

# Postgraduate Certificate New Digital Revolution in Railway Systems and Railroads





## Postgraduate Certificate New Digital Revolution in Railway Systems and Railroads

- » Modality: **online**
- » Duration: **6 weeks**
- » Certificate: **TECH Global University**
- » Credits: **6 ECTS**
- » Schedule: **at your own pace**
- » Exams: **online**

Website: [www.techtute.com/us/engineering/postgraduate-certificate/new-digital-revolution-railway-systems-railroads](http://www.techtute.com/us/engineering/postgraduate-certificate/new-digital-revolution-railway-systems-railroads)

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# 01

# Introduction

Digital transformation can be approached from different perspectives, from an industrial point of view it seeks to maximize the time of an operation, i.e. reduce the number of stops and the duration at stations, which can improve service and user experience. In this sense, the program addresses how this process has evolved and how it is important for engineers to continue with this line of research from a strategic point of view, since these new strategies allow endless improvements to the system.





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*Learn the latest advances in the digital transformation of railway systems directly from a group of highly-qualified experts”*

Changes in the sector are causing the different companies and organizations that make up the industry to demand these new technical requirements from their professionals. This includes knowing all the improvements that the digital transformation process has meant for the railway sector. The development of these new tools today makes it possible to know the behavior of the entire railway system in real time, as well as the speeds at which trains move. This also represents a benefit, considering the ease with which we can obtain large amounts of data that can determine the behavior of the trains and then analyze them and perform a descriptive analysis.

In line with the above, this Postgraduate Certificate in New Digital Revolution in Railway Systems and Railroads addresses the digital transformation that the sector is undergoing and how it has happened in other industrial sectors. Traditionally, railroads have been digital in the field of control, command and signaling and rolling stock, but not in other areas, such as energy, infrastructure, freight, etc., which are now the targets of this new transformation. This program analyzes all these new transformations and topics of great strategic interest in the current moment.

The experience of the teaching staff in the field of railroads, in different areas and approaches such as administration, industry and the engineering company, has made it possible to develop this practical and complete content oriented to the new challenges and needs of the sector. Unlike other programs in the market, the approach is international and not only oriented to one type of country and/or system.

A 100% online program that provides the student with the ease of being able to study it comfortably, wherever and whenever they want. All you need is a device with internet access to take your career one step further. A modality according to the current times with all the guarantees to position the engineer in a highly demanded sector.

This **Postgraduate Certificate in New Digital Revolution in Railway Systems and Railroads** contains the most complete and up-to-date educational program on the market. The most important features of the program include:

- ◆ Improve professional skills in the field of railroad systems
- ◆ Update and focus the student's company's strategies in these terms
- ◆ Demand new requirements in the technology acquisition processes
- ◆ Add value to the technical projects to be developed by student's companies and organizations
- ◆ The graphic, schematic, and eminently practical contents with which they are created, provide scientific and practical information on the disciplines that are essential for professional practice
- ◆ Practical exercises where the self-assessment process can be carried out to improve learning
- ◆ Special emphasis on innovative methodologies
- ◆ Theoretical lessons, questions to the expert, debate forums on controversial topics, and individual reflection assignments
- ◆ Access to content from any fixed or portable device with an Internet connection



*Boost your career with a complete program adapted to the international needs of the Railway Systems”*

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*It has the advantage of being able to access the content of this Postgraduate Certificate from anywhere in the world thanks to its online format"*

*Reflect on the technological and digital evolution in such an important sector as railroads.*

*New technologies applied to Rail Systems will be analyzed through practical case studies.*

The program's teaching staff includes professionals from sector who contribute their work experience to this training program, as well as renowned specialists from leading societies and prestigious universities.

The multimedia content, developed with the latest educational technology, will provide professionals with situated and contextual learning, i.e., a simulated environment that will provide immersive training, designed for training oneself in real situations.

This program is designed around Problem Based Learning, whereby the professional must try to solve the different professional practice situations that arise during the academic program. For this purpose, the professional will be assisted by an innovative interactive video system created by renowned and experienced experts.



# 02

# Objectives

The Railroad System is one of the most in-demand in the engineering field. Specializing in this area means enhancing your work profile in any part of the world. For this reason, and taking into account all the key aspects that professionals need to advance in their careers, the main aspects of the new digital revolutions in railway systems and railroads have been identified, with special emphasis on those that translate into an improvement for the system. As a result, students will develop their skills while aiming to achieve this eminently technological objective, gaining up-to-date knowledge of current trends in railroad systems. In view of the above, TECH establishes the following general and specific objectives to guarantee the satisfaction of the future graduate.





