



**Modernization and Internationalisation of Iranian HEIs via collaborative
TEL-based curriculum development in engineering and STEM**

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Comparative Analysis of Iranian and EU Universities in state of the art of HEIs for TEL

ACRONYMS

ARCS	Attention, Relevance, Confidence, and Satisfaction
CDIO	Conceiving, Designing, Implementing, and Operating
ECTS	European Credit Transfer and Accumulation System
ENQA	European Network for Quality Assurance
EU	European Union
EUA	European Universities Association
HE	Higher Education
HEI	Higher Education Institution
ICT	Information and Communications Technology
IKIU	Imam Khomeini International University
IR	Iran
MSRT	Ministry of Science, Research and technology
NARIC	National Academic Recognition Information Centres
PC	Partner Countries
PD	Professional Development
QA	Quality Assurance
SU	Shiraz University
SBU	Sistan and Baluchistan University
SCU	Shahid Chamran University
SES	Socio Economic Status
STEM	Science, Technology, Engineering and Mathematics
SUT	Sharif University of Technology
UAb	University of Alberta
UI	University of Isfahan
USGM	Università degli Studi Guglielmo Marconi
UTU	University of Turku
VLE	Virtual Learning Environment



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Introduction

This report compares Iran and EU universities' partners on the Modernisation and internationalization of Iranian HEIs via collaborative TEL-based curriculum development in engineering and STEM project (UNITEL). The main general aim of the UNI-Tel project is to support modernisation, internationalisation and accessibility of the HE system within Iran through the development of innovative pedagogical approaches based on collaborative technology enhanced learning methodologies. Computer-supported collaborative learning (CSCL) is a promising social approach to foster learning.

The comparison process is a part of the baseline analysis which is focused on the state of the Art of HEIs in Engineering and STEM studies in relation to the pedagogical approaches and ICT-supported tools and systems used. this comparison is based on institutional and national reports.

Chapter 1. Methods and materials

The partners and participants of this project were from 7 Iranian universities including:

- Sistan and Baluchistan University (SBU),
- University of Isfahan (UI),
- Shahid Chamran University of Ahvaz (SCU),
- Sharif University of Technology (SUT),
- University of Tehran (UT),
- Imam Khomeini International University (IKIU),
- and Shiraz University (SU).

and EU partners were from 3 universities including:

- University of Turku (UTU), Finland
- University of Aberta (UAb), Portugal
- Università degli Studi Guglielmo Marconi (USGM, “Marconi”), Italy.

Data was gathered from various tools including 3 questionnaires and a semi-structured interview to acquire qualitative and quantitative data. Questionnaires and interviews covered all components of the existing status of Computer-supported collaborative learning (CSCL) in the Iran and EU partners. Such components included existing practices for curriculum planning, designing and implementing and a TEL course, industry relevance, TEL quality practices and support, and opportunities and challenges for adoption of TEL practices. All the collected information flowed into the comparative analysis.



Chapter 2. Existing practices for curriculum planning

2.1. Policies and guidelines in use for curriculum planning

Planning the initiation of a course (e.g. needs analysis for demand and constraint identification etc.)
Iranian universities, based on needs analysis (labour market needs, national, provincial, city needs and facilities of departments), departments design a new course and propose to the Ministry of Science, Research and Technology (MSRT), then necessarily, the MSRT revises. And finally offers to all universities.

According to the EU survey, starting a new course includes several kinds of information including: Responsible teacher and workload in the course; Learning objectives; Justification of the modular design of the contents, the methodologies and the teaching and learning activities, Syllabus; Assessment; and evaluation of current programmes and the needs of the society

Goals set in the organizational strategy and other governing documents for overall curriculum planning and development

Survey revealed In the Iranian Universities goals are set mainly in the light of the third and fourth generation of the university, qualitative development in parallel with quantitative expansion, diversification of funding sources, commercialization of research and completion of science, technology and wealth chain, increasing international scientific and academic exchanges, entrepreneurship, needs and students' ethics.

In EU universities governing documents besides academic autonomy plays an important role. Universities have strategies, policy programs, and quality policies/regulations. These documents can be very detailed and also tackle curriculum planning and development. and also "In curricula planning, special attention is paid to the clear description of learning outcomes, order of studies, and professional life relevance. The goal is to ensure the even distribution of studies throughout the academic year and to improve student well-being.

