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# INNOVATIVE STRATEGIES FOR TEACHING VOCATIONAL, SCIENCE, TECHNOLOGY AND MATHEMATICS EDUCATION: CLASSROOM PRACTICES



PROF. JOSEPHINE N. OKOLI

**INNOVATIVE STRATEGIES FOR TEACHING  
VOCATIONAL, SCIENCE, TECHNOLOGY AND  
MATHEMATICS EDUCATION: CLASSROOM  
PRACTICES**

**EDITOR  
PROF. JOSEPHINE N. OKOLI**

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## **PREFACE**

The electronic book (e-book) acknowledges that traditional methods in Vocational, Science, Technology and Mathematics Education: Classroom Practices may not be sufficient to equip students with the necessary skills for a rapidly evolving technological landscape.

Therefore, it advocates for the adoption of Innovative teaching approaches that promote a more dynamic and effective learning experience.

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## FOREWORD

This book entitled “**Innovative Strategies for Teaching Vocational, Science, Technology and Mathematics Education: Classroom Practices**”, is a book of readings on various innovative classroom pedagogies. It is a welcome literature for Education System and a very important resource book for teachers who are functioning in the disciplines of Vocational Education, Science, Mathematics and Technology education and training. It is a compendium of most of the **active learning strategies** aimed at producing graduates who have been prepared for adaptation to the conditions of the 21<sup>st</sup> century world of fluidity. The 21<sup>st</sup> century world accommodates soft skills which the individual can edit from time to time as the conditions of socio-cultural, economic and technological environments change constantly and uncontrollably. A century in which cross-border job openings are important means of employment, a century where attitude is more important than subject-based excellence, a century where collaboration, innovation and creativity are irreducible demands by employers of labour, a century where adaptive skills are critical for entrepreneurship, creation of jobs and wealth.

All categories of teachers at all levels of education would find this resource book interesting and professionally helpful for their teaching practice. Because conditions of the modern world are in perpetual flux, teachers have to re-skill in order to produce adaptive graduates and the era of lecture method is literally over. It is these modern innovative instructional strategies that would enable teachers to produce such graduates who would survive and then succeed in the 21<sup>st</sup> century global economy.

This book would also be very useful to researchers and innovators in the envisioned pedagogic paradigm shift of this era. I therefore, proudly recommend this book, a compendium on innovative pedagogies to all classes of teachers and researchers on pedagogies and curriculum reforms in the modern era.

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## **DEDICATION**

This book is dedicated to educators in the world

## CHAPTER 23

# E-LEARNING PLATFORMS FOR CONTINUOUS PROFESSIONAL DEVELOPMENT

**Chikendu Rebecca Ebonam  
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### Abstract

In today's rapidly changing world, the demand for professionals to stay ahead of industry trends, master emerging technologies, and continuously refine their skills has never been greater. The key to maintaining relevance in an ever-evolving job market lies in continuous professional development (CPD). To stay competitive, professionals must adapt to new technologies, industry practices, and market demands. CPD is the lifelong process of learning, acquiring new competencies, and adapting to the evolving demands of one's profession. While traditional methods of professional development, such as workshops, seminars, and conferences, have been valuable, the rise of e-learning platforms has transformed how individuals engage in CPD.

This article explores the role of e-learning platforms in CPD, examining their features, benefits, and challenges, while also highlighting the most popular platforms available today. It provides insights into how these platforms are reshaping professional development and contributing to the overall success of individuals and organizations.

**Keywords:** E-learning Platforms, Continuous Professional Development

### Introduction

Electronic learning, or e-learning, involves using digital devices such as computers, tablets, and smartphones to offer instructional content. This contemporary kind of distance learning enables students to access various materials at any time and from any location. It can be used in various contexts, including corporate training, continuing professional development, academic education, and skill development programs.

The significance of information and communication technology in its derivation must be considered while discussing e-learning. The English word "e-learning" is a combination of the words "e" for "electronic" and "learning" for "learning." The phrase was originally used during a meeting on online education hosted by the European Commission in the late 1990s (Tech, 2023). Since then, it has been used extensively to refer to any kind of education that makes use of electronic technology to help teachers and students communicate and learn.

E-learning platforms are technologically enabled online systems that establish virtual classrooms for instruction and cooperation. They are comprehensive collections of interactive online services that offer instructors, students, and other educators' tools, resources, and information to assist and improve the administration and delivery of education. It is a virtual classroom that uses communication and information technology to make learning and teaching easier. It includes several tools that let users connect, interact, and work together online. Discussion boards, live chat, video conferencing, online tests, interactive learning resources, and online assessments are a few examples of these tools (Tech, 2023).