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*Expand your area of expertise, completing the objectives of this Postgraduate Certificate in which you will address the main trends in digital transformation”*



## General Objectives

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- ◆ Gain in-depth knowledge of the different technical concepts of the railroad in its different fields
- ◆ Know the technological advances that the railroad sector is experiencing mainly due to the new digital revolution, but without forgetting the traditional approaches on which this mode of transport is based
- ◆ Understand the changes in the industry that have triggered the demand for new technical requirements
- ◆ Implement strategies based on the technological changes that have arisen in the sector
- ◆ Gain up-to-date knowledge in all aspects and trends of railroads





## Specific Objectives

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- ◆ Reflect on the technological evolution of the railroad, including the new digital revolution it is currently undergoing
- ◆ Analyze the different digital technologies applicable to the railroad sector, specifically detailing the most strategic ones
- ◆ Master the application of new digital technologies in different areas of the railroad, identifying the associated improvements: traction energy, passenger stations, railroad logistics, maintenance and traffic management
- ◆ Reflect on the importance of cybersecurity in the railroad sector
- ◆ Analyze digitization programs and strategies in different world railroads

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*Learn the new railroad technologies and apply them in your professional work, increasing your value as a qualified engineer in the digital revolution”*

# 03

# Course Management

In our commitment to offer education for all, TECH works with renowned professionals in order for the student to acquire solid knowledge in this Postgraduate Certificate in New Digital Revolution in Railway Systems and Railroads. For this reason, we have the support of a highly qualified team with extensive experience in the sector, which will offer the best tools to help students to develop their skills during the program. In this way, students have the guarantees they need to specialize at an international level in a booming sector that will catapult them to professional success.





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*Acquire the knowledge you need to specialize in a sector that is growing significantly due to the expansion of new technologies and the digital revolution”*

## Management



### Mr. Martínez Acevedo, José Conrado

- ♦ Experience in the public railroad sector, occupying various positions in construction, operation and technological development of the Spanish high-speed and conventional railroad networks
- ♦ Head of Research, Development and Innovation projects at Administrador de Infraestructuras Ferroviarias (Adif), a state-owned company attached to the Spanish Ministry of Transport, Mobility and Urban Agenda (MITMA)
- ♦ Coordinator of more than 90 technology projects and initiatives in all areas of the railroad
- ♦ Industrial Engineer and Master's Degree in Specialization in Railroad Technologies and in Construction and Maintenance of Railroad Infrastructures
- ♦ Professor in the Master's Degree courses on railroads at the Pontificia de Comillas University (ICAI) and the University of Cantabria
- ♦ Member of the IEEE (Institute of Electrical and Electronics Engineers) and member of the Editorial Committee of Electrification Magazine at the same institution (magazine specialized in transportation electrification)
- ♦ Member of the AENOR group CTN 166 "Research, Technological Development and Innovation Activities (R&D&I)"
- ♦ Adif representative in the MITMA R&D&I and EGNSS (Galileo) working groups
- ♦ Speaker at more than 40 congresses and seminars



# 04

## Structure and Content

The following content complies with the current requirements which are essential for those wanting to specialize in the area of New Digital Revolution in Railway Systems and Railroads. In addition, it has the support of an experienced teaching team, resulting in a curriculum with all the necessary information to provide a broad overview of this area in engineering. For students, this translates into an excellent opportunity to catapult their career to an international level, analyzing the different digital technologies that can be applied to this sector. From the first class, students will see their knowledge expanding, which will enable them to develop professionally, knowing that they can count on the support of a team of experts.







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*Apply a methodology based on problem solving and learn everything related to the digital revolution and its application to the railroad system through a practical approach”*

## Module 1. The New Digital Revolution in Railroads

- 1.1. The Fourth Railroad Revolution
  - 1.1.1. Technological Evolution
  - 1.1.2. Digital Technologies Applied to Railroads
  - 1.1.3. Fields of Application in the Current Context
- 1.2. Key Technology Analysis
  - 1.2.1. Big Data
  - 1.2.2. Cloud Computing
  - 1.2.3. Artificial Intelligence
  - 1.2.4. IoT and New Sensorization
  - 1.2.5. DAS
- 1.3. Application of Electric Railroad Network
  - 1.3.1. Objective
  - 1.3.2. Functionality
  - 1.3.3. Implementation
- 1.4. Application in Maintenance
  - 1.4.1. Objective
  - 1.4.2. Functionality
  - 1.4.3. Implementation
- 1.5. Application in Passenger Stations
  - 1.5.1. Objective
  - 1.5.2. Functionality
  - 1.5.3. Implementation
- 1.6. Application in Railroad Logistics Management
  - 1.6.1. Objective
  - 1.6.2. Functionality
  - 1.6.3. Implementation





