BAVARIAN JOURNAL OF APPLIED SCIENCES®

Increasing Efficiency in Virtual Teaching in an International Context: E-learning and Instructional Approaches at ECRI

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ABSTRACT

Aims: **Successful learning requires both an interactive and collaborative learning environment. Virtual teaching or electronic learning (e-learning) can be defined as the delivery of teaching and learning materials at a distance with the use of computer, digital tools and internet technologies.** ***Aims:*** **The main scope of this study is to analyze the various teaching formats at the Faculty European Campus Rottal-Inn of the Deggendorf Institute of Technology, and to identify gaps that suggest the proposal of tools for the support of an efficient virtual teaching and learning process. Moreover, it optimizes virtual assessment through an analysis of the new electronic examination forms (e-exams).** ***Method:*** **For this paper, a qualitative research approach was employed, i.e. the data involved collection according to a structured review of the subject's moodle handbook of three selected bachelor courses (B.Sc.) Health Informatics; (B.Eng.) Energy System Engineering and (B.A) International Tourism Management, followed by data classification using Microsoft Excel to present the results.** ***Results:*** **Various teaching formats such as lecture and whiteboard, seminars, laboratory work, field trips, case-study, and online teaching were identified according to subject classification level in science. Results had also shown that in comparison to the other courses, (B.A.) International Tourism Management had the highest number of classroom-independent teaching events.** ***Conclusion:*** **Digital education aims at minimizing interferences to education among challenging times during the COVID-19 pandemic, and empowering students to experience new tools and resources while at the same time creating a safe place for educators to have control over the teaching process.**

Hintergrund: *Erfolgreiches Lernen erfordert sowohl ein interaktives als auch ein kooperatives Lernumfeld. Virtueller Unterricht oder elektronisches Lernen (E-Learning) kann definiert werden als die Bereitstellung von Lehr- und Lernmaterialien auf Distanz mit Hilfe von Computern, digitalen Werkzeugen und Internettechnologien.* ***Ziele:*** *Das Hauptziel dieser Studie ist es, die verschiedenen Lehrformate an der Fakultät European Campus Rottal-Inn der Technischen Hochschule Deggendorf zu analysieren und Lücken zu identifizieren, die den Vorschlag von Werkzeugen zur Unterstützung eines effizienten virtuellen Lehr- und Lernprozesses nahelegen. Darüber hinaus wird das virtuelle Assessment durch eine Analyse der neuen elektronischen Prüfungsformen (E-Exams) optimiert.* ***Methode:*** *Die Arbeit wendet einen qualitativen Forschungsansatz an, d.h. die Datenerhebung erfolgte anhand einer strukturierten Durchsicht des Moodle-Handbuchs der drei ausgewählten Bachelor-Studiengänge (B.Sc.) Health Informatics; (B.Eng.) Energy System Engineering und (B.A.) International Tourism Management, gefolgt von einer Datenklassifizierung mit Microsoft Excel zur Darstellung der Ergebnisse.* ***Ergebnisse:*** *Verschiedene Lehrformate wie Vorlesung und Whiteboard,*

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Seminare, Laborarbeit, Exkursionen, Fallstudien und Online-Unterricht wurden je nach Fachklassifizierungsstufe in den Naturwissenschaften identifiziert. Die Ergebnisse haben auch gezeigt, dass der Studiengang (B.A.) Internationales Tourismusmanagement die höchste Anzahl an nicht vom Präsenzunterricht abhängigen Lehrveranstaltungen im Vergleich zu den anderen Studiengängen aufweist. ***Schlussfolgerungen:*** *Die digitale Bildung zielt darauf ab, die Beeinträchtigung des Unterrichts in den herausfordernden Zeiten der COVID-19-Pandemie zu minimieren und die Studierenden in die Lage zu versetzen, neue Werkzeuge und Ressourcen kennenzulernen, und gleichzeitig einen sicheren Ort zu schaffen, an dem die Lehrkräfte die Kontrolle über den Lehrprozess haben.*

KEYWORDS

COVID-19, e-learning, formats, tools, virtual teaching

COVID-19, E-Learning, Formate, virtuelle Lehre, Werkzeuge

1. Introduction

Virtual teaching or virtual classroom involves the delivery of teaching and assessment materials at a distance with the use of computer and digital tools or internet technologies for teaching and learning. Virtual teaching differs from electronic learning (e-learning) or technology-enhanced learning (TEL) through bridging geographic regions between learning requirements and delivery time whereas e-learning and technology-enhanced learning employ self-paced learning, independent of geographical location and time [1]. The most effective e-learning intends to capture a learner's interest and attention, engaging him / her in a multimodal, immersive and effective learning experience [2].