When it comes to continuous professional development, Albert Einstein's statement that "education is not the learning of facts, but the training of the mind to think" is unquestionably accurate. Proficiency and efficiency in your skill set will be made possible by making sure that your abilities and skills are developed and expanded upon outside of the classroom (FutureLearn, 2021). The term "continuous professional development," or CPD for short, refers to the additional learning that professionals do. Generally speaking, CPD aids in enhancing and augmenting their professional skills. Nevertheless, it involves much more than just education. CPD transforms

learning from passive and reactive to proactive and conscious, enhancing individual skills for use in the workplace. Furthermore, there are other approaches used, including conferences, seminars, and online courses or e-learning methods (FutureLearn, 2021)

### **Statement of the Problem**

In traditional continuing education formats, some people do not have access, nor the tools, to continue to learn. Existing CPD approaches (seminars and workshops) may not necessarily be adequate or flexible to accommodate the professional learning of the present era. Professionals are under pressure to stay ahead of ever-changing industrial trends and technology. Thus, an electronic learning platform was developed and utilized to offer learners' different ways to learn, acquire information, collaborate with other learners and build themselves individually for professional development. Hence the need for the present study.

### **Objectives of the Study**

The primary objective of studying e-learning platforms for continuous professional development (CPD) is;

1. To examine the value and importance of e-learning systems in lifelong learning.
2. To find out and compare the features and qualities of specified e-learning platforms for CPD.
3. To determine challenges that professionals experience when implementing e-learning for professional development.
4. To offer suggestions for people and organizations to make effective use of e-learning for lifelong learning.

### **Current Trends in E-Learning**

Today, e-learning platforms have become integral to professional development, particularly in corporate environments. The key trends shaping e-learning include:

1. **Microlearning:** Short, focused learning modules designed to be consumed in brief periods, making it easier for busy professionals to learn.
2. **Mobile Learning:** With the proliferation of smartphones, mobile learning allows learners to access courses on the go, anytime, anywhere.
3. **Social Learning:** Platforms are increasingly integrating social elements like discussion forums, peer reviews, and collaborative projects to encourage learning through interaction.
4. **Data Analytics:** E-learning platforms now collect and analyze learner data to provide insights into progress, engagement, and areas needing improvement.

### **How E-Learning Enables CPD (The Role of E-Learning Platforms in Professional Development)**

- **Accessibility:** E-learning, often known as educational technology, has improved education in various ways. Because of increased technology in education that has transcended conventional geographic and infrastructure barriers, access to learning resources is now possible from anywhere at any time. Course materials and instructional content are available on computers, tablets, and mobile devices with internet connectivity, so students are no longer restricted to the traditional classroom setting. Online education Online learning techniques are growing increasingly viable and well-liked thanks to technology (Husnita, Rahayuni, Fusfitasari, Siswanto & Rintaningrum; 2023).
- **Flexibility:** E-learning, as opposed to traditional classroom-based training, enables users to learn at their own speed and schedule study sessions around their personal and professional obligations. A more flexible learning process is another benefit of online education, Learner-related elements. These are the aspects of flexibility in online learning that are most frequently discussed, such as schedule, location, learning materials, communication, and learning speed. There is no requirement for a specific place or time limit because students can finish their work whenever and wherever it is most convenient

for them. This adaptability guarantees and sustains a balance between education and life(Che Soh, Kamarunzaman, Md Nen, Yaacob, & Rahmat, 2024). Study-life balance, according to Hendriks (2020), is the allocation of a student's time and attention between their studies and other pursuits, including leisure and extracurricular activities, as well as how their personal and academic lives (whether favorably or negatively) impact or obstruct one another.

- **Cost-Effectiveness:** By lowering the expenses of travel, venue rents, and printed materials, e-learning makes professional development more accessible. The majority of schools and institutions across the world have been using traditional lecture techniques. Additionally, they are currently regarded as the most widely utilized techniques used by educational institutions, including group discussions, scientific excursions, role-playing, lectures, question-and-answer sessions, dramatic training, memorization and repetition, and laboratory-based instruction. However majority of research demonstrated that virtual education, either by itself or in conjunction with traditional education (blended model), was just as cost-effective as or more so than traditional education (Pakdaman, Nazari Moghadam, Dehghan, Dehghani, & Namayandeh; 2021).
- **Diverse Offerings:** E-learning platforms include a wide range of topics, guaranteeing applicability across industries and career phases, from technical certifications to the development of soft skills. Online learning platforms that support the development of soft skills, as well as topic expertise, have become effective resources for learning new skills, upskilling, and reskilling. By providing accessibility, flexibility, and a wide range of courses, these platforms enable people to take charge of their career development. Online learning platforms offer the tools to help people reach their objectives, whether they want to improve their technical skills, cultivate strong leadership traits, or investigate new career options (Marketing, 2024).

