Transformation of Traditional Teaching Methods in the Context of Karl Popper's Conception of Education

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Abstract. This article explores the impact of Karl Popper's educational philosophy on traditional teaching practices. By analyzing the core principles of his theory, the author evaluates the strengths and weaknesses of conventional teaching methods in light of contemporary educational standards. Following this, the author proposes specific strategies for adapting traditional methods to align with Popper's ideals, such as using research projects method, project method and case-study. The author provides practical suggestions for implementing new approaches to teaching and organizing the educational process, drawing on Popper's ideas.

Keywords: *learning, education, pedagogy, critical rationalism, falsificationism, method of research projects.*

Introduction

Today, various transformations are taking place in the field of education, both at the local and global levels. This is because teaching methods are changing. We can see this in the emergence of new learning theories, such as connectivism, reconstructionism, existentialism, and critical rationalism. However, traditional teaching methods still play a significant role. This is mainly due to their historical significance. Many traditional methods have deep roots in education and have been used for decades or even centuries. As a result, they have created established learning practices and cultural norms that are difficult to change. Additionally, traditional methods are often more accessible and easier to implement than newer methods. Lectures can easily be organized for large groups, and textbooks provide structured information in a clear and concise manner. Moreover, some traditional methods have proven to be effective over time. For example, a lecture system can be effective for transferring basic knowledge, especially if the teacher has good communication skills. However, it should also be noted that some situations and learning objectives may be better suited to traditional methods. For instance, some technical skills may be better learned through practical exercises and demonstrations, rather than through innovative methods. Additionally, many educational systems still focus on traditional teaching methods due to their structure and organization, which may require significant efforts to change. Changing these methods could involve altering the culture and infrastructure of education, as well as the teaching methodologies themselves. The theory of critical rationalism, proposed by Karl Popper, indicates the necessity for transforming established, traditional educational practices. Falsificationism suggests that no teaching method should be permanent and should change with time, in order to ensure the best possible learning outcomes for students.In this article, we will explore how Karl Popper's ideas about education influence the transformation of traditional teaching methods.

Literature review

Karl Popper's scientific and philosophical ideas are presented in his works such as "The Logic of Scientific Discovery" [1], "Open Society and Its Enemies" [2; 3], and "The Poverty of Historism" [4]. These ideas have been analyzed by researchers such as P.M. Duerr, A.Chmielewski, M.Mao et al. For example, Duerr examines Popper's critical rationalism, conventionalism, and virtual epistemology [5]; Ch-

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mielewski analyses critical rationalism and the issue of truth in science [6]; and Mao et al. explore Popper's falsification theory in IS [7]. Among domestic researchers, R.Karimov and G.Ruzmatova examine Popper's philosophy within the context of historical and philosophical reflection [8]; R. Bekbaev analyses the application of Popper's ideas to education [9].

Methodology

This article uses various methods, such as analysis, synthesis, and comparison, to in-depth consider Karl Popper's ideas on education within the context of the problem being discussed. A comparative approach is also used to compare traditional teaching methods with Popper's concepts, in order to identify the fundamental aspects of his ideas. The author also turns to hermeneutics to gain a better understanding and interpretation of Popper's thoughts. To summarize the analysis and comparison, a generalization method is applied to extrapolate the findings and apply them to modern educational theories and practices. These methods are used to organize and structure the material, present arguments, and substantiate conclusions in a logical and coherent manner.

Results and discussion

Various innovative teaching methods have emerged in modern education. However, some traditional methods are still widely used, including:

1. *Lecture*, which is a method of transferring knowledge and information to students through oral presentations. Lectures are useful for conveying basic knowledge and concepts, as they allow large amounts of information to be presented in a uniform manner. They also allow the teacher to monitor the learning process and ensure that all students receive the same information. However, lectures can be monotonous and lack interaction, as they do not take into account individual student needs and limit student participation.

2. *Self-study* through reading textbooks and literature, which allows students to master the material at their own pace, develops self-learning and self-discipline, but requires good motivation from the students. This method is not always effective for all students, as it depends on their individual abilities and motivation.

3. *Discussion*, which involves a group of people discussing a particular topic, stimulates critical thinking and increases motivation. It also develops communication skills and allows discussing complex topics. However, discussion requires time and preparation, and there is a risk of unconstructive discussions, uneven participation, and limitations from a thematic point of view.