Enhancing e-learning and digital transformation competencies should assemble basic digital skills, for instance: digital literacy, computing education, good knowledge and understanding of data-intensive technologies (e.g. artificial intelligence) and advanced digital skills which ensures that high-quality materials are equally represented in digital tools among learners [1, 2].

The main scope of this paper is to i) assemble, describe and analyze previous secondary academic literature and sources such as synchronous versus asynchronous e-learning courses and e-learning tool selection factors that foster the development of high-performing digital education, ii) analyze, discuss and present the various teaching methods among the three programs at ECRI. This chapter embraces data classification, subjects' segmentation, common subjects' comparison versus current teaching formats, and results in graphical figures, and iii) present various electronic examination formats including concrete needs and existing challenges.

2. Literature Review

2.1 How to select digital tools for e-learning?

E-learning generally falls into two major categories: information-based and performance-based. Information-based courses are designed to enhance understanding or certify uncertainty towards a topic. Content awareness is a key objective to information-based courses through sharing information or offering a linear explanation of the content to the participants such as e-learning that is about a new company policy or an annual compliance course. Whereas, performance-based courses are designed to change behavior resulting in a measurable impact on learners. They focus on changing performance and improving skills rather than on theory, such as the participant learning the communication skills to an irritated client; it boosts consumer satisfaction and retaining rates. In selecting the appropriate tools for any subject, certain factors should be considered (Table 1) [3].

Selection criteria
E-learning tool category
Encouragement of independent thinking
Active or passive learner
Reading proficiency and literacy
Availability across multiple devices and platforms
Open educational resources (OERs)
Basic and advanced digital skills
Feedback to reflect active use (usability)

Table 1: E-learning tool selection factors

Providing e-learning globally can result in challenges to overcome, for instance, previous studies have concluded that selecting the e-learning tool also depends on addressing the type and level of the learner. E-learners can be active or passive learners; they are classified into five main types (Table 2) [2].

Learner's type	Description	Type
Gamers	To learn while playing games (gamification)	Active
Listeners	To listen while writing notes	Active
Observers	To learn while watching the content, attracted to multimedia content	Passive
Readers	To learn while reading the content	Passive
Interactive	Prompted after every two slides	Active

Table 2: E-learning learners (active versus passive)

Supported studies have indicated that assessing reading proficiency remains an essential primary factor for a wide variety of human activities. The proficiency test aims to assess the reading literacy of students in the digital environment while retaining the ability to measure trends in reading literacy (Table 3). Therefore, education systems are increasingly incorporating digital (reading) literacy into their programs of instruction [1, 3, 4]

Type of reader	Comprehension of words per minute
Slow	50%
Oral	60%
Auditory	80%
Visual	85%

Table 3: Reader profile in reading proficiency test

In addition to COVID-19 disruptions, millions of people around the world have already used digital learning tools that have contributed to the transition from real-time lecturing to virtual education. Microsoft Teams (MS Teams) and Zoom have been used by online educators to create an immersive and digital collaborative classroom. Various criteria have been included in differentiating both platforms in terms of collaboration, user interface, room systems, certification, integration and video quality (Table 4) [5].

Criteria	Zoom	Ms.Teams
Platform	Cloud platform	Full integration with office 356
Collaboration	Requires setting up a conference	Seamless collaboration, backups and file search
User interface	Little training or no IT support	More challenging in interacting in different teams
Room systems	People counting	Proximity detection
Certification	Certifies both integrators and hardware providers	Only certifies hardware solutions
Integration	Used for web conferencing	Used for its chat features; robust chat service
Quality	High-quality video and audio; showing up to 49 participants (7x7 grid)	Only perfect for internal communication

Table 4: Illustrates the main differences between Zoom and Microsoft teams

2.2 What are the current e-learning instructional and assessment approaches?

E-learning approaches can be defined as self-paced and facilitated or instructor-led. Self-paced also known as independent study or study at home e-learning, involves the free will of students to learn at their own pace based on individual needs. In self-paced, e-learning materials, providers do not require to schedule, manage or track learners. In contrast to instructor, integration-based e-learning courses, where the application of sharing of audio and video conferencing is involved to aid collaboration and communication [2].

Moreover, activities in e-learning teaching approaches are classified into synchronous and asynchronous. Synchronous learning events take place in real-time, for instance, in live-stream conferencing with audio and video applications. On the other hand, asynchronous activities are time-independent, such as self-paced learning courses. Table 5 illustrates the main communication tools for synchronous and asynchronous e-learning activities [4, 6].

