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Proposing a Framework for Virtual Teaching at the European Campus Rottal-Inn (ECRI)

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ABSTRACT

***Background*: Digital education aims at minimizing interferences to education among challenging times such as during COVID-19, 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. *Aims*: With this study, the project CREATE aimed at examining the experiences of academic students with their first weeks of online teaching post COVID-19. The specific aim was to map their experiences and acquire knowledge in order to make necessary short-term adjustments in the subsequent rounds of online teaching through proposing the structure for online teaching framework. *Method*: This framework is based on identifying students' perspectives with a distributed survey towards virtual teaching in the timeframe of pre- and post COVID-19 restrictions situations. *Results*: The results provide a framework for accessing methods and content in the form of delivery formats needed to be included in the curriculum for specialty development of online teaching. *Conclusion*: The methodology and results presented in this study may prove useful to educational institutions determined to target professional development curricula for students, with the criteria and skills needed to successfully organize online teaching.**

Hintergrund*: Die digitale Bildung zielt darauf ab, die Beeinträchtigung des Unterrichts in den schwierigen Zeiten wie während der COVID-19-Pandemie zu minimieren und den Studierenden die Möglichkeit zu geben, neue Werkzeuge und Ressourcen kennenzulernen, während gleichzeitig ein sicherer Ort für die Lehrenden geschaffen wird, um die Kontrolle über den Lehrprozess zu behalten.* **Ziele***: Mit dieser Studie zielte das Projekt CREATE darauf ab, die Erfahrungen von Hochschulstudierenden mit ihren ersten Wochen des Online-Unterrichts nach COVID-19 zu untersuchen. Das spezifische Ziel bestand darin, ihre Erfahrungen zu erfassen und Erkenntnisse zu gewinnen, um in den folgenden Runden des Online-Unterrichts die notwendigen kurzfristigen Anpassungen vorzunehmen, indem eine Struktur für den Online-Unterrichtsrahmen vorgeschlagen wurde.* **Methode***: Dieser Rahmen basiert auf der Identifizierung der Perspektiven der Studierenden mit einer verteilten Umfrage zum virtuellen Unterricht in der Zeit vor und nach den COVID-19-Beschränkungen.* **Ergebnisse***: Die Ergebnisse bieten einen Rahmen für den Zugang zu Methoden und Inhalten in Form von Lehrformaten, die in den Lehrplan für die Entwicklung von Online-Lehrveranstaltungen aufgenommen werden müssen.* **Schlussfolgerung***: Die in dieser Studie vorgestellte Methodik und die Ergebnisse können sich für Bildungseinrichtungen als nützlich erweisen, um Lehrpläne für die berufliche Entwicklung von Studierenden mit den Kriterien und Skills zu erstellen, die für die erfolgreiche Organisation von Online-Unterricht erforderlich sind.*

KEYWORDS

COVID-19, framework, format, online teaching, online learning

COVID-19, Rahmen, Format, Online-Unterricht, Online-Lernen

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1. Introduction

The physical closure of universities and university colleges in Germany and COVID-19 disruptions have also resulted in the transformation from real-time lecturing to digital education or electronic learning (e-learning) [1]. However, this does not imply that the applicable digital technologies and related skills are being effectively in use. Across Germany, academics, administrators, and information technology (IT) supported a series of bottom-up initiatives by the National and European policies which acknowledge the need to provide a structure which allows the use of digital technologies creatively [2].

In addition to the fundamental IT application in teaching, the recognizable proof of criteria and the demand for proposing a framework for online teaching are indispensable requirements in education [3]. Many research results show that the integration of technology has many benefits for both teachers and students in the teaching process [4, 5]. For instance, from the Deggendorf Distance Learning Model (DEGDLM) research project, which was undertaken at the Deggendorf Institute of Technology, it can be deduced that the use of technology-supported teaching was generally well received by the students. Considering the fact that the learners were granted a high degree of flexibility in terms of location and time through the use of digital teaching formats, it can be assumed that blended learning approaches can play an important role in the future of in-service adult education [6]. However, a sense of enhancing the online teaching is central to students' satisfaction [7, 8]. Drawing on students' engagement is essential for developing strategies for online teaching. Setting the strategies for developing the online teaching framework is based on testing and exploring students' perceptions towards online teaching [9].

