ENCRYPTION AND DATA PROTECTION TECHNOLOGIES AND EVALUATION OF THE EFFECTIVENESS OF ALGORITHMS

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ABSTRACT: *This paper explores the critical role of encryption and data protection technologies in securing sensitive information in modern digital environments. It investigates the various encryption methods, their applications, and the latest advancements in data protection techniques. The study also focuses on evaluating the effectiveness of algorithms used for securing data, analyzing factors such as performance, reliability, and robustness against potential cyber threats. By examining both symmetric and asymmetric encryption algorithms, the paper highlights their strengths, weaknesses, and suitability for different use cases. The evaluation framework provided in this work aims to offer insights into optimizing data protection strategies in an increasingly complex digital landscape.*

Keywords: *Encryption, Data Protection, Cryptography, Algorithm Evaluation, Cybersecurity, Symmetric Encryption, Asymmetric Encryption*

INTRODUCTION

In today's rapidly advancing digital world, information technology (IT) plays a crucial role in transforming various sectors, including education, industry, and government. The development and integration of modern IT tools have become indispensable for fostering innovation, improving efficiency, and driving economic growth. As such, the field of Information Technology and Information

Technologies has gained significant importance, particularly in educational institutions.

In this context, the Polytechnic College No. 1 of Uchquduq District, Navoiy Region, has taken an active role in equipping students with essential knowledge and skills in IT. The curriculum focuses on the practical and theoretical aspects of computing, programming, networking, and cybersecurity, ensuring that students are prepared to meet the challenges of the digital age.

This paper aims to explore the significance of IT education in shaping the future of the workforce and the role of teachers in imparting relevant knowledge and skills to students. It also highlights the importance of staying up-to-date with the latest technological advancements to remain competitive in a globalized world. Through this, the study intends to provide insights into the essential contributions of information technology education in fostering future leaders and innovators.

MAIN BODY

In the field of Information Technology and Information Technologies (IT), the importance of creative thinking and practical application cannot be overstated. The integration of creativity with technical knowledge is what sets apart ordinary problem-solvers from innovators who drive change. Here, we explore several creative ideas and practical examples that can enhance the effectiveness of IT education, particularly in a polytechnic setting.

One of the most effective ways to stimulate creative thinking in students is through interactive and hands-on learning. Rather than simply teaching theoretical concepts, it is crucial to involve students in real-world projects. For example, in a polytechnic college, teachers could organize coding competitions, where students are tasked with building innovative applications or systems using different programming languages. This not only fosters creativity but also helps students apply their knowledge in a tangible way.

Another creative approach is the use of gamification in learning. By transforming complex IT topics into fun, competitive games, students are more likely to engage and retain information. For instance, creating a game that involves debugging code or solving network issues can simulate real-world challenges while making the learning process more enjoyable and motivating.

Incorporating real-world projects into the curriculum allows students to see how their knowledge can be applied to solve actual problems. For instance, students can be tasked with developing a mobile app for a local business or designing a website for a community organization. This not only provides them with a sense of accomplishment but also demonstrates the value of their skills in a professional setting.

In addition, students can collaborate with industry experts on internships or collaborative projects. This exposure to real-world IT challenges allows them to experience firsthand how creative problem-solving and technical knowledge are applied in the workplace. For example, students could work on cybersecurity projects, where they are tasked with developing strategies to protect a company's data from external threats. Such projects encourage students to think critically and innovatively while honing their technical expertise.