The description of the needs of working life and the industry in the governing documents

In Iranian universities there is no any written directive or statute that encourages colleges to make the connection between work and work-life. However, in some cases, some educators try to strengthen their curriculum by involving knowledgeable people in a profession. In a limited number of cases, universities also hold workshops inviting people who are successful in their field of work and working life. In general, In the vice-rector statutory letter for curricula planning does not emphasize the general skills that



can be transferred in the curriculum. For example, problem-solving skills, critical thinking, information retrieval, analysis and application, and the ability to communicate and collaborate have no place in the curriculum. Perhaps the only issue that is emphasized is entrepreneurial skills.

Nevertheless, the development of work life skills can be supported in a variety of ways in the curriculum. Therefore, some instructors try to acquaint students with common work methods in working life by choosing appropriate teaching methods. Also, some of them try to establish a connection between students' work and career life in the form of student projects.

Working life and the industry issues were tackled in the governing documents of all EU partner universities. For instance, In the UAb the whole organizational structure is supporting such orientation. Also, Labour market needs are mentioned in the Strategic Plan. In Italy proposal of a new course is finalized through consultation with job market stakeholders. According to the Italian law this phase is mandatory. In the university of Turku working life relevance is one of the key areas in the policy plan of the university. It is stressed that employers should be engaged in curricula planning whenever possible. Working life relevance is suggested to be planned also in a collaboration between the faculties. In the governing documents also, some concrete means are mentioned.

TEL/online learning as a part of the overall strategy for institution's development

Many Iranian universities had e-learning infrastructure before covid-19 pandemic but with the emergence of the Covid-19 Pandemic, e-learning become a main university strategy. In addition, now, with the changes that have taken place, organizational policies support online learning at the curriculum level. Higher education policy in Iran also shows that online learning will continue after Corona and will be considered as one of the important strategies in post-Corona education.

In all of the EU partner universities online learning is strongly represented in the overall strategy for institution's development. In fact, UAb and USGM are fully online universities. UTU has strong traditions in using technology in teaching and learning.

Laboratory activities within curriculum planning

In Iranian Universities Laboratory activities are always part of STEM programs. These may include engineering sciences (physics, chemistry, etc.) or specialized courses which require labs. But these laboratory activities are mostly done physically and in the laboratory.



In all EU partner universities, laboratory activities are part of curriculum planning in various fields. In these courses the laboratory activities are studied: planning, carrying out research, analysing the results, presenting the results orally and writing a report.

Laboratory activities in use (e.g., in presence, virtual, remote labs etc.).

The main laboratory activities in Iranian universities are in presence and only, few universities, such as Shiraz University, have e-laboratories and offer their laboratory activities virtually universities use virtual labs.

All EU partner universities have both in presence and virtual laboratories. UAb and USGM have also remote laboratories. UTU being a campus university, virtual labs are not replacing real laboratories, but complementing them.

Virtual/remote labs in terms of technological infrastructure and pedagogical model applied

Most Iranian universities do not yet have the necessary technical infrastructure to run virtual laboratories.

The following technological infrastructures and pedagogical model are used in Turku and UAb:

Labster virtual laboratories (Turku)

Virtual Programming Lab (UAb)

Virtual reality environments OpenSimulator (UAb)

Linux and open-source software (UAb)

Affect of the COV-19 pandemic to curriculum planning practices

Covid-19 affects all teaching and learning activities in Iran Universities. Learner-centered tendency, Evaluation, Group activities, Teaching and Use of media have been affected. But the syllabus remained unchanged.

In EU partners the Covid-19 pandemic didn't have much impact in regard to curriculum planning practices. The only major change relates to exams. All EU universities during the pandemic had the possibility to hold the exams in distance modality.



2.2. Curriculum planning in practice

Planning the initiation of a course (e.g. needs analysis for demand and constraint identification etc.).

In Iranian Universities, departments play a critical role in preparing, designing, and initiating a course. They are expected to consider needs and constraints in the initiation of a course.

Eu universities follow different strategies but, in many cases, proposals emerge from benchmarking exercises with other public universities. Also, professors own research and expertise, ideas and feedback from the students, and university strategy and support can be a starting point for a new course.

Taking into account different stakeholders (e.g. teachers, students, businesses and other actors in society) and their needs in the curriculum development

Iranian universities owe offices that are responsible for identifying business and society needs. also, recently faculty members must to spend a 6-month period at business to get familiar with business needs. In addition, university professors have the authority to design their own curriculum based on the needs of the students

In Eu universities Faculties or departments can have advisory committees where different stakeholders are represented. Students are having their representatives along with the teachers in faculty and department level committees as well as in the General Council of the University, which is a top strategic oriented governing body, that includes invited external advisors alongside student and teacher representatives.