This study aims at proposing the structure for an online teaching framework. This framework is based on identifying students' perspectives towards virtual teaching in the timeframe of pre- and post-COVID-19 restrictions situations. The specific aim was to map their experiences and acquire knowledge in order to make necessary short-term adjustments in the subsequent rounds of online teaching. Thus, it would help in proposing a storyboard of e-learning tools and instructional learning video type according to the type of teaching course. The framework also proposes a progression model to help educators assess and develop their digital competence.

2. Related Work

2.1 European framework in online teaching

In proposing the online teaching framework, various tools and recommendations are involved in different phases. Figure 1 illustrates six major areas to be involved in concerning the online teaching framework: professional engagement and organizational communication, selecting digital resources, planning the teaching process according to digital devices and resources, assessment strategies and results efficiency, empowering learners with content accessibility and finally facilitating learners' digital competence. Thus, it should cover examining the context of the course content and determining the learning programme suitability. Additionally, it also aims to include designing instructional strategies, activities and assessments that will reach the teaching objectives while at the same time helping learners to improve their e-learning performance. This is achieved through choosing the most appropriate learning modality and delivery format accordingly to the course context. E-learners' performance is also enhanced through constant supervision and establishing mechanisms to assess the efficiency and effectiveness of the teaching method (see Figure 1) [10].

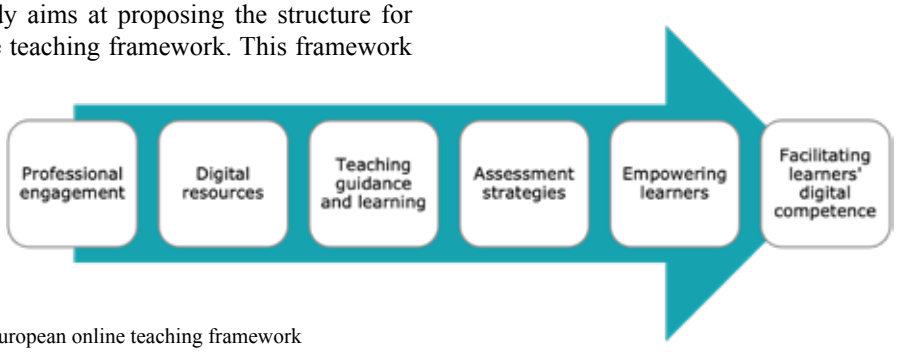

Figure 1: European online teaching framework

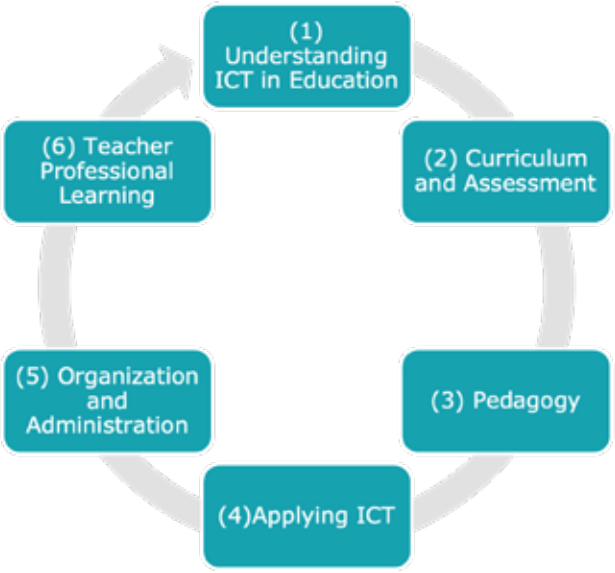

Figure 2: UNESCO online teaching framework

2.2 World-wide framework in online teaching

According to UNESCO: In 2011, the United Nations Educational, Scientific and Cultural Organization (UNESCO) established an ICT (Information Communication Technology) Competence Framework for Teachers, where the competence framework covers six dimensions (see Figure 2). This includes: (1) Understanding ICT in Education, (2) Curriculum and Assessment, (3) Pedagogy, (4) Applying ICT, (5) Organization and Administration, (6) Teacher Professional Learning. Each aspect consists of three levels of endurance in the advancement of teacher competences: technology literacy, knowledge deepening, knowledge creation [11].

3. Methodology

This study used a qualitative method. Based on a students' survey and a previously published study, principles were identified. In this study section, we used investigation results for data collection analysis methods. Thus, the efficiency of e-learning instructional approaches including Distribution, Analysis, Design, and Development was optimized.

3.1 Distribution

Non-probability sampling with a convenience sampling technique was used to recruit participants who are convenient to participate by an invitation to an online survey link.