Synchronous	Asynchronous
Chat	E-mail
Audio and video conferencing	Discussion forum
Live webcasting	Wiki
Application sharing	Blog
Whiteboard	Streaming audio
Polling	Streaming video
Webinars	Polling

Table 5: E-communication tools for synchronous and asynchronous activities

The emergence of the pandemic situation of COVID-19 had led to the development of new exam formats that are handled by electronic means [7]. TOEFL iBT test represents one of the available technical options for digital distance tests worldwide. The test is recognized by more than 11,000 universities in more than 150 countries around the world, and it uses (*eRater*® Engine, *SpeechRater*® Service). *eRater*® Scoring Engine identifies features related to writing proficiency in student essays so they can be used for scoring and feedback. This feedback is based on natural language processing. Whereas *SpeechRater*® Service uses advanced speech recognition and analysis technology to assess and provide detailed feedback about specific aspects of a non-native speaker's speaking proficiency that other automated assessments cannot [8, 9].

Technique/Format used	Features	Challenges
Proctorio	Automates processes, reporting, monitoring	Requires high-speed internet, loss of network connection
Video Supervision	ZOOM live supervision	Lack of video image recording
LockDown Browser	Prevents cheating during online exams	Assessment cannot be accessed with other browsers
Remote Practical Exam	ZOOM live exam	Forming students database
Take-home exam	Online open-book exam	Authentication (i.e. eye tribe tracker, fingerprint, biometric framework)

Table 6: E-exams formats with related features and challenges

Table 6 presents various types of electronic exams or e-exams with related features and associated challenges [10–13].

3. Methodology

3.1 Data Collection

The first stage aimed to collect previous secondary academic literature and sources towards virtual teaching that helped to select potentially suitable teaching formats and tools in the upcoming chapters. It involved searching the following questions: What is virtual teaching? How can successful e-learning be achieved? How are digital tools for e-learning selected? And what are the main e-learning instructional and assessment approaches?

To conduct this study, three different bachelor programs at the Deggendorf Institute of Technology (DIT), faculty European Campus Rottal-Inn (ECRI), a technical program (Energy Systems Engineering), a business-focused program (International Tourism Management) and an interdisciplinary program (Health Informatics) were selected. Module handbook analysis through a structured review of the subjects and assigned teaching format have been done from the period of 1st September to 10th December, 2020.

3.2 Data Extraction

To analyze the various teaching formats at ECRI, subjects within the three different bachelor courses were organized in tables format using Microsoft Excel according to two main categories; subject classification level in science (natural, formal, applied, computer, social, languages) and teaching formats (lecture and whiteboard, seminars, laboratory work, field trips, case-study, online). Data classification and extraction have been carried out within the period of 11th December, 2020 to 29th February, 2021.

4. Results

The most significant insights are described in the following section. An explanation for the proper understanding of the results will follow subsequent to the presentation of the results.

4.1 Teaching methods at the DIT – European Campus Rottal-Inn according to module handbooks

Figure 1 summarizes the teaching formats of assigned programs modules in percentages. Results have shown that nearly more than half of the modules planned to deliver in classroom teaching (seminars), whereas only 4% of the modules intended to rely on an independent and self-paced at-home study with distanced instructor's supervision.