Designing the content of the course

In Iranian universities the Ministry of Science, Research and Technology (MSRT) lists Courses, Modules, and as well as Syllabuses. However, some flexibilities are acceptable made by academics who are experts in that specific field. But for planning a new module and syllables, the professors of a department provide a proposal and take the procedure described before.

In Eu universities the faculty member has broad autonomy in the design process, mostly making use of research output openly accessible. The content can also be designed by a team of Faculty members including not only content experts but also pedagogical and technological support personnel

Specific pedagogical practices and innovation in curriculum design in faculty level

Iranian universities do not have a specific and uniform procedure in this field; however, each university pays attention to some methods and innovations in teaching according to its own taste.



Eu universities have different approaches in this regard. In UAb the curriculum reflects the UAb's Pedagogical Model for Distance Education, and its Development Scenarios. The technological didactic model of distance teaching/learning, adopted by USGM capitalizes effectively boosts the best design, production and delivery of services/content of online education, and the internal know-how. In UTU the curriculum does not reflect any specific, tight pedagogical practice. However, university has promoted and supported ie. flipped learning by organizing courses and support material for teachers interested in such a topic.

Ways to discuss working-life relevance of the curricula in the faculty level

In Iranian Universities connection between working-life and the curriculum depends to a large extent on the teacher. Although some suggestions are provided in the curriculum documents, teachers are free to use them. planning. The curriculum normally includes an internship at least as an option, if not mandatory.

In Eu Universities faculties are encouraged to strengthen the professional life relevance of education such as problem-solving skills, critical thinking, information retrieval, analysis and application, entrepreneurial skills, and the ability to communicate and collaborate both in basic and doctoral degrees by involving professional and business life representatives in the curricula planning. Alumni collaboration is often used in the planning of education and services. The curriculum normally includes an internship at least as an option, if not mandatory.

Teaching staff-student ratio

In Iranian Universities average rate can be announced from 1 to 21 to 1 to 28. This is the teacher-to-student rate. In addition, in each of the universities, as well as at the faculty level, there are some people who support online learning and are involved in holding online courses.

Teaching staff / student ratio In EU partner universities is different in different courses. In the 1st cycle course, it can be 1 teacher up to 60 students, later 1 teacher up to 10 - 20 students.

Chapter 3. Designing and implementing and a TEL course

3.1. TEL as a practice in institutions

TEL / online courses as a usual practice, not just because of the pandemic



In Iranian universities before the pandemic, TEL or online courses were not widespread, but after that, it became prevalent practice. So that now most universities do their education this way and are looking for continuous development

All EU partner universities use TEL extensively. UAb and USGM are dedicated online universities and the pandemic has had no significant impact on that respect. In those universities TEL is used in all levels of education. In UTU TEL has been an integrated part of teaching and learning for decades. The pandemic has increased the use of TEL in terms of users and the ways TEL is used.

TEL as a part of the overall strategy for institution's development

In all Iranian partner universities, TEL is part of the university's strategy, the majority of professors take part in short-term seminars or specific workshops to enhance their skills in designing TEL-based courses.

TEL is strongly represented in the strategies of all EU partner universities. UAB is intended as a university able to adapt to changes and respond to the current needs of society, incorporating the resources and technological developments to provide a better service and increase its competitiveness. Teaching and IT technologies innovation" is one of the pillars of USGM mission. Main strategies to enhance and promote educational research and teaching innovation are as follow:

- Focusing the attention on the learning potential of students
- Providing a didactic methodology and innovative technological tools in order to facilitate and personalize students' studies, following the benefits and the characteristics of the e-learning
- Developing theoretical and practical models designed to ensure a continuous improvement of the learning environment, always reflecting the best national and international standards.

UTU's main strategy is "We are a forerunner in the staff and students' digital competence and expertise". This is operationalized in the Policy Programme with the goal "We inspire unique learning experiences and outstanding learning outcomes." For this goal is a policy titled "Modern and accessible learning and teaching methods". Under this policy are eight actions. For every action the responsible parties are named.