## Key Features of Effective E-Learning Platforms

Effective e-learning platforms are designed with several key features that make learning engaging, accessible, and valuable for professionals seeking CPD. These features include:

1. **User Experience (UX) and Interface Design:** An intuitive and user-friendly interface is critical for e-learning platforms. Professionals typically have busy schedules, so platforms need to be easy to navigate and efficient. The user experience must facilitate smooth access to learning materials, whether it's through an organized course dashboard or an easy-to-use mobile app. A well-designed UX reduces the cognitive load and makes it easier for learners to focus on the content itself.
2. **Customization and Personalization:** A one-size-fits-all approach does not work in professional development. E-learning platforms that offer personalized learning experiences are more effective in engaging learners. Customization can take several forms, such as providing different learning pathways based on the learner's profession, offering varying levels of difficulty, or allowing learners to choose specific skills or topics they want to focus on.
3. **Content Variety and Delivery Methods:** Different professionals learn in different ways, so a diverse range of content formats is essential. The best e-learning platforms incorporate various media types, such as text-based lectures, videos, infographics, interactive quizzes, and simulations. This variety caters to different learning preferences, whether auditory, visual, or kinesthetic.
4. **Assessment and Progress Tracking:** Effective CPD is not just about consuming content but also about applying it and demonstrating progress. E-learning platforms typically feature regular assessments, such as quizzes, assignments, and exams, to measure learners' understanding of the material. Additionally, learners should be able to track their progress, identify areas of strength and weakness, and receive feedback to improve their knowledge and skills.

5. **Collaboration and Networking Opportunities:** A key element of professional development is networking with peers and mentors. Many modern e-learning platforms integrate social features like discussion forums, group projects, and virtual study groups to foster collaboration. Learners can discuss ideas, share experiences, and learn from each other, enriching the educational experience and helping them develop a sense of community.
6. **Mobile and Offline Access:** The flexibility offered by mobile learning is essential for professionals who are always on the move. Many e-learning platforms have mobile apps that allow users to access content at any time and from any location. Furthermore, some platforms allow learners to download content for offline access, ensuring uninterrupted learning in areas with poor connectivity.

### **Notable E-Learning Platforms for CPD**

#### **1. LinkedIn Learning**

**Overview:** Formerly known as Lynda.com, LinkedIn Learning offers thousands of courses on topics ranging from leadership and marketing to software development and design.

#### **Key Features**

- Integration with LinkedIn profiles for showcasing certifications
- Bite-sized videos for microlearning
- Customizable learning paths for specific career goals

**Target Audience:** Professionals seeking to enhance their skills or explore new career avenues.

#### **Pros**

- ix. Detailed instructions for the most widely used applications;
- x. More than 17,000 courses accessible
- xi. Your LinkedIn profile can be easily updated with new certifications.

#### **Cons**

- To access learning, a LinkedIn profile is required (Trovato, 2024).

#### **2. Coursera**

**Overview:** Partnering with top universities and institutions, Coursera provides access to courses, specializations, and degree programs. It is among the biggest platforms for online learning available today. The platform makes education more accessible for anyone who wishes to learn online and seek professional certificates and degrees by providing over 5,000 courses from top institutions and businesses. By offering faculty tools for student evaluation, Coursera, an online learning platform, has also assisted more than 3,600 schools and universities in making the transition to online education. The course offerings cover a broad range of subjects, such as data science, computer science, business, and health (Bouchrika, 2024).

#### **Key Features**

- Industry-recognized certifications
- Flexible deadlines
- Access to world-class instructors

#### **Pros**

- There are almost 1,500 free courses
- Available courses in a range of areas, including computer science and the arts
- Official certificates recognized by many employers

#### **Cons**

- Free courses don't come with a certificate
- Some courses have time limits (Trovato, 2024)

#### **3. edX**

**Overview:** A nonprofit platform founded by MIT and Harvard, edX offers free and paid courses across diverse disciplines. It provides a wide range of courses for executive education, bachelor's degrees, and master's degrees through its online learning platform and course marketplace. The platform, created by a group of academics from MIT and Harvard, offers a cognitive science-based educational experience. Therefore, experience, practice, and application are the three key tenets of edX's distinctive methodology (Bouchrika, 2024).