- 1.7. Application in Railroad Traffic Management
  - 1.7.1. Objective
  - 1.7.2. Functionality
  - 1.7.3. Implementation
- 1.8. Cybersecurity in the Railroad
  - 1.8.1. Objective
  - 1.8.2. Functionality
  - 1.8.3. Implementation
- 1.9. User Experience
  - 1.9.1. Objective
  - 1.9.2. Functionality
  - 1.9.3. Implementation
- 1.10. Digitalization Strategies in Various Railroads
  - 1.10.1. German Railroads
  - 1.10.2. French Railroads
  - 1.10.3. Japanese Railroads
  - 1.10.4. Other Railroads

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*Plan new digital strategies and implement them in railroad systems in order to improve its performance and user service”*

05

# Methodology

This training program offers a different way of learning. Our methodology uses a cyclical learning approach: **Relearning**.

This teaching system is used, for example, in the most prestigious medical schools in the world, and major publications such as the **New England Journal of Medicine** have considered it to be one of the most effective.





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*Discover Relearning, a system that abandons conventional linear learning, to take you through cyclical teaching systems: a way of learning that has proven to be extremely effective, especially in subjects that require memorization"*

## At TECH we use the Case Method

Our program offers a revolutionary method of skills and knowledge development. Our goal is to strengthen skills in a changing, competitive, and highly demanding environment.

“

*At TECH, you will experience a way of learning that is shaking the foundations of traditional universities around the world”*



*We are the first online university to combine Harvard Business School case studies with a 100% online learning system based on repetition.*



### A learning method that is different and innovative.

This intensive Engineering program at TECH Global University prepares you to face all the challenges in this field, both nationally and internationally. We are committed to promoting your personal and professional growth, the best way to strive for success, that is why at TECH Global University you will use Harvard case studies, with which we have a strategic agreement that allows us, to offer you material from the best university in the world.

“*Our program prepares you to face new challenges in uncertain environments and achieve success in your career”*

*The student will learn, through collaborative activities and real cases, how to solve complex situations in real business environments.*

The case method is the most widely used learning system by the best faculties in the world. The case method was developed in 1912 so that law students would not only learn the law based on theoretical content. It consisted of presenting students with real-life, complex situations for them to make informed decisions and value judgments on how to resolve them. In 1924, Harvard adopted it as a standard teaching method.

What should a professional do in a given situation? This is the question that you are presented with in the case method, an action-oriented learning method. Throughout the program, the studies will be presented with multiple real cases.

They will have to combine all their knowledge and research, and argue and defend their ideas and decisions.

## Relearning Methodology

TECH is the first university in the world to combine Harvard University case studies with a 100% online learning system based on repetition, which combines 8 different didactic elements in each lesson.

We enhance Harvard case studies with the best 100% online teaching method: Relearning.

*In 2019, we obtained the best learning results of all online universities in the world.*

At TECH, you will learn using a cutting-edge methodology designed to train the executives of the future. This method, at the forefront of international teaching, is called Relearning.

Our university is the only university in the world authorized to employ this successful method. In 2019, we managed to improve our students' overall satisfaction levels (teaching quality, quality of materials, course structure, objectives...) based on the best online university indicators.





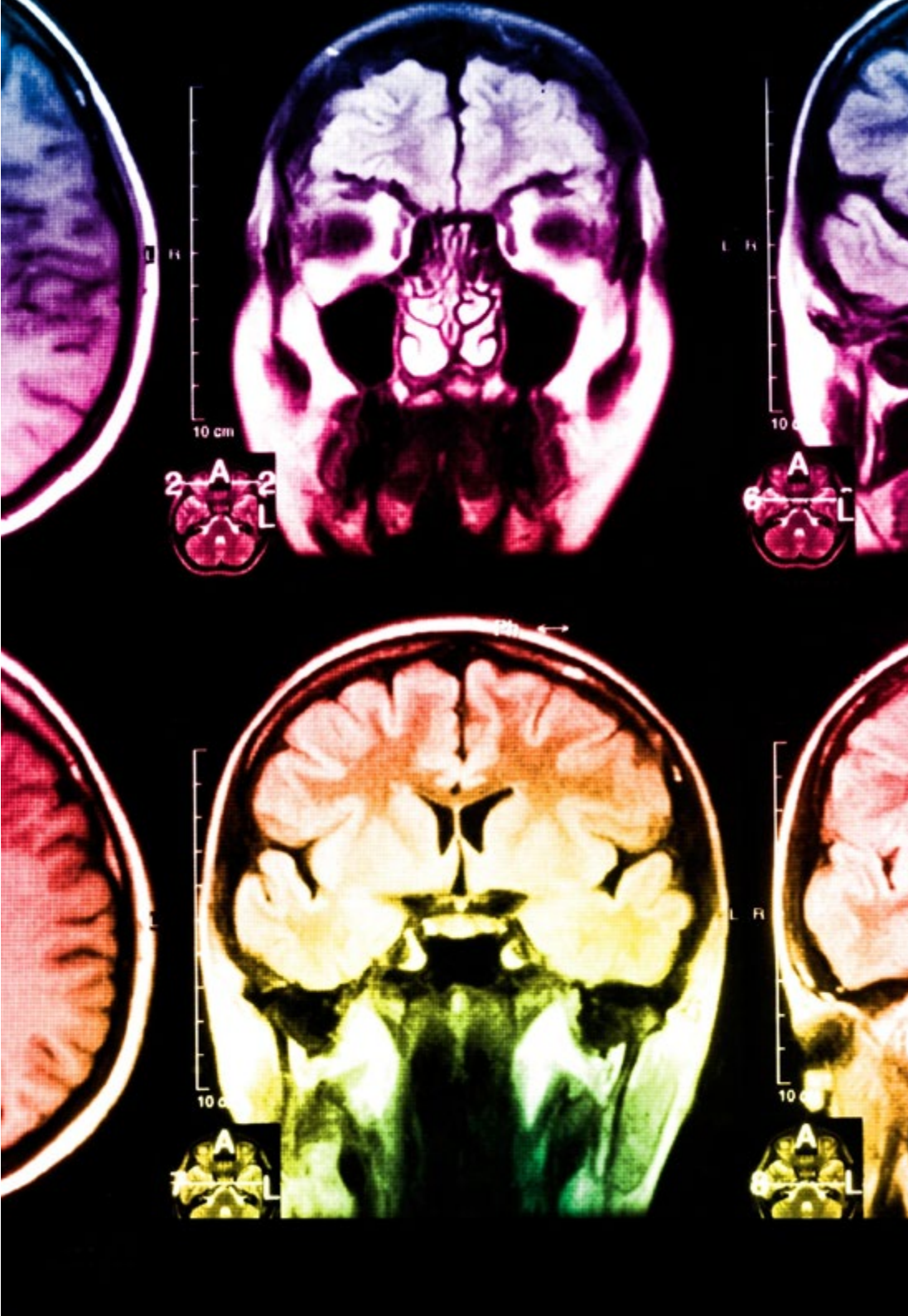
In our program, learning is not a linear process, but rather a spiral (learn, unlearn, forget, and re-learn). Therefore, we combine each of these elements concentrically.

This methodology has trained more than 650,000 university graduates with unprecedented success in fields as diverse as biochemistry, genetics, surgery, international law, management skills, sports science, philosophy, law, engineering, journalism, history, and financial markets and instruments. All this in a highly demanding environment, where the students have a strong socio-economic profile and an average age of 43.5 years.

*Relearning will allow you to learn with less effort and better performance, involving you more in your training, developing a critical mindset, defending arguments, and contrasting opinions: a direct equation for success.*

From the latest scientific evidence in the field of neuroscience, not only do we know how to organize information, ideas, images and memories, but we know that the place and context where we have learned something is fundamental for us to be able to remember it and store it in the hippocampus, to retain it in our long-term memory.

In this way, and in what is called neurocognitive context-dependent e-learning, the different elements in our program are connected to the context where the individual carries out their professional activity.



This program offers the best educational material, prepared with professionals in mind:



### Study Material

All teaching material is produced by the specialists who teach the course, specifically for the course, so that the teaching content is highly specific and precise.

These contents are then applied to the audiovisual format, to create the TECH online working method. All this, with the latest techniques that offer high quality pieces in each and every one of the materials that are made available to the student.



### Classes

There is scientific evidence suggesting that observing third-party experts can be useful. Learning from an Expert strengthens knowledge and memory, and generates confidence in future difficult decisions.



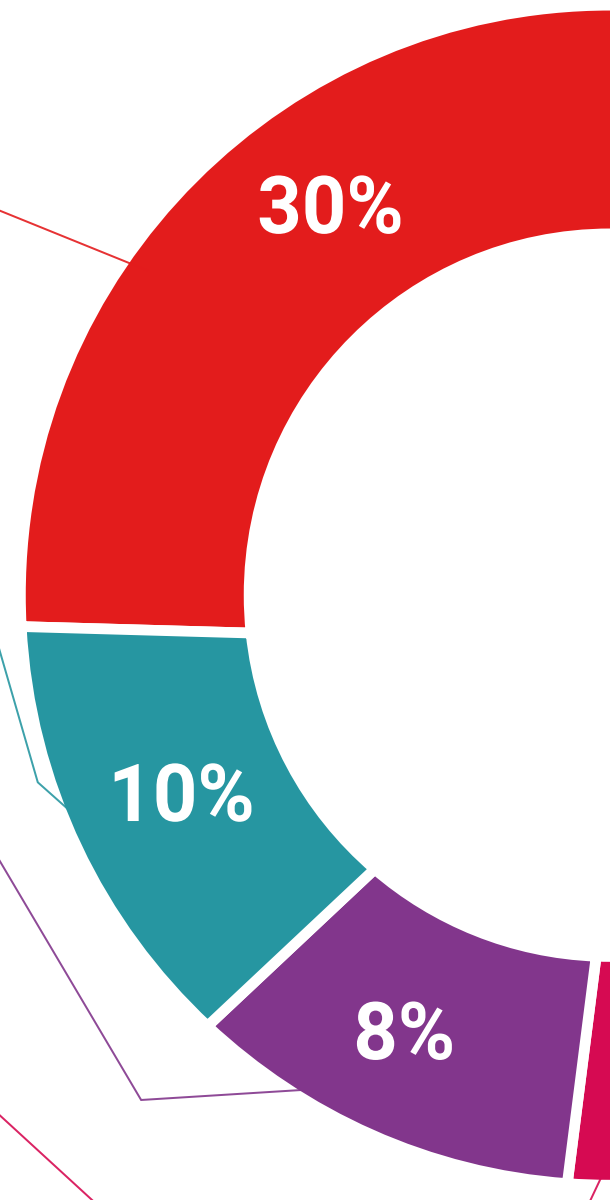
### Practising Skills and Abilities

They will carry out activities to develop specific competencies and skills in each thematic area. Exercises and activities to acquire and develop the skills and abilities that a specialist needs to develop in the context of the globalization we live in.



### Additional Reading

Recent articles, consensus documents and international guidelines, among others. In TECH's virtual library, students will have access to everything they need to complete their course.





**Case Studies**

They will complete a selection of the best case studies in the field used at Harvard. Cases that are presented, analyzed, and supervised by the best senior management specialists in the world.



**Interactive Summaries**

The TECH team presents the contents attractively and dynamically in multimedia lessons that include audio, videos, images, diagrams, and concept maps in order to reinforce knowledge.

This exclusive multimedia content presentation training Exclusive system was awarded by Microsoft as a "European Success Story".



**Testing & Retesting**

We periodically evaluate and re-evaluate students' knowledge throughout the program, through assessment and self-assessment activities and exercises: so that they can see how they are achieving your goals.



06

# Certificate

The Postgraduate Certificate in New Digital Revolution in Railway Systems and Railroads guarantees, in addition to the most rigorous and up-to-date training, access to a Postgraduate Certificate issued by TECH Global University.



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*Successfully complete this program  
and receive your university qualification  
without the hassle of travel or paperwork”*

This program will allow you to obtain your **Postgraduate Certificate New Digital Revolution in Railway Systems and Railroads** endorsed by **TECH Global University**, the world's largest online university.

**TECH Global University** is an official European University publicly recognized by the Government of Andorra ([official bulletin](#)). Andorra is part of the European Higher Education Area (EHEA) since 2003. The EHEA is an initiative promoted by the European Union that aims to organize the international training framework and harmonize the higher education systems of the member countries of this space. The project promotes common values, the implementation of collaborative tools and strengthening its quality assurance mechanisms to enhance collaboration and mobility among students, researchers and academics.

This **TECH Global University** title is a European program of continuing education and professional updating that guarantees the acquisition of competencies in its area of knowledge, providing a high curricular value to the student who completes the program.

Title: **Postgraduate Certificate New Digital Revolution in Railway Systems and Railroads**

Modality: **online**

Duration: **6 weeks**

Accreditation: **6 ECTS**



\*Apostille Convention. In the event that the student wishes to have their paper certificate issued with an apostille, TECH Global University will make the necessary arrangements to obtain it, at an additional cost.

future  
health confidence people  
education information tutors  
guarantee accreditation teaching  
institutions technology learning  
community commitment  
personalized service innovation  
knowledge present  
development languages  
virtual classroom



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