Institutional strategies for digital innovation

all Iranian universities have reported pursuing digital innovation strategies. each of them pursues a different strategy in the field of digital innovation. Based on this strategy, the teacher can evaluate the educational content directly on the platform and provide the resulting feedback more effectively. Students can also access and participate in learning from home.



digitalization is a priority in all EU partner universities.” there are actions such as “Developing research equipment and its usability and accessibility. Advancing the joint use of equipment both internally and with regional partners” and “Supporting the acquisition and joint use of research data, data processing and management, for example, with artificial intelligence solutions; Promoting the use of computational science.”

3.2. Technology in use

Technology (e.g. platforms, videoconferencing etc.) and it’s use

Iranian partners almost use similar platforms for online and offline communication. they use Adobe Connect, Big Blue Button, and Skyroom platforms for online and synchronous communications. The universities commonly use Moodle for asynchronous communications and for uploading videos, homework, and assignments, creating discussion enlivenments, and taking quizzes.

In contrast EU partners use wide range of platforms and tools. USGM uses CO-SHARING, CO-BROWSING, WHITE-BOARD, SURVEY, RECORDING. And it also uses Video lessons, Self-assessment and exercises, Multimedia case studies, Virtual laboratories, Simulations and Serious games. The virtual learning environment in UAB is based on a customized version of Moodle. The university uses various web2 tools and mobile apps. And also, it uses LimeSurvey, Zoom, Power BI, NVivo, SPSS, LaTeX, Urkund, H5P plugins. University of TURU uses following technologies:

- Platforms:
 - Moodle,
 - ViLLE (collaborative learning platform, developed by the Centre of Learning Analytics, University of Turku)
- Electronic exams
 - Exam (rooms with video surveillance for electronic exams in the university)
- Videoconferencing:
 - Zoom
 - Teams
 - Adobe Connect
 - Skype for Business
- Recording and presenting lectures:
 - Echo360
 - Adobe Presenter



- Collaborative platforms:
 - Flinga (message board)
 - Messagewall (for large seminars)
- Course feedback: Webropol
- Electronic thesis process:
 - UTUGradu process includes an electronic originality check (plagiarism detection), examination and approval process, electronic publication, and electronic archiving
- Student databases
 - HOPS (personal study plan)
 - Peppi (courses, timetables etc.)

3.3. Course development process

The initiation of a course (e.g. needs analysis for demand and constraint identification etc.) in TEL/online courses compared to face-to-face courses

In Iranian partners there is no difference between online and face-to-face curriculum, in fact TEL/online courses are as same as f2f course. however, the faculty members are trained to use the LMS, videoconferencing, and other required software.

In contrast, UAb and USGM concentrating in online courses only. In UTU, basically there are no differences with the curriculum development process in face-to-face and online courses

3.4. Stakeholders involved and their roles and tasks

Involvement of students in TEL/online course design

In the Iranian partner, some Universities, receive students' feedback and report them to faculty members, and encourage them to use it in course design.

EU partners involve students in two ways: Having their representatives in different bodies: Curriculum council, Pedagogical council, Departments plenary meetings, Programme Advisory Committee, Faculty Committee and by giving feedback on courses and programmes.

Designing the content of the course

In Iranian universities, TEL content is designed similarly to a face-to-face course. In fact, the content is the same and does not change much, but the media is new and has its own requirements that must be complied with.

Eu universities follow different procedures have different strategies. Some of them are described in 2.2. In USGM process begin with receiving the storyboard or the design



document of the educational object and after several procedures, the content will be prepared to be shared and delivered.

Technical support for teachers in course design at university, faculty and department level

In Iranian universities there is an office or center called Teaching Development Center or the Office of Educational Planning in universities that conducts f2f or online workshops and courses on course design. But at the faculty level, there is no support for design, and this is left to the teachers themselves.

Eu universities provide technical support too. For instance, in UAb the support is given at university level, in USGM at the faculty level, in UTU at the department, faculty and university level depending on the need. In UTU The support consists of the e.g. expertise:

- instructional designers,
- programmers and developers that implement the e-learning platform
- audio/video technicians for the shooting, production and post production of the video and audio lessons
- graphic designers for interface and multimedia graphics production.

Facilitators that support the learners: their role, tasks and the cooperation with the lecturer

In Iranian partner there is no facilitation system at the university or college level. Teachers themselves largely carry out facilitation tasks for students and try to support learners when needed.

Eu universities provide various support. In UAb there are positions as follows: Tutor, Patron/Mentor, Course secretary, and Course teacher coordination team. In USGM two kinds of tutors constantly support learners: Didactic tutors, more focused on giving assistance on course contents, and technical tutors, who take care of the technical supports of the learning path. In UTU there is no university level facilitator system at the course level, but at the programme level there are personal tutors, who follow the study process yearly.