### **Key Features**

- Verified certificates for career advancement
- MicroMasters programs for in-depth study
- Strong focus on STEM fields

**Target Audience:** Lifelong learners and professionals in technical fields.

### **Pros**

- A vast collection of excellent courses
- The opportunity to obtain a bachelor's or master's degree
- Collaborate with Ivy League universities

### **Cons**

- Fewer courses in artistic domains (Trovato, 2024)

## **4. Udemy**

**Overview:** Udemy is a marketplace for online learning, featuring courses created by individual instructors worldwide. It is committed to democratizing and upending online learning platforms by making its pool of over 20,000 subject matter experts available to everyone. Udemy has achieved a great deal of success in its goal. Numerous content development tools, including PowerPoint and PDF documents, are available on this e-learning platform. Courses can be created and published by combining text and video content. Instructors can utilize this online training platform for free. But Udemy earns a lot of money by keeping 50% of each course sale. There are almost 12 million students on Udemy (Duong, 2024).

### **Key Features**

- Affordable pricing and frequent discounts
- Wide variety of topics, including niche interests
- Lifetime access to purchased courses

**Target Audience:** Professionals seeking affordable, on-demand learning options.

### **Pros**

1. The greatest variety of courses
2. A 30-day money-back guarantee
4. No deadlines; no subscription

### **Cons**

1. No credit toward higher education
2. Some courses may be of poor quality (Trovato, 2024).

## **5. Skillshare**

**Overview:** Focused on creative and entrepreneurial skills, Skillshare offers classes in design, writing, photography, and more. The highest-paid instructors on Skillshare earn up to \$40000 a year. The class project and the video are two essential elements of nearly every course lesson. Usually lasting between 10 and 25 minutes, courses consist of a sequence of brief movies. Through Skillshare's Partner Program, you can earn money. Naturally, some requirements must be met, such as enrolling a minimum of 25 students in each class. The subscription structure of Skillshare differs from Udemy's. While Skillshare offers subscriptions to all of its content, Udemy only offers subscriptions to certain courses (Duong, 2024)

## Key Features

- Project-based learning
- Community-driven approach
- Free trial periods for new users

**Target Audience:** Creative professionals and hobbyists.

## Pros

1. Over 35,000 courses are offered
2. A smartphone application for studying while on the run
3. Gaining knowledge from "real" individuals as opposed to institutions

## Cons

1. Less in-depth instruction is frequently provided
2. Instructors might lack professional training (Trovato, 2024).

## Challenges in Using E-Learning Platforms for CPD

1. **Digital divide:** A digital divide is an economic and social inequality regarding access to, use of, or impact of information and communication technologies. However, economic or other resource gaps, as well as differences in the cultural tastes and preferences of different social classes, are factors contributing to disparities in internet use. To some extent, the digital divide reflects structural factors in advanced societies that give rise to social inequalities in general (Wilmon Brown, 2020). Limited access to high-speed internet and devices in some regions restricts e-learning opportunities.
2. **Lack of Interaction:** One of the most crucial elements of an online learning community is social interaction. Social interaction refers to the interaction between students and teachers. Achieving a positive student learning outcome requires interaction, which is at the core of the learning process. Interaction promotes knowledge development and the empowerment of students and offers a platform for members of a community to share their opinions and passions (Azmat & Ahmad, 2022). Limited face-to-face interaction may reduce opportunities for networking and mentorship.
3. **Quality Assurance:** Variability in course quality and content credibility can lead to inconsistent learning experiences and outcomes. Without rigorous QA processes, professionals may encounter outdated, irrelevant, or incorrect information, undermining the platform's effectiveness. Ensuring standardized, credible, and up-to-date content is vital to support meaningful professional growth. (Holcomb & Greer, 2020). Lack of oversight can lead to duplication, conflicting information, or gaps in critical knowledge areas. Another challenge is aligning courses with industry standards and accreditation requirements, which is essential for CPD validity (Lal, Ranjan, Singh & Ratna; 2024).
4. **Self-Discipline:** Maintaining motivation in an online course is another drawback that online learners encounter. Compared to their peers, students who lacked independence and self-discipline had lower success rates. Students who struggle with self-control often don't give themselves enough time to do homework, which leads to late or subpar work (Rawashdeh, 2021).
5. **Technological Challenges:** Technological challenges are a significant concern in using e-learning platforms for Continuing Professional Development (CPD). Platform downtime, slow loading speeds, or technical glitches can frustrate users and interrupt learning continuity. Software incompatibility, such as difficulties accessing content on specific devices or operating systems, further complicates participation and limits accessibility. These issues not only hinder learning progress but can also demotivate professionals who rely on seamless access to their courses. To mitigate these challenges, platforms must prioritize system reliability, regular updates, and cross-platform compatibility. Robust customer support and user-friendly interfaces are also essential for minimizing disruptions and ensuring a smooth learning experience.

