

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

STATE OF THE ART OF HE FOR TEL

National Report of Iranian Universities



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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
IR	Iran
NARIC	National Academic Recognition Information Centers
PC	Partner Countries
PD	Professional Development
QA	Quality Assurance
SES	Socio Economic Status
STEM	Science, Technology, Engineering and Mathematics
TEL	Technology Enhanced Learning
VLE	Virtual Learning Environment

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6.1. Opportunities
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Chapter 1. Institution Information

- *Name of the partner*
- *Names of respondents, positions, departments*
- *Provide a short introduction describing the methodology you used and the number and types of sources*
- *Please keep your answer short, maximum 1 page*

The partners and participants of this project were from 7 Iranian universities including: Sistan and Baluchistan University, University of Isfahan, Shahid Chamran University of Ahvaz, Sharif University of Technology, University of Tehran, Imam Khomeini International University and Shiraz University. In each of these universities, students, professors, and business actors who had experience using TEL courses participated in the project.

The research method was a mixed and including quantitative and qualitative. In order to collect data 3 main steps were followed. In the first step questionnaires and interviews were gathered, the second step received data were analyzed and in the last step they were validated.

Chapter 2. Existing practices for curriculum planning