3.5. Protocol of course and programme assessment

Assessment of courses and programmes and student involvement in the evaluation process

In Iranian universities faculty members are free to select their evaluation methods, however there are some general standards and regulations imbedded in formal curriculum which every teacher must take into account.

Eu universities have their own procedures and actors. The faculties are responsible for organising education but in quality assurance they are supported by a wide range of



actors, such as the University Quality Presidium, Quality Unit, Teaching and Learning Council, Committee for the Follow up and Improvement and Joint Committee Professors-Students. At some level also the national evaluation bodies are setting the requirements

Data collection

In Iranian universities Educational Planning Office (EPO) is responsible for collecting and analysing data. This office provides the data to the professors if necessary, and they can use this data to improve their work. Also, all professors can access this data through the training system.

In EU universities, student feedback is collected through online surveys. Learning analytics is used for continuous evaluation and support. The data is collected from Moodle and other databases. Also, in some universities, phone interviews are used, for the whole, learning experience at the university.

Informing about the evaluation

In Iranian universities the evaluation results are gathered and statistically analysed by a database. Each faculty member will have access to the results through the designed platform. These data are also available to the head of the department, dean of the college, and the office of vice-president in educational affairs.

In EU partner universities the information is “filtered” through the evaluation system so that each level has the information which is needed to monitor and develop the quality of teaching and learning: Some information is made available to the Rector and his/her team, to departments’ directors who share the results with the course coordinators; the course coordinators share them with the teachers. The results can also be made available to the general public outside the university.

Measures taken for improvement

According to the survey, in Iranian universities, there is no one-size-fits-all plan to improve the situation based on student feedback, and professors usually decide to improve their teaching methods based on the feedback they receive. Sometimes professors may make suggestions to the Vice Chancellor for Education and ask the Vice Chancellor to hold a workshop in this area.

In contrast in EU universities, evaluation results are used as follows: they can be discussed in yearly developmental discussions between a lecturer and his/her foreman. They are often discussed in plenary meetings and seminars of the departments, and in meetings between the course coordination team and all the program teaching staff.



Concrete measures for improvement are proposed and analysed in such meetings. These measures are monitored by respective actors according to the quality system of the university.

3.6. Identification of TEL / online quality practices or patterns of quality

Quality standards/frameworks for TEL/online

Iranian universities have a quality assurance system which is not customized for TEL-based learning.

EU partners are following their own quality practices and manuals, and None of them have plans to adopt any special quality framework for TEL/online teaching.

Data collected to evaluate TEL/online programs and the use of learning analytics

In Iranian universities Various kinds of data are collected including: Technology, Covering the curriculum in the designate time, Quality of online interaction, Quality of the contents and instructional materials, Quality of online teaching and Teaching strategies.

EU partners also Various kinds of data are collected. In particular, UTU has launched the “Learning analytics policy of the University of Turku. this university has “The Centre for Learning Analytics”.

Ethical norms and government policy with respect to data protection and the privacy of students

In Iranian universities, data protection is accompanied by compliance with ethical norms. They always strive to protect data while respecting the privacy of students and faculty.

In EU partners there is EU regulation on data protection (EU, 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and Directive 95/46/EC / General Data Protection Regulation). Also, at the national level, there are additional norms, and universities are taken these into account in their own policy programs and practices.

3.7. Process of continuous improving of educational provision

Review, updating, and improvement of TEL/online programs



Since Iranian universities have recently emphasized on TEL programs, they have not yet been reviewed and updated. But, TEL-based programs are treated the same as traditional programs. Normally Each program is updated every 5 years.

In EU partner universities TEL program is evaluated with the same procedures as traditional teaching according to the quality manual of the institute.

Institutional policies, structures, processes, and resources in place to guarantee the successful teaching and learning process of students with special educational needs

In Iranian universities, there are some regulations regarding students with special educational needs. welfare organization also provides facilities for students with special educational needs across the universities.

All the EU partner universities have seen the fulfilment of the needs of the students with special educational needs as an important objective. UTU has been advancing availability since 2001 by developing equal study opportunities for different students. There are two officers called The Accessibility Planning Officers advise students and personnel in different questions dealing with accessibility and availability. In UAb the Student Regulation with Special Educational Needs of Universidade Aberta, Moreover, the initiative of the Vice-Rector for Teaching, Training and Academic Organization - The admission to the UAb students with special educational needs (NEE Students) justified in the past the creation of the "Accessibility Project", which has allowed the monitoring of life academic performance of these students and promote their inclusion in the UAb. In USGM for SEND (students with special educational needs) students, in every course the presence of lecture notes together with video lessons is ensured.