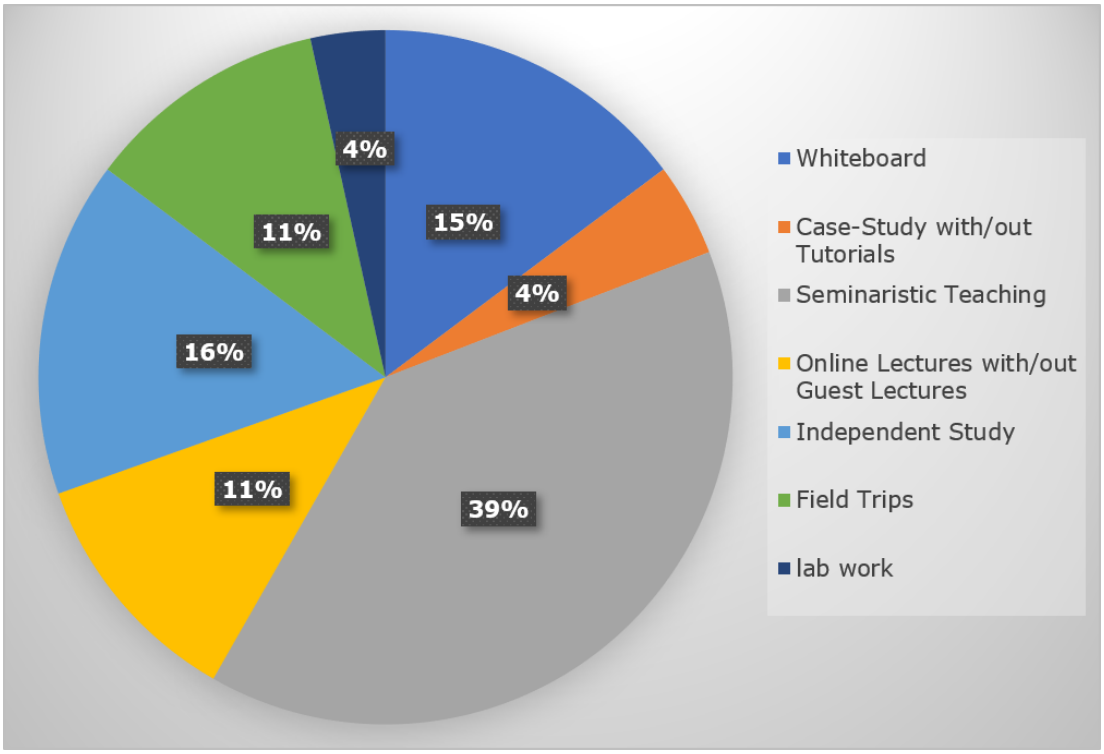

Figure 1: DIT-ECRI teaching methods within B.Eng. (Energy System Engineering); B.A. (International Tourism Management); B.Sc. (Health Informatics)

Individualized teaching formats according to the number of subjects for the Bachelor of Science (B.Sc.) Health Informatics were analyzed as well. Results have revealed that the majority of subjects planned to deliver in classroom teaching (seminars) and whiteboard teaching in the classroom, whereas eight subjects within the course relied on an independent student study with or without lecturer involvement through self-paced and at home reading as well as online lectures with or without guest lectures (Figure 2).

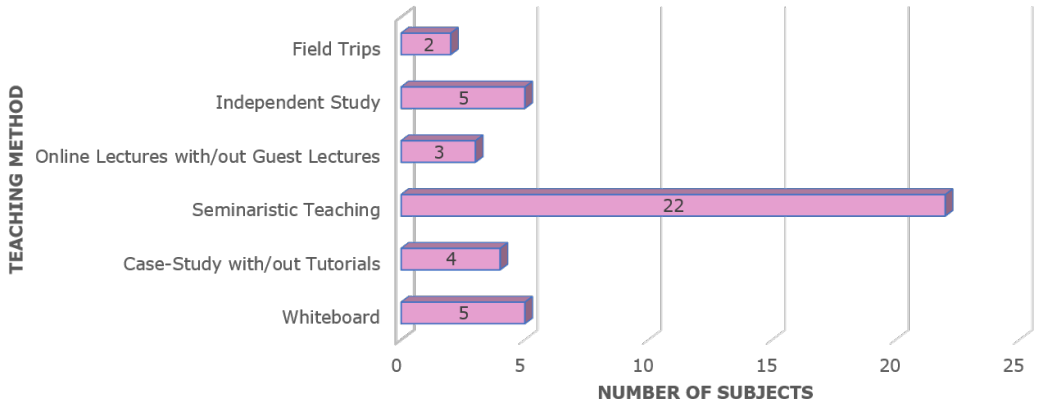

Figure 2: DIT-ECRI teaching methods within B.Sc. (Health Informatics) [14]

Similarly, teaching formats according to the number of subjects for the Bachelor of Engineering (B.Eng.) Energy System Engineering were analyzed. Analysis results have indicated that nearly half of subjects planned to deliver in classroom teaching in the form of seminars. Results supported by approximately a quarter of the number of subjects within the course depended on various methods of face-to-face teaching such as involvement of workshops, case studies and practical laboratory work (Figure 3).