3.2 Analysis

Target audience analysis is a major step in proposing a framework for virtual teaching. The design and delivery of electronic instructional approaches will be influenced by key characteristics of the e-learning learners, i.e. their previous knowledge and skills, geographical provenience, learning perspectives and context, and access to technology, while all the direct and indirect identifiers were excluded from the sampling.

3.3 Design

The design stage encompasses i) formulating a set of questionnaires to achieve the general, high-level project objectives, ii) testing capabilities of e-learners towards technology's use, and iii) selecting instructional, media, evaluation, and delivery strategies.

This stage involves testing students' perceptions towards applied teaching tools during COVID-19 restrictions using a questionnaire. This questionnaire is part of a study on the capabilities of technology to provide effective virtual teaching and learning experience. The purpose of this survey is to assess academic lecturers and learners' perceptions towards digital teaching, including concrete needs and existing challenges, and to provide an outcome of preferred teaching formats and processes.

This survey was created using Google Forms. The questions contain different question formats including Likert scale, matrix, dropdown, open-ended, and single or multiple-choice questions. The questionnaire is divided into three sections: academic disciplines and teaching hours, perception towards online teaching during COVID-19, and instructional approaches. To ensure its effectiveness, all the answers are strictly confidential, and no personal identification is done.

3.4 Development

In this stage, the e-learning modified tools for the e-learning content are suggested. The selection of the tools can vary considerably, depending on the available content and selected instructional approaches. The development of e-learning tools encompasses storyboard development, which is a document that describes all the components of related interactive teaching tools.

3.4 Evaluation

The e-learning project is endured an evaluation for specific purposes. This involves addressing electronic learners' reactions, the achievement of learning objectives, the transfer of professor's related knowledge and skills, as well as the impact of the project on Deggendorf Institute of Technology, European Campus Rottal-Inn.

4. Results

4.1 Situation of online teaching pre-COVID-19

Based on the published study "Increasing Efficiency in Virtual Teaching in an International Context: E-learning and Instructional Approaches at ECRI" [12], various teaching formats such as lecture and whiteboard, seminars, laboratory work, field trips, case study, and online teaching were identified according to subject classification levels in science (see Figure 3). 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. Digital education aims at minimizing interferences to education among challenging times such as 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.

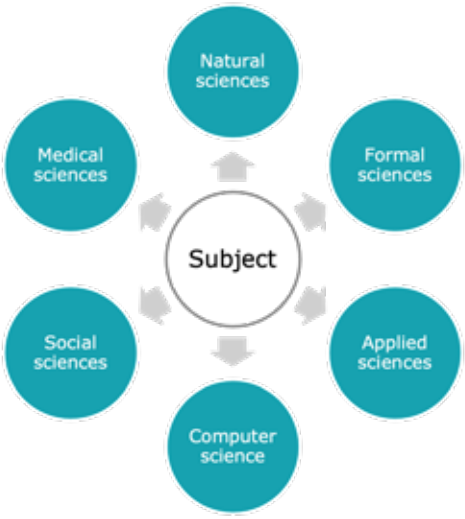

Figure 3: Subject classification levels in science

4.2 Situation of online teaching post-COVID-19

Prior to the proposal of the framework, it is necessary to identify the main components in facilitating digital competences in learning. Figure 4 shows an overview of the key concepts used in this study.

4.2.1 Proposing the structure of the online teaching framework for lecturers

In order to build the framework in line with the online teaching, and to approach the international trend, we will base the online teaching framework (see Figure 5) on the

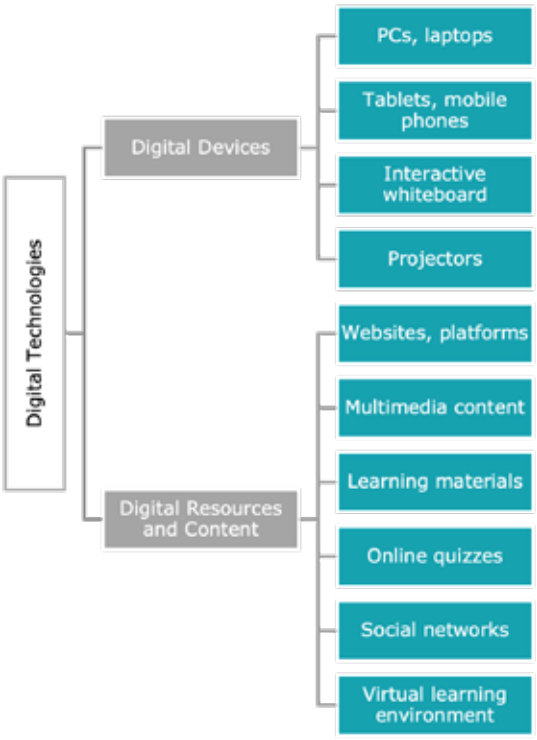

Figure 4: An overview of the key concepts in this study

following principles:

1) Students' perceptions
2) Instructional learning video type
3) Expositive-based teaching subjects
4) Application-based teaching subjects
5) Delivery format

Table 1 shows six suggested instructional learning videos, which encompasses flipped or inverted classroom videos, auditory visual learning, interactive videos, animations, video recordings, and slide cast. The first instructional approach involves expositive teaching methods, which encompasses presentations,

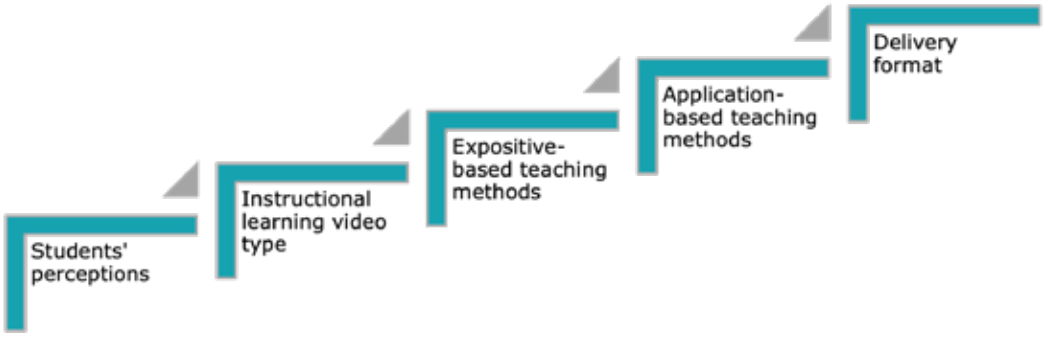

Figure 5: Proposed structure of online teaching framework principles

case studies, and worked examples. Table 2 presents the delivery formats under expositive methods. The second instructional approach involves application teaching methods, which encompasses demonstration of practicing methods to develop procedural skills such as laboratory work. These methods allow the learners to practice through applying the gained knowledge. Table 3 presents the delivery formats under application methods.

A survey on 102 students studying bachelor courses (B.Sc.) Health Informatics; (B.Eng.) Energy System Engineering and (B.A) International Tourism Management was carried out at the Faculty European Campus Rottal-

Inn (ECRI) of the Deggendorf Institute of Technology (DIT).

In this survey, students have proposed various opinions towards learning remotely. The purpose was to assess students' perceptions towards digital teaching including concrete needs and existing challenges and to provide an outcome of preferred teaching formats and processes.

Students' opinions have identified the potential for success in online teaching. Through the results of our investigations and analysis of the success in online teaching, we propose basic criteria for an online teaching framework based on these opinions (see Figure 6).

To achieve a user-friendly learner experience, and enhance students performance in various

Instructional learning video types
Flipped or inverted classroom videos (maximum 15 minutes recorded lecture)
Instructional videos supported by auditory-visual learning
Interactive videos
Animations
Video recordings of courses
Slide cast (parallel recording of the audio track of the oral lecture)

Table 1: Instructional learning video types

Delivery Format
Documents and PPT slides
Interactive e-learning lesson (interactive E-book)
Online educational videos
Webcasting (video lessons and podcasts)
Webinars (video/audio conferencing, chat-based)
Virtual classroom

Table 2: Expositive teaching methods and related delivery formats

Delivery Format
Combination of application sharing, animations, and real practice
Glossaries, templates
Electronic branched scenarios
Interactive whiteboard
Individual tutored activity in person
Online group activity