Institutional policy and code of practice to ensure academic integrity and freedom and ethical behavior

Iran's MSRT provides some policies and codes of practice to ensure academic integrity and freedom and ethical behaviour and universities are committed to following these policies.

In all EU partners universities, there is an Institutional policy and code of practice to ensure academic integrity and freedom and ethical behaviour. For instance, in UTU there is are "Guidelines for Misconduct and Fraud" including ethical rules. University is committed to follow the guidelines of good scientific practice and procedures for handling misconduct and fraud in science, compiled by the Finnish Advisory Board on Research Ethics. UAb has an institutional policy on this subject and the Student Disciplinary Regulation (Regulamento Disciplinar dos Estudantes da Universidade Aberta) is the specific code of practice that regulates academic integrity, freedom and



ethical behaviour. In USGM all these aspects are reported into the Faculty Handbook that is signed by every lecturer, teacher and professor before starting his activity at USGM. In the Faculty Handbook is stated that Academic Freedom is fully supported: “Instructors teach students within assigned courses and accurately track all submissions and grades within those assigned courses.

Electronic security measures set by your institution’s policy/code of practice

In Iranian universities, there is a center called University's informatics and information center that is responsible for electronic security. In addition, MSRT has provided a tool for plagiarism detection which is mainly used for dissertations.

All EU partner universities are using electronic plagiarism detection.

3.8. Professional development of teachers and instructional designers

The specific expertise in academic and technical aspects of the people involved in designing/ developing/ evaluating TEL/online programs in faculty level

During the covid pandemic In Iranian partner universities, some webinars and workshops on designing/ developing/ evaluating TEL/online programs were held, so the teachers are more or less familiar with the topics.

UAb and USGM are both online universities, so the people who are engaged in designing/ developing/ evaluating TEL/online programs have received advanced training in the use of media technology for academic purposes, and most conduct regular research and innovation activities in the field. There are (part-time) instructional designers in some of UTU's faculties who are responsible for design/develop/evaluate courses and programs. In most cases, designers have practical “hands-on” expertise after utilizing TEL for years. Sometimes teachers are the key persons to design/develop/evaluate courses and programmes.

Familiarity of the teaching staff involved in designing/ developing/ evaluating educational programs with the advantages/disadvantages of using TEL/online in particular course contexts

Iranian partner universities during covid 19 pandemic got more familiar with advantages/disadvantages of using TEL/online in particular course contexts.

Eu partners also are familiar with the advantages and disadvantages of TEL.

Training of teaching staff and new staff in the use of learning technologies and (e-) assessment methods

There is sufficient teaching on the use of learning technologies and (e-) assessment methods across Iranian partner universities.



In Eu partners, the teachers are trained and there is also much support available. But in some cases, especially during “emergency online teaching” caused by Covid 19 teachers have not been prepared to use TEL on a large scale. In some partners pedagogical courses as a part of the PhD training (UTU).

Procedures to identify the support requirements of the teaching staff

According to the findings, in Iranian partner universities, there are some centers that are responsible to identify the support requirements of the teaching staff.

In Eu partners, Universities based on procedures are constantly assessing the training needs of the personnel.

Workshops available for teachers to attend

In Iranian universities faculty competencies such as teaching methods, motivating students, assessing learning, writing lesson plans, creating lessons on the Moodle platform, interaction in e-learning, and so on.

Eu partners provide several workshops such as technology as a support in hybrid teaching, technology in face-to-face teaching, designing online teaching (Workshop: Moodle activities and discussions, presenting a self-made course plan in a seminar including feedback from experts), Editing and subtitling with Screencast-O-Matic, Tips for making videos, Tips for podcasts, electronic assessment, Students making videos.

Chapter 4. Industry relevance

4.1. Policy and action plan for industry-relevance

Ways to consider industry needs when developing the learning model and the curricula design

In Iranian universities, different sectors have their own ways of cooperating with industry. The selected approaches may be based on organizational or personal relationships. At the ministry level, recently there has been introduced some innovative ways leading to better collaboration with the industry. One of them is an industry-related research opportunity that all newly recruited professors are obligated to take part in it.