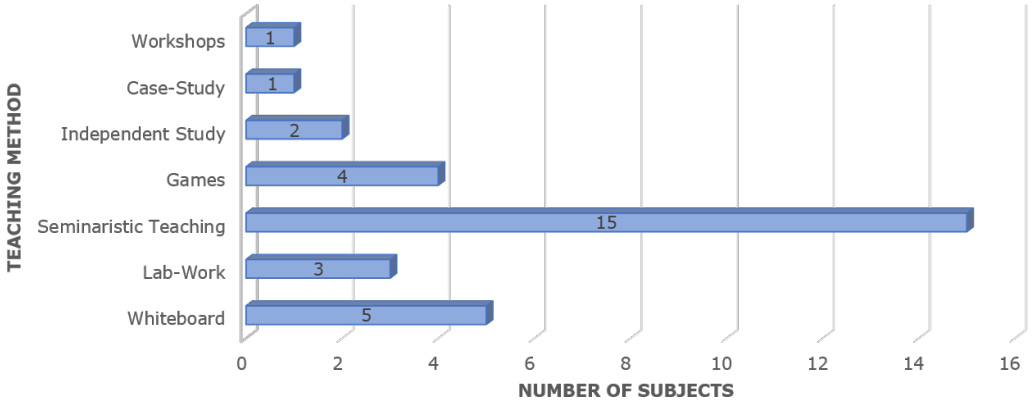

Figure 3: DIT-ECRI teaching methods within B.Eng. (Energy System Engineering) [15]

On the other hand, teaching formats according to the number of subjects for the Bachelor of Arts (B.A.) International Tourism Management determined that more than half of subjects within the course assembled a distanced teaching, employing independent study and at-home reading, online lectures, and undertaking field trips. Therefore, results have indicated that the bachelor course of International Tourism Management had the highest numbers subjects that reply on various teaching methods such as field trips, independent learning, online lectures, and online whiteboardscomparable to the courses health informatics and energy system engineering (Figure 4).

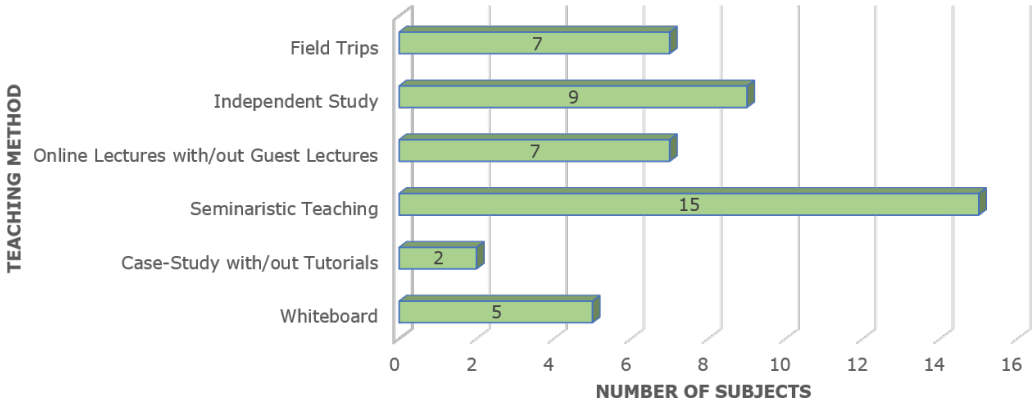

Figure 4: DIT-ECRI teaching methods within B.A. (International Tourism Management) [16]

4.2 Selecting instructional approaches for testing

To understand the criteria that play a role in selecting the most appropriate digital tool for e-learning per subject at DIT-ECRI, it would be necessary to identify the current tools and associated activities of the iLearn management system through DIT-ECRI iLearn platform (Table 7).

Tool's type	Description
H5P interactive	Drag and drop, Question set (multiple choice, true and false, fill in blanks, drag the words, mark the words), Image hotspots, Accordion, Flipping cards, Memory games, Flashcards, Image slider, Iframe embedder, and Interactive video
Self-Paced	Reading book chapter, Links/URL, Uploading pdf files, Text page
Survey	Three evaluation tools, Predefined questions
Questions	Test, Student Quiz
Planner	Participants Meeting's date planner
Glossary	Definitions and terms (dictionary)
Forum	Feedback, Group discussions
Zoom-Meeting	Video conference (Livestream, recorded video presentation)
Pool	Voting
Task	Task/work submission (e.g. pdf,doc,ppt,)

Table 7: iLearn management system activities at DIT-ECRI

Different teaching and instructional approaches have been proposed in an online meeting through MSTeams verbally for testing by four professors of the bachelor courses B.Eng. (Energy System Engineering), B.A. (International Tourism Management), B.Sc. (Health Informatics) to be selected as teaching format testing (Table 8).