## Strategies for Effective CPD through E-Learning

To maximize the benefits of e-learning for CPD, professionals and organizations should consider the following strategies:

1. **Define Clear Objectives:** For Continuing Professional Development (CPD) to be effective, it is necessary to establish clear objectives. These objectives help to streamline learning efforts by ensuring that time and resources are concentrated on areas that have the greatest impact (Campbell et al., 2010). CPD entails identifying specific skills, competencies, and knowledge areas that align with both organizational needs and individual professional goals.
2. **Choose the Right Platform:** A crucial first step in guaranteeing effective continuing professional development (CPD) is selecting the appropriate platform. The platform must be in line with the learner's career objectives, industry norms, and certification specifications. A good CPD platform provides a wide selection of excellent, pertinent courses that are suited to particular knowledge and skill development (CPDE Editorial Team, 2024). Key factors to consider include content credibility, ease of use, compatibility with various devices, and integration with certification or licensing systems. Additionally, platforms with interactive features, such as live webinars, discussion forums, and progress tracking, provide a more engaging learning experience (Kaban, 2022). Selecting the right platform ensures efficient use of time and resources while maximizing professional growth.
3. **Leverage Peer Learning:** Peer-to-peer learning is an effective teaching strategy that uses students' combined knowledge and experience to improve learning results. Peer-to-peer learning helps students succeed in school, the workplace, and life by encouraging active participation, fostering varied viewpoints, enhancing communication skills, encouraging peer support, and cultivating higher-order thinking abilities (Sappital, 2024). Collaborative projects encourage teamwork, problem-solving, and critical thinking, while forums provide opportunities for networking and mentorship. Peer feedback can also help identify areas for improvement and refine skills.
4. **Set a Schedule:** For Continuing Professional Development (CPD) to remain consistent, a schedule is necessary. Setting aside specific time for education guarantees that, even in the face of demanding work and personal obligations, professional development will always come first. People can stay on track with their development goals by avoiding procrastination with the aid of a well-organized plan.
5. **Seek Accreditation:** When choosing courses for Continuing Professional Development (CPD), obtaining accreditation is an essential first step. Recognized certifications from accredited courses attest to the acquired knowledge and abilities, giving a professional's credentials more legitimacy. These certificates can improve employment opportunities by showcasing a dedication to excellence and lifelong learning, and they are frequently in line with industry norms.  
It's crucial to confirm that the provider of CPD courses has been approved by respectable, industry-relevant accrediting organizations. Accredited programs assist in meeting licensing or regulatory requirements in addition to guaranteeing the quality of the content. The value and impact of the CPD initiative are maximized with this strategy.
6. **Monitor Progress:** Use analytics and feedback to assess learning outcomes and make necessary adjustments.

## Suggestions for Improvement

1. **Boosting awareness campaigns to highlight the importance and accessibility of e-learning platforms for continuing professional development (CPD) across various industries.**
2. **Adding more interactive and adaptive features to e-learning platforms to enhance user engagement and make the experience more personalized.**
3. **The government should partner with public institutions to subsidize internet access and devices for professionals in underserved regions.**
4. **Offering blended learning options that mix the flexibility of e-learning with the networking benefits of traditional CPD.**
5. **Providing institutional support and incentives, like certification credits and recognition, for professionals who pursue CPD through e-learning.**
6. **Regular evaluation and updating of e-learning content to keep it relevant, accurate, and in line with industry standards.**

## Conclusion

E-learning platforms have become indispensable for Continuous Professional Development, empowering professionals to stay competitive and competent in a rapidly changing world. The platforms have transformed the landscape of continuous professional development, making it more accessible, engaging, and effective. By providing accessible, flexible, and innovative learning solutions, these platforms bridge the gap between evolving industry demands and professional capabilities. By leveraging these platforms, professionals can stay competitive in an ever-changing world, while organizations can build a skilled and adaptable workforce. As technology continues to advance, the potential for e-learning in CPD will expand, offering new ways to enhance knowledge, skills, and career prospects. By embracing these platforms, professionals and organizations can unlock a future of limitless growth and achievement.

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