EU partner universities have different practices to consider industry needs. in Utu, there is a position of professor of practice. Professors of practice are industry experts who lecture and do research in their own fields. Thus, bringing in the practical world for the students. Thus, industry involvement is inherited to the activities of the university. At Uab, Departments have their own ways of collaborating with the industry and promoting knowledge and innovation transfer. These are based both on



formal agreements with organisations, institutions and companies as well as on personal informal ties and connections. The Sciences and Technology Department specifically collaborates with local, national and international companies. Students can be involved in R&D projects (usually in the framework of their PhD research) with the industry/companies. UAb has established hundreds of protocols and partnerships with national and foreign institutions with special focus on research and development activities, especially in the area of distance education and eLearning.

Industry and other stakeholder involvement in the curriculum process (e.g. ways to consider specific needs for STEM education when transferring courses to technology enhanced learning or online learning)

In Iranian universities partner when transferring courses to the online learning environment, some attention is paid to some of the needs for STEM education. European Universities are more or less on the same level on TEL activities, and the pandemic made the ones behind to take a big leap to develop their university. They use same e-learning tools, and they have the technology to further develop their TEL methods.

4.2. Infrastructure

Alignment of the technical infrastructure with the teaching methodology, learning activities, and e-assessment methods

technical infrastructure at Iranian partner universities has improved recently occurrence with pandemic, meanwhile some universities had founded desire technical infrastructure before covid 19. Many e-learning tools are aligned with teaching methodology, learning activities, and e-assessment methods.

UAb and USGM a functioning infrastructure including e-assessment methods is a prerequisite for successful action. Also, UTU as a traditional university has added flexibility and increased possibilities for planning the studies, electronic exams are used.

Infrastructure and used online tools supporting student active learning and collaboration

At the Iranian universities the existing technical infrastructure is suitable for providing theoretical lessons and learning activities. Evaluation is also possible in these systems. However, evaluation methods are limited due to the technical infrastructure provided and there is a possibility of fraud in these methods.

The role of technology at Eu universities is to support student active learning. However, depending on teachers' pedagogical thinking and technological skills there is variation in how much collaboration the courses include.



4.3. Assessment of learning

(E-) assessment methods: fit for purpose, allowing students to demonstrate the extent to which the intended learning outcomes have been achieved

Due to the pandemic, Iranian universities were forced to quickly move to e-assessment. Despite organizing several workshops on e-assessment, designing and implementing e-assessment as well as formative assessment across Iranian Universities, there is not any formal data about the success or failure of e-assessment. At Eu universities, some principles are considered crucial e.g., assessment must be aligned with the intended learning outcomes, multiple forms of assessment methods are encouraged, and feedback given to the student is important in the assessment process.

Designing assessment

Iranian universities assess TEL courses by LMS. professors can design different types of questions such as multiple-choice, true-false, easy, and so on by LMS tools. Usually, assignments are created by LMS.

Eu partners use different tools and methodologies for assessing learning. In UAb the e-assessment methodology is based on the production by students of a number of evidences of learning outcomes achievement. Several e-assessment tools are used from portfolios to learning analytics. In UTU the methods of evaluation are mentioned in the curricula, However, the individual teacher has autonomy to decide about the content of the evaluation.

4.4. Functionalities of the technical infrastructure

Virtual learning environment supporting specific pedagogical methods and tools

Existing VLE in Iranian Universities supports only direct pedagogical methods. The platform used to create a virtual learning environment in most universities is Moodle and how it is used depends to a large extent on the skills and knowledge of professors in this field.

Moodle is also widely used in EU partner universities. It is up to the individual teacher and his/her skills and knowledge of pedagogy and tools how Moodle and its different elements are used.

VLE based on non-proprietary web standards and updating the VLE to reflect technological changes

The majority of Iranian Universities use open-source web standards. They customize VLE according to their needs and circumstances.

Eu partners also use open sources web standards. Moodle supports open standards, and is interoperable by design to enable integration of external applications.

Technical infrastructure ensuring the accessibility of the TEL/online programme by students with special educational needs

Since Iranian universities have no long background in e-learning such required tools have not been considered. Students with special educational needs are taken into account in Eu partners. The technical infrastructure applies the Accessibility Guidelines for Web Content. In addition, there are Guidelines for Creating Accessible Documents and templates provided.

4.5. Use of virtual and remote laboratories

Provision of an e-library

Students in all Iranian and Eu partners have access to e-Library.