Teaching approach
Fully online teaching (live video and audio conferencing)
Face to face in classroom teaching
Blended/flipped (combined in classroom and online) teaching
Study at home (independent reading from the lecturer)
Laboratory work
Field trips
Auditory (speech recognition, broadcast)
Gamification (educational games)

Table 8: Proposed selected instructional approaches for testing

4.3 Evaluation of new examination formats

To apply new formats of examinations in the digital era, an evaluation of e-exams among institutes, lecturers and students are essential. Figure 5 proposes the evaluation criteria for e-exams that include identifying issues and challenges such as the need for backup in case of data loss, authentications errors, and; loss of internet connection. It also includes planning and embedding solutions for the identified challenges such as forming a database, eye tribe tracker for authentication errors, and a model to solve connection interruption. The figure shows interrelated positive impacts on lecturers and students such as fewer spelling errors, immediate scoring and accurate marking. Moreover, e-exams lead to lower costs in terms of work, time and money. However, further work would be to focus on these criteria, which are based on the understanding of experiences at DIT-ECRI.

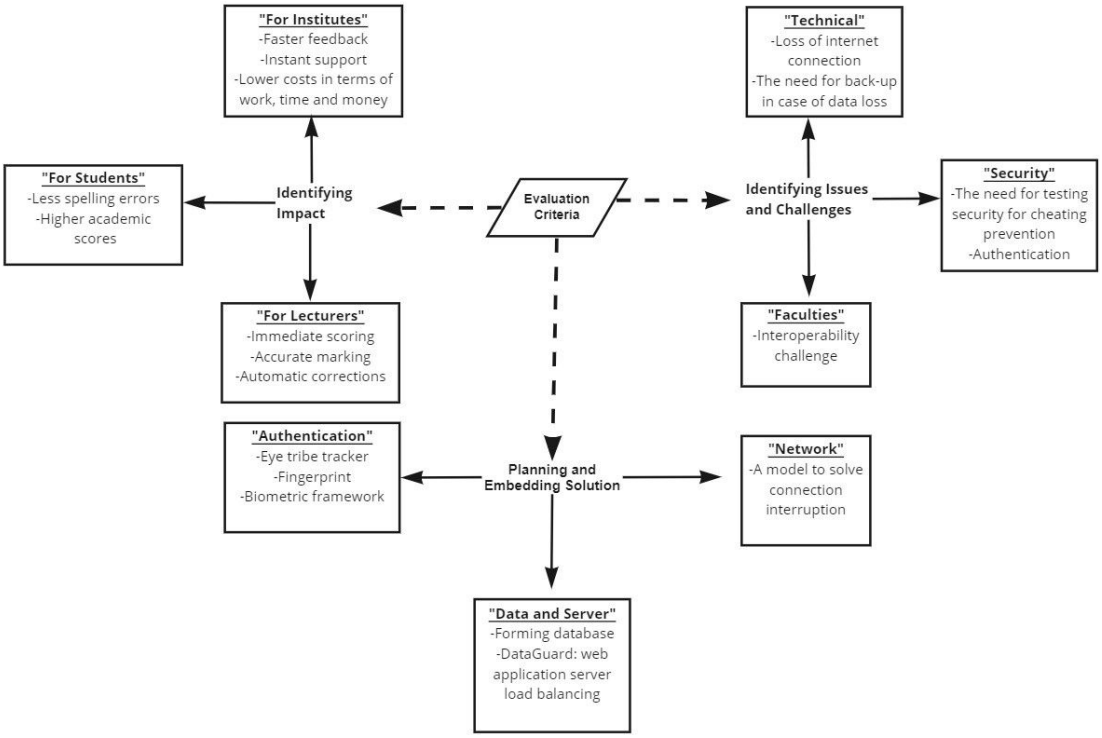

Figure 5: Illustrates evaluation criteria for electronic exams or e-exams

Conclusion

Digital education aims at minimizing interferences to education, providing rhythm and routine during current challenges due to the COVID-19 pandemic and empowering students to experience new tools and resources while at the same time creating a safe place for educators to have control over the teaching process. This study has involved three different bachelor programs at ECRI, a technical program (Energy Systems Engineering), a business-focused program (International Tourism Management) and an interdisciplinary program (Health Informatics). Results had included that the bachelor course of international tourism management had the highest number of subjects that rely on various teaching methods such as fields trips, independent learning, online lectures, and online whiteboards comparable to the courses health informatics and energy system engineering.

Acknowledgements

The project “Increasing Efficiency In Virtual Teaching In An International Context” (CREATE) is a two-year project from October 2020 until September 2022, funded by the DIT.

Conflicts of interest statement

The authors declare that there is no conflict of interest regarding the publication of this paper.

