

# Investigating Students' Expectations and Preferences: E-Learning Tools vs. Traditional Teaching in Programming Instruction

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## Abstract

The research evaluates how Al-Baha University programming students perceive the W3Schools e-learning system compared to traditional classroom methodology. The study measures motivation patterns, problem-solving abilities, and learning style preferences to determine the effects of e-learning. By combining quantitative methodologies with qualitative analysis, the research seeks to understand how students perform in programming and their levels of determination in virtual learning environments, as well as their likelihood of continuing with e-learning. Online students appreciated W3Schools for its flexibility, easy interface, and clear tutorials but noted issues with internet connectivity. On the other hand, traditional learners disliked the formal lecture sessions, particularly their fast pace. E-learning proves beneficial for students due to adaptable schedules and personalized educational content; however, there is a need for further development of technical skills and socialization features.

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**Key words and phrases:** E-learning Platforms, Programming Expertise, W3Schools, Computer Programming.

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## 1 Introduction

E-learning platforms like W3Schools have revolutionized programming education with flexible, self-paced learning [1]. These platforms enable students to develop programming skills on their own schedule, overcoming the limitations of traditional classrooms [2]. By engaging with quizzes, hands-on projects, and interactive exercises, students learn more effectively and develop stronger programming competencies [3]. E-learning offers significant advantages, including adaptable timetables and self-paced learning, which are essential for developing programming skills through consistent practice [4]. However, students face challenges, such as a lack of immediate support and feelings of isolation, which can hinder their problem-solving abilities and progress [5]. Despite these obstacles, the flexibility and accessibility of e-learning platforms make them fundamental to modern education, providing varied resources like instructional videos, coding activities, and quizzes [6]. The research investigates student perspectives regarding W3Schools online learning compared to traditional classroom programming education especially regarding student motivation and problem-solving dynamics and preference choices. The assessment determines e-learning effectiveness and recommends possible improvements. The research contains literature examination together with methodology section and result findings and anticipated improvements.

## 2 Literature Review

E-learning platforms like W3Schools have become popular in programming education for their flexibility and self-paced learning. Research on these platforms highlights their positive outcomes but also points to technical challenges and the importance of fair assessment practices [7]. Programming education paced with game elements helps students become more motivated and achieve better results although its impact depends upon the programming language together with the student demographics [8]. Personalized learning systems, which adapt to students' specific needs, have been shown to increase engagement and improve learning outcomes, though challenges in data consistency across platforms remain [9]. Social media platforms like TikTok are also gaining attention for their potential in teaching programming, but their informal nature limits their effectiveness for more complex topics [10]. Despite the benefits of e-learning, many students continue to prefer traditional face-to-face teaching, especially for difficult programming con-

cepts. Research emphasizes that a combination of e-learning and traditional teaching methods is most effective in developing computational thinking and programming skills [11]. Students face two main issues with e-learning tools and difficulty accessing quality feedback which personalized instruction and game-like elements can solve . Additional research must improve tools along with personalization features to maximize student achievement outcomes.

### **3 Research Methods**

This research employed a mixed-methods design to assess the effectiveness of e-learning platforms, specifically W3Schools, in programming education, comparing it with traditional classroom instruction. The study focused on programming competence, motivation, and engagement. A total of 100 diploma-level IT students participated, divided into experimental and control groups. The experimental group used W3Schools for interactive coding lessons, while the control group followed traditional textbook-based lectures. Data were collected through pre- and post-tests, surveys, and open-ended responses, measuring programming skills and student perceptions. Quantitative analysis, including paired t-tests and regression analysis, evaluated academic progress, while qualitative analysis identified key student feedback on learning preferences. The six-week intervention showed that e-learning platforms increased student engagement and motivation, providing more flexibility and interactivity compared to traditional methods. This mixed-methods approach allowed for a comprehensive evaluation of the e-learning experience.

### **4 Results and Discussion**

The results of the study highlighted key differences between the experimental (e-learning) and non-experimental (traditional) groups regarding their experiences with learning programming. E-learning students demonstrated a significant increase in their motivation, with a pre-experiment mean of 4.26 rising to 4.36 post-experiment, whereas traditional students showed a smaller increase, from 3.14 to 3.93, with a p-value of 0.036. This suggests that e-learning platforms were more engaging, with students describing them as "easy to navigate," while traditional learners found the experience "boring" and too theoretical. E-learning students also reported more positive feedback on the use of educational websites [9], with pre-experiment scores of 4.02 rising to 4.07 post-experiment, compared to traditional students who

struggled with unclear resources [12]. Furthermore, e-learning students appreciated the self-paced nature of the course, with a post-experiment mean of 4.29, while traditional students felt the pace was "too fast," reflecting a preference for flexibility in e-learning.

Despite the benefits, both groups faced challenges. E-learning students experienced issues with "slow websites" and "balancing assignments," while traditional students struggled with "difficulty understanding" the material. The  $p$ -value of 0.009 indicated these differences, showing that while e-learning offered flexibility, traditional students had more difficulty grasping the content due to the lack of hands-on experiences. Suggestions for improvement varied, with e-learning students requesting "forums" for peer discussions, while traditional students wanted more "coding exercises" to make the learning process more practical. The findings support the notion that e-learning platforms, such as W3Schools, foster greater engagement and motivation, though both groups expressed a desire for more interactive, hands-on learning experiences [13], [14], [15], [16].

## 5 Conclusion

We studied diploma students' preferences between W3Schools e- Learning and conventional programming education by analyzing motivational factors, problem-solving approaches, and learning techniques. Student surveys indicate that e-learning supports both increased motivation and improved programming abilities, while students appreciate its program flexibility as well as its interactive nature. The study recommends additional research focusing on combining e-learning technology with conventional teaching approaches and testing platforms such as Codecademy, Coursera, and edX. Improving e-learning solutions requires student interaction and personalized educational features to achieve better student participation and successful results.

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