Table 3: Application teaching methods and related delivery formats

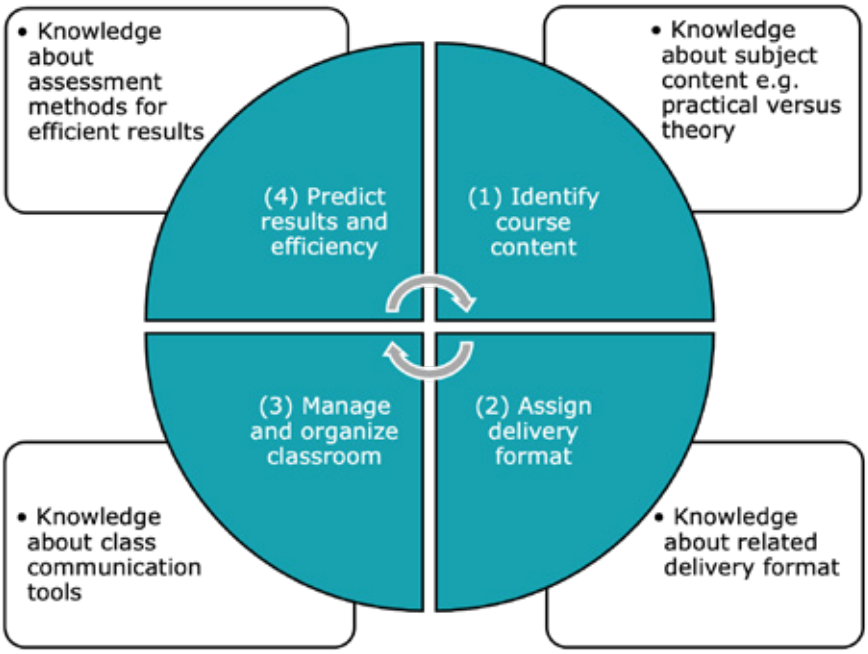

Figure 6: Basic criteria for an online teaching framework based on students' extracted free text

aspects of learner-computer interaction including: information, content, accessibility, relevance, and ease of use. Thus, further description and related suggested improvements are recommended accordingly to previously proposed criteria for online teaching framework (see Figure 7). Improvements in key concepts for approaching online accessibility involved perceivable, operable, understandable and robust.

To achieve a user-friendly learner experience,

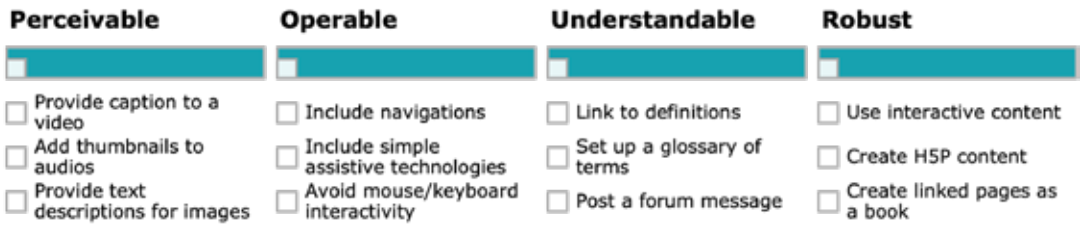

Figure 7: Online teaching improvements in key concepts and related recommendations

and enhance students performance in various aspects of learner-computer interaction including: information, content, accessibility, relevance, and ease of use. Thus, further description and related suggested improvements are recommended accordingly to previously proposed criteria for online teaching framework (see Figure 7). Improvements in key concepts for approaching online accessibility involved perceivable, operable, understandable and robust. In proposing the online teaching framework at the European Campus Rottal-Inn, various tools and recommendations are involved in different phases. The paper shows a list of activities that are examples of digital competence that serves to indicate to framework users what kinds of criteria are covered by the competence in question. How to determine the criteria, measure their value, and evaluate their effectiveness when applying the framework to online teaching needs to be clarified. The building of a framework must cover general capacity, professional competence, and management capacity to solve the elements of mission objectives, standards, and capacity requirements in online training and promote

efficiency in teaching methods towards developing the competence of students.

5. Conclusion

With this study, the project CREATE aimed at examining the experiences of academic students with their first weeks of online teaching post-COVID-19. The specific aim was to map their experiences and acquire knowledge in order to make necessary short-term adjustments in the subsequent rounds of online teaching. As the dataset is relatively small, due to the limited response, generalizations and exhaustive conclusions based on these findings are not within the scope of this report. Nonetheless, the study offers a first insight into the students' experiences with a drastic change in the delivery of their e-learning, and provides basic data that can be compared with future evaluations. These study results provide a framework for accessing methods and content in the form of delivery formats which needed to be included in the curriculum for specialty development of online teaching. The methodology and results presented in this study may prove useful to educational institutions determined to target professional development curricula for students, with the criteria and skills needed to successfully organize online teaching.

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Conflicts of interest statement

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

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