The assessment of students' knowledge and skills is mainly carried out through standard test papers and exams. This provide an objective assessment of their knowledge and skills and motivate students to study the material. They also help to structure the learning process, but they can also create stress for students and evaluate only certain aspects of their knowledge. This method does not always reflect a real understanding of the material and can be improved by using other methods. For the analysis of traditional assessment methods, it is important to highlight the main theoretical principles behind Karl Popper's concept of education. These principles were developed by the philosopher in his works not only on philosophy of science but also on social philosophy.

So, Karl Popper's concept of education is based on *falsificationism*, one of the central principles of his philosophy. This means that scientific theories can be refuted or proven wrongly. In education, students should study different points of view and hypotheses and look for ways to challenge them [1, 11]. This helps develop critical thinking and scientific methods. From this, we can see the importance of *openness and critical thinking* in Popper's philosophy. He emphasizes the need to question and analyze knowledge rather than simply accepting it. Popper urges students to be skeptical and to seek alternative solutions. This can be seen in his work "The Open Society and Its Enemies", a two-volume book that explores these ideas [2; 3]. Another important principle of Karl Popper's educational theory is the *development of self-criticism and self-reflection*. In education, this means that students should be able to analyze and evaluate their knowledge, skills, and beliefs. They should also be willing to correct and change their ideas based on new data and insights. From a socio-philosophical perspective, Popper *rejected authoritarian and dogmatic approaches to education*. He advocated for freedom of thought and openness to new ideas, as well as a willingness to engage in dialogue and exchange opinions [4, 45]. The root principle of Popper's learning theory is the understanding that *learning is a process of seeking truth*. For him, learning is not merely the transmission of pre-existing knowledge, but rather a journey of discovery and the development of scientific thinking. Students should actively engage in the learning process and not simply memorize facts. These theoretical principles of Karl Popper's approach to education form the foundation for developing educational programs that encourage critical thinking, an openness to new ideas, and a continuous pur-

suit of self-improvement and growth. This approach also underpins *critical rationalism*, a modern theory of learning.

From the standpoint of Karl Popper's principles of education, the methods mentioned above can be approached in the following way:

1. *Lectures* are effective means for transferring basic knowledge. However, they should stimulate critical thinking and discussion, rather than simply conveying information one-sidedly. Lecturers should encourage questions and debates, rather than acting as authorities. At the same time, lectures can serve as a starting point for further analysis and discussion, rather than a source of absolute truth.

2. *Self-study* is an essential component of learning. Reading textbooks and literature should encourage students to analyze, evaluate, and discuss what they have read, rather than accepting it at face value. Popper's approach emphasizes the importance of active engagement with the material, asking questions, expressing thoughts, and participating in discussions.

3. *Discussions* can stimulate critical thinking by allowing participants to express their opinions and argue their positions. They can also be used to analyze the arguments of others and identify errors and contradictions. Through discussion, ideas and beliefs can be exchanged, leading to a change in biased or incorrect viewpoints.

Standard tests and exams are useful for evaluating students' knowledge and skills according to Popper's perspective, but they should not be seen as the final confirmation of truth. Instead, it is important for students to understand that knowledge is constantly at risk of being refuted and changed. This approach implies that students should focus not only on memorizing facts, but also on analyzing them and checking their truthfulness.

However, when analyzing traditional teaching methods through the lens of Karl Popper's philosophy of education, we should not only focus on understanding these methods, correcting them, or revising them, but also consider proposing new methods that could contribute to a transformation of traditional learning. Popper, himself, was critical of traditionalism in education, emphasizing the importance of openness to new ideas and critical thinking. He saw traditionalism as a barrier to intellectual freedom and innovation in education. Traditional teaching methods, he argued, do not encourage critical thinking and limit students' exposure to outdated ideas and practices.Popper believed that education should focus on developing critical thinking skills, introspection, and the search for truth rather than simply memorizing facts. He argued that traditional education approaches often lead to a lack of intellectual independence and limit diversity of thought. Instead, he proposed an open and flexible approach to education that would encourage students to think for themselves and find new solutions. Popper supported the idea of education as a process of discovery, where students are encouraged to explore new ideas and challenge the status quo.

So, what new learning method can be proposed from the perspective of Karl Popper? Based on the basic principles of his concept of education, such as falsificationism, openness, and critical thinking, as well as the *development of self-criticism, self-reflection, and rejection of authoritarianism and dogmatism*, we can formulate *a teaching method that emphasizes research projects*. This method encourages students to actively participate in independent research on a specific problem or topic, guided by a teacher. Rather than simply receiving information from textbooks or lectures, students formulate their own questions, conduct research, analyze data, and draw conclusions. The main aspects of this approach are:

- student independence;
- active participation;
- development of critical thinking;
- openness to new and diverse ideas;
- interactive learning.