Availability of virtual labs

Majority of Iranian partners have no virtual labs.

In contrast Eu partners have virtual labs. In UTU the Institute of Biomedicine has a licence to use Labster virtual laboratory. The institute also has a licence for Aiforia, which is a cloud-based solution for virtual microscopy and image analysis. Also, UAb has virtual labs. The VPL - Virtual Programming Lab coupled with the e-learning experience at UAb offers students a complete programming environment, and professors the means of creating and evaluating code development exercises.

Availability of remote labs

Majority of Iranian partners have no remote labs. Only shiraz university has remote labs.

Among Eu partners USGM uses remote laboratories in many programs: Electrical Engineering (EE); Thermochemical and Electrochemical Energy Conversion Systems (TEECS: Reactors and Fuel Cells); Management of Advanced Powertrain Systems (MAPS: hybrid and alternative fuels vehicles, powertrain and road management).

Chapter 5. TEL quality practices and support

5.1. Staff professionalization

Procedures for recruiting and hiring teaching staff



Iranian partner universities follow similar procedures for recruiting and hiring teaching staff. Iran ministry of science and technology has regulated some procedures for all universities and also each university has its own for recruiting and hiring teaching staff. Eu partner universities have systematic procedures for recruiting teaching staff. International recruiting has become more and more important and it's encouraged.

Pedagogical training for teaching staff and courses for technology-enhanced learning

Iranian university partners have a regular plan for training teaching staff. Every year, the University Planning Office or any other center organizes courses for faculty members on teaching methods, lesson plans, test designs, and the use of technology in teaching. planning office conducts a preliminary needs assessment for each training course and the training objectives of the courses are determined based on the results of the needs assessment.

Eu partners have special focus on training teaching staff. In UAb pedagogical training is mandatory for teaching staff. In UAb teacher training focuses on online pedagogical and technological aspects. In UTU, personnel in positions that involve teaching, pedagogic studies or a preparedness to carry them out are required. UTU has organized systematic pedagogical training for teaching staff since 1996.

Teaching staff coordination during course delivery

Iranian universities have an office responsible for coordinating course delivery. The university educational planning office schedules training courses.

Eu partner universities have different approaches. In online universities UAb and USGM all programs have coordination teams. At UTU, the responsible teacher has great autonomy and coordination is much looser.

Support materials on the intranet for online learning and teaching

Iranian universities have various training materials available on the university LMS and can be accessed by any teaching staff.

Eu partners also have wide range of support materials (etc. texts, animations, videos) in intranet.

Chapter 6. Opportunities and challenges for adoption of TEL practices

6.1. Opportunities and barriers for transformation of education in order: the most important first

Iranian universities have similar opportunities and barriers for adoption of TEL practices.



Providing online learning software and training for faculty members, Faculty members can use various type of media in teaching (video, audio, multimedia, simulation and etc.), Reviewing and updating the curriculum regularly based on the needs of society and industry, providing the practical training in form of online for industries, Possibility of reducing educational and laboratory costs by holding theoretical and practical-laboratory classes of educational groups online, Possibility to recruit faculty members of other universities to present e-courses, More flexibility in course scheduling (time, duration, etc.), and, Facilitating design and development of new interdisciplinary programs.

Eu partners also have similar opportunities such as the use of TEL offers flexible (time, place) learning opportunities. There is not always need to come to campus, but it's possible to study with recorded lectures. In the long run the use of TEL will save time and resources. TEL can offer "other", augmented worlds and make learning experience wider in many senses. TEL can add a motivating factor for learning. Through TEL it's possible to construct new kind of inclusiveness and offer an alternative way for more introvert students, who are not so ready and fast to communicate face to face. TEL also offers an opportunity to practice future skills (remote work, collaboration at distance). Online learning contributes to achieve the sustainable development goals, namely to decrease the carbon footprint, Open and flexible education contributes to widen access to quality higher learning opportunities for all, Digital learning is critical to support the digital transition in Europe.

6.2. Barriers

Iranian partners face challenges and barriers such as poor advanced technological infrastructure, challenges to teaching practical courses, students' poor motivation to participate in online learning activities, e-assessment challenges in particular cheating, lack of access to high-speed internet in rural areas, low familiarity of faculty members and students with teaching and learning online, and, lower interaction between the faculty member and student.

Eu partners have different challenges and barriers. They reported barriers related to learners, related to teachers and related to the university.

According to the findings some barriers reported by Iranian and Eu partners are similar.

