immersion, which allowed him not only enter a university, but also put forward and implement (in the future) interesting scientific ideas.

Of course, the fate of reputable scientists is always unique and diverse: some were immersed in a school (gymnasium) and received fundamental basic training there (such as DI Mendeleev, NI Lobachevsky, etc.). The facts of their biographies show that both in the gymnasium and in the family they had appropriate pedagogical conditions for immersion.

Other scientists (Thomas Alva Edison, Albert Einstein, Sergey Korolev, etc.) could not assimilate the program at the pace set by the school, and needed an individual (nature-friendly) trajectory of immersion in knowledge.

An example of a fast (and even outstripping) pace in both education and research is the American inventor Steve Jobs.

**Stephen Paul (Steve) Jobs** (1955-2011), American inventor, entrepreneur, industrial designer, pioneer of the information technology era. Jobs created and established the production of iPhone devices. Both at school and at the university, he grasped everything on the fly; he easily had mastering the program for two or three years in one year and after a while losing interest in the study.

It must be remembered that in pedagogical anthropology there is such a concept as conformity to nature [18]. All people are different: some naturally have an average rate of intellectual, mental, and other development, others have a slow pace, and still others have a fast one. The typical program of a school or university is designed for an average pace. Therefore, students with a slow pace may not keep up with the pace of a typical program, and students with a fast pace may get bored with a slow explanation.

All three types of students are absolutely normal people, but those who have a slow pace (such as Thomas Alva Edison, Albert Einstein, etc.) can, in the process of their school (and even university) development, fall into the category of unsuccessful or unpromising persons.
Stephen Paul (Steve) Jobs was the third type (students with a rapid development program): he learned everything quickly, and the typical educational program, oriented at an average pace, made him bored.

You can imagine how much we are losing potential scientists in the midst of poor and C students. In this group of students, for sure, there are those who simply have a slow pace of assimilation of education, they do not keep up with the typical program (they constantly misunderstand something and, of course, do not learn). And, many are simply unlucky with parents or teachers who do not see individuality in their pupil or cannot create conditions for the implementation of an individual development program.

At one time, Academician of the Russian Academy of Education Valentin Ivanovich Andreev, the author of numerous studies on pedagogy, admitted that he became a professor, an academician not because of education, but in spite of education, in spite of the requirements of education. Education prepared him for work and defense, and he dreamed of becoming a scientist and independently built the trajectory of his self-education, self-development and self-activity.

The facts of the biography of famous scientists indicate that if everyone immersed themselves in knowledge in different ways (depending on the individual nature-friendly program of each), then the research activity itself, which has a professional and productive meaning, no longer depended on the individual rate of immersion: this rate attracted attention only at the stage of personality formation.

Thus, immersion is the stage that provides fundamental (basic) preparation in the subject. It is impossible to understand the next topic without a well-learning of the previous one. Therefore, the missed (or not understood) topics has to be studied completely and only thus continue to move on.

3. Conclusion

Results of the conducted in 2018-2020 questionnaires show that not all students of natural science training areas have real research competencies. The majority of students (in 2018 - 71%, in 2019 - 74%, in 2020 - 78%) imitate research activities and are more busy with passing the intermediate and final certification.

Students need to pay attention to the first (most problematic) stage of learning, which is the immersion in the educational material and a thorough (fundamental) study of problems and all aspects of their expression. If this stage is skipped or not understood, independent returning to it and analyzing all the issues of a particular topic until it is fully understood is required.

The historical experience of the development of science in the past suggests that in the system of modern university education, the issues of tutoring and mentoring support not only of the student's research activities, but also of the entire process of his education are still relevant. The tutoring system is adopted in Russia, but it still does not work fully: in fact, students are supported by imitation of research activity, and not the activity itself. At student conferences, it is extremely rare to find papers that have real research meaning.

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