And although this method shares some similarities with the methods used in projects and case studies, it differs in its essence, level of student independence, and application methods. We have conducted a comparative analysis of these differences below (Table 1).

It can be seen that the method of research projects has several important aspects, and the central focus is on the development of scientific research skills. Science is the foundation of global development, and it is essential to develop these skills in students [10]. The method of research projects has a significant impact on students' moral development for several reasons:

1. It encourages *responsibility and independence*. In completing a research project, students are responsible for their work, which helps them develop a sense of responsibility for their actions and outcomes. This is an important aspect of moral development.

Table 1. Comparative analysis of the research project method, the project method and the case study

№	The name of the method	The essence of the method	Students' independence	The method of application
1.	The method of research projects	This method involves students choosing a research topic and developing a research plan independently. They actively engage in the collection, analysis, and interpretation of data, and formulate conclusions based on their findings.	Students have a high degree of independence, as they are able to determine the direction of their research and make decisions at each stage of the project.	This method is often used to explore a specific issue or subject in more detail and requires considerable effort on the part of both students and teachers.
2.	Project method	The project method involves students completing a specific task or project, based on the instructions provided by their teacher. This could include creating a presentation, conducting research, designing a product, or developing a new idea.	The level of independence in a project can vary depending on its specific goals and requirements. Some projects might offer more freedom for students to explore their ideas, while others might be more structured and require a more traditional approach.	The project method can be applied in various fields and for various purposes, such as teaching new materials or developing practical skills.
3.	Case-study	The case method is a teaching approach that involves the analysis of real or hypothetical situations (cases). Students work in groups to discuss and analyze these cases, developing strategies and making decisions. The goal is to understand the complexities of a given situation and develop effective solutions.	The level of independence in case study method may vary depending on the amount of freedom given to students in decision-making and strategy development.	The case method is often used in educational programs in management, business, and law to help students develop skills in analysis, critical thinking, and decision-making.

2. The method emphasizes *honesty and integrity*. Students must adhere to principles of honesty in research, including presenting data and results honestly and avoiding plagiarism and copyright infringement. This encourages honesty and integrity among students.

3. *Self-control and self-regulation* are essential skills that students develop through research projects. These skills involve organizing time, managing resources, and completing tasks. These activities contribute to the development of self-discipline and self-management, which are important aspects of moral and ethical behavior.

4. *Respecting different points of view* is another important aspect that students learn through research. During the research process, students may encounter diverse opinions and perspectives. They must learn to respect these differences and understand that there is no single "right" answer. This helps students develop tolerance and respect for diversity.

5. *Ethical thinking* is also an essential component of research. As students analyze data and research findings, they must make ethical decisions that consider the implications of their actions. This process helps students develop critical thinking skills and make informed moral choices.

Thus, the method of conducting research projects can have a positive impact on the development of certain moral qualities in students, such as responsibility, honesty, self-discipline, respect for others, and ethical thinking.

Conclusion

Karl Popper's concept of education challenges traditional teaching methods and encourages innovation and the adoption of new approaches in the educational process. His principles, when applied in teaching practice, transform traditional methods by stimulating critical thinking and self-improvement. They also help students overcome dogmatism and authoritarianism, and encourage innovation. This creates a more flexible and dynamic educational environment that can better meet the challenges of today's world. Our research project method is not just a teaching method; it is also a powerful tool for student development, both academically and personally. Its introduction into educational practice could lead to significant changes and stimulate deep

learning. The method of research projects goes beyond the traditional approach to education, where students are not simply recipients of information but actively participate in creating and analyzing it. This approach promotes the development of critical thinking, independence, and responsibility among students, which are essential for their successful adaptation in today's world. In addition to academic skills, the research project approach has a significant impact on the moral development of students. Values such as responsibility, honesty, respect for others, and ethical thinking become integral parts of the learning process. Implementing the research project method requires collaboration between teachers and educational administrators. It is essential to provide training and support for teachers, develop high-quality teaching materials, and establish appropriate infrastructure for successful implementation. In general, the research project approach is an innovative method that has the potential to revolutionize educational practice and bring new life to learning, making it more effective, interesting, and holistic.

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