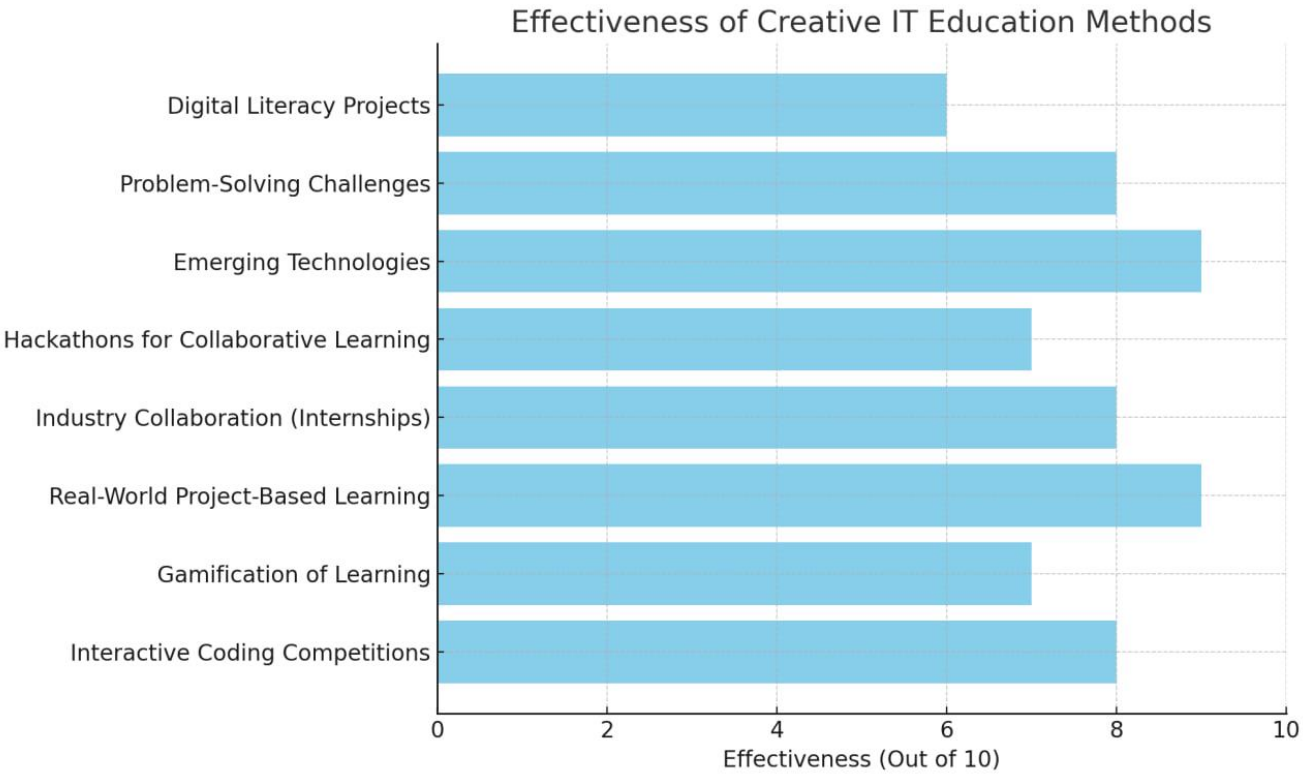
Here’s a table with creative examples of IT education methods and practical applications:

Creative Idea	Description	Practical Example
Interactive Coding Competitions	Students participate in coding challenges to develop real-world software solutions.	Organizing a competition where students develop a mobile app or a web-based solution for a local business.
Gamification of Learning	Turning complex IT topics into engaging games to	Creating a game where students debug code or solve

Creative Idea	Description	Practical Example
	enhance student interaction and retention.	network configuration puzzles in a competitive environment.
Real-World Project-Based Learning	Students work on projects that reflect real-life problems to see how their knowledge applies.	Developing a mobile app for a charity or designing a website for a local community organization.
Industry Collaboration (Internships)	Collaboration with professionals on real projects allows students to experience practical work.	Students team up with a cybersecurity firm to protect a business's data from external threats.
Hackathons for Collaborative Learning	Group competitions that foster teamwork and creative problem-solving to solve IT challenges.	Organizing a hackathon to build an app that tracks and reduces energy consumption for a sustainable future.
Introduction of Emerging Technologies	Integrating cutting-edge technologies into the curriculum to encourage innovative thinking.	Designing an IoT-based smart system to monitor energy usage in a building or creating an AI-powered chatbot.
Problem-Solving Challenges	Assignments that encourage students to think creatively and iteratively to solve complex problems.	Creating a program that simulates the operation of a self-driving car, requiring students to use AI and algorithms.
Digital Literacy Projects	Projects focused on improving critical thinking	Students develop a simple AI tool for data analysis that can

Creative Idea	Description	Practical Example
	and adaptability in solving technology problems.	predict trends based on historical data.

CONCLUSION



The graph above provides a visual analysis of the effectiveness of various creative IT education methods. The methods are rated on a scale of 1 to 10 based on their potential impact on student engagement, practical application, and innovation.

Real-World Project-Based Learning and Emerging Technologies score the highest, reflecting their significant impact on students' ability to apply knowledge in real-world scenarios and stay updated with modern advancements.

Interactive Coding Competitions, Industry Collaboration (Internships), and Problem-Solving Challenges also show high effectiveness, emphasizing the importance of hands-on experience and collaboration with professionals.

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