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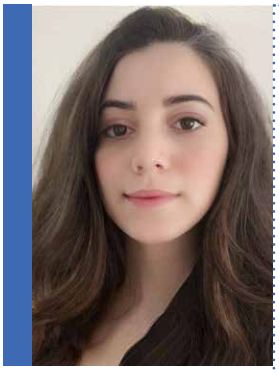

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Helana Lutfi received her M.Sc. degree in Medical Informatics from Deggendorf Institute of Technology (DIT) – European Campus Rottal-Inn (ECRI) in 2019. Since then she has been part of the scientific staff at ECRI. In 2020, she became a doctoral student with a research focus in the fields of artificial intelligence (AI), user interface, machine learning and behavior as well as healthcare in a collaboration between DIT-ECRI and the Brandenburg University of Technology (BUT) Cottbus-Senftenberg.

Helana Lutfi absolvierte 2019 ihren Masterabschluss in Medizinischer Informatik an der Technischen Hochschule Deggendorf (THD) – European Campus Rottal-Inn (ECRI). Seitdem ist sie wissenschaftliche Mitarbeiterin am ECRI. Seit 2020 promoviert sie mit einem Forschungsschwerpunkt in den Bereichen Künstliche Intelligenz (KI), User Interface, Maschinelles Lernen und Verhalten sowie Gesundheitswesen in einer Kooperation zwischen der THD(ECRI) und der Brandenburgischen Technischen Universität (BUT) Cottbus-Senftenberg.

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Since 2018 Dr. Li has been a professor at the Deggendorf Institute of Technology. He was a postdoctoral researcher (2012–2018) at the Institute of Nuclear and Energy Technology (now known as the Institute of Thermal Energy Technology and Safety) at the Karlsruhe Institute of Technology (KIT). He received his Ph.D. in mechanical engineering from Tokyo Institute of Technology, Japan (2012). Li has many years of experience in the fields of numerical heat transfer, computational fluid dynamics, heat transfer enhancement, two-phase flow, turbulence modelling, erosion and corrosion, reactor safety and thermal hydraulic analysis. He has been involved in and contributed to the major European Commission FP-7 projects SEARCH, MAXSIMA, EVOL and ESNII+. As the first author, Li has published 13 international journal articles and contributed 5 papers to the European Commission. Current research is on simulation for efficient biomass to renewable energy conversion technologies, efficient renewable energy and solar thermal applications, heat and mass transfer, and fluid flow in porous materials.

Dr. Li ist seit 2018 Professor an der Technischen Hochschule Deggendorf. Von2012 bis 2018 war er Postdoc am Institut für Kern- und Energietechnik (jetzt Institut für Thermische Energietechnik und Sicherheit) am Karlsruher Institut für Technologie (KIT). Er promovierte im Fach Maschinenbau am Tokyo Institute of Technology, Japan (2012). Li verfügt über langjährige Erfahrung in den Bereichen numerische Wärmeübertragung, rechnergestützte Strömungsmechanik, Verbesserung der Wärmeübertragung, Zweiphasenströmung, Turbulenzmodellierung, Erosion und Korrosion, Reaktorsicherheit und thermohydraulische Analysen. Er war außerdem an den großen FP-7-Projekten der Europäischen Kommission SEARCH, MAXSIMA, EVOL und ESNII+ beteiligt und trug zu diesen bei. Als Erstautor hat Li 13 Artikel in internationalen Zeitschriften veröffentlicht und 5 Beiträge für die Europäische Kommission verfasst. Aktuelle Forschungsarbeiten befassen sich mit der Simulation für effiziente Konversionstechnologien für Biomasse zu erneuerbarer Energie, effizienten Anwendungen für erneuerbare Energien und Solarthermie, Wärme- und Stoffübertragung und Flüssigkeitsströmung in porösen Materialien.

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Prof. Spittler holds a Ph.D. in Electrical Engineering (Technical University of Munich, 2017) and has worked in industry for nine years. He acquired experience in the processing, evaluation and analyzing of data, mainly in the areas of health, avionics and the automotive industry. He is the vice-dean of the European Campus Rottal-Inn. He coordinates the bachelor's degree program Health Informatics and the Joint Master Global Public Health. His specialty lies in applied health care with research interests related to applied artificial intelligence, personalized medicine, digital health and sensor technologies. He coordinates national and European research projects and proposals: INTERREG, 5G Healthcare, ERASMUS+, etc. Moreover, he is responsible on DIT side for the joint project "Transfer and Innovation Eastern Bavaria (TRIO)". In this project, the six regional universities and universities of applied sciences contribute to supporting companies in research, development and consulting. He is also responsible for the project med4PAN, which aims to improve healthcare in rural areas by digitalization.

Prof. Spittler hat einen Doktortitel in Elektrotechnik (Technische Universität München, 2017) und war neun Jahre in der Industrie tätig. Er sammelte Erfahrungen in der Verarbeitung, Auswertung und Analyse von Daten, hauptsächlich in den Bereichen Gesundheit, Avionik und in der Automobilindustrie. Er ist Prodekan des European Campus Rottal-Inn. Darüber hinaus ist er Studiengangsleiter des Bachelor Health Informatics sowie des Joint Master Global Public Health. Sein Spezialgebiet ist die angewandte Gesundheitsversorgung mit Forschungsinteressen in Bezug auf angewandte künstliche Intelligenz, personalisierte Medizin, digitale Gesundheit und Sensortechnologien. Er koordiniert nationale und europäische Forschungsprojekte und -anträge: INTERREG, 5G Healthcare, ERASMUS+, etc. Darüber hinaus ist er auf Seiten der THD verantwortlich für das Verbundprojekt "Transfer und Innovation Ostbayern (TRIO)", an dem sich insgesamt sechs ostbayerische Hochschulen beteiligen. Er ist zudem verantwortlich für das Projekt med4PAN, das zum Ziel hat, die Gesundheitsversorgung im ländlichen Raum durch Digitalisierung zu verbessern.

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Prof. Dr. Sascha Kreiskott

Since the beginning of the 2018 summer semester, the previous E.ON manager Dr. Sascha Kreiskott holds the professorship "Computer Science – Digitization in the Energy Industry" at the Faculty of Applied Natural Sciences and Industrial Engineering of the Deggendorf Institute of Technology. He primarily works at the European Campus Rottal-Inn in Pfarrkirchen. Dr. Sascha Kreiskott studied technical physics and experimental physics at the University of Wuppertal. There he did his doctorate in cooperation with a small university spin-off in the field of superconducting tapes for energy technology applications. His work made it possible to achieve the physical properties of superconducting layers of monocrystalline carrier substrates on metal strips, which are much more relevant for the application. After completing his doctorate, he continued his research activities in this field as a postdoc at Los Alamos National Laboratory, New Mexico/USA. He received several awards and a patent for his work.

Mit Beginn des Sommersemesters 2018 übernahm der bisherige E.ON-Manager Dr. Sascha Kreiskott an der Fakultät für Angewandte Naturwissenschaften und Wirtschaftsingenieurwesen der THD die Professur „Informatik – Digitalisierung in der Energiewirtschaft". Er ist vornehmlich am European Campus Rottal-Inn in Pfarrkirchen tätig. Sascha Kreiskott studierte Technische Physik und Experimentalphysik an der Bergischen Universität Wuppertal. Dort promovierte er in Kooperation mit einem kleinen Spin-Off der Universität im Bereich supraleitender Bänder für energietechnische Anwendungen. Durch seine Arbeiten wurde es möglich, die physikalischen Eigenschaften supraleitender Schichten von monokristallinen Trägersubstraten auch auf den für die Anwendung wesentlich relevanteren Metallbändern zu erzielen. Nach der Promotion setzte er seine Forschungstätigkeiten auf diesem Feld als Postdoc am Los Alamos National Laboratory, New Mexico/USA, fort. Für seine Arbeiten bekam er mehrere Preise und ein Patent.

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Prof. Dr. Katerina Volchek (M.Sc., B.A.)

Dr Katerina Volchek is a professor and a manager of the DigiHealth & Smart Tourism lab at the Deggendorf Institute of Technology. She is an expert in customer experience, information and communication technologies and marketing strategy for tourism, including the design of personalized services and optimization ROI through marketing attribution. Currently, her research interest also lies in the capabilities of neuromarketing and smart environments for the service industries. Katerina serves as a Director for Marketing at the International Federation for Information Technologies and Travel & Tourism (IFITT).

Dr. Katerina Volchek ist Professorin und Leiterin des DigiHealth & Smart Tourism Lab an der THD. Sie ist Expertin für Kundenerlebnisse, Informations- und Kommunikationstechnologien und Marketingstrategien für den Tourismus, einschließlich der Gestaltung personalisierter Dienstleistungen und der Optimierung des ROI durch Marketing-Attribution. Derzeit liegt ihr Forschungsinteresse auch auf den Möglichkeiten des Neuromarketings und intelligenter Umgebungen für die Dienstleistungsbranche. Katerina Volchek ist außerdem Direktorin für Marketing bei der International Federation for Information Technologies and Travel & Tourism (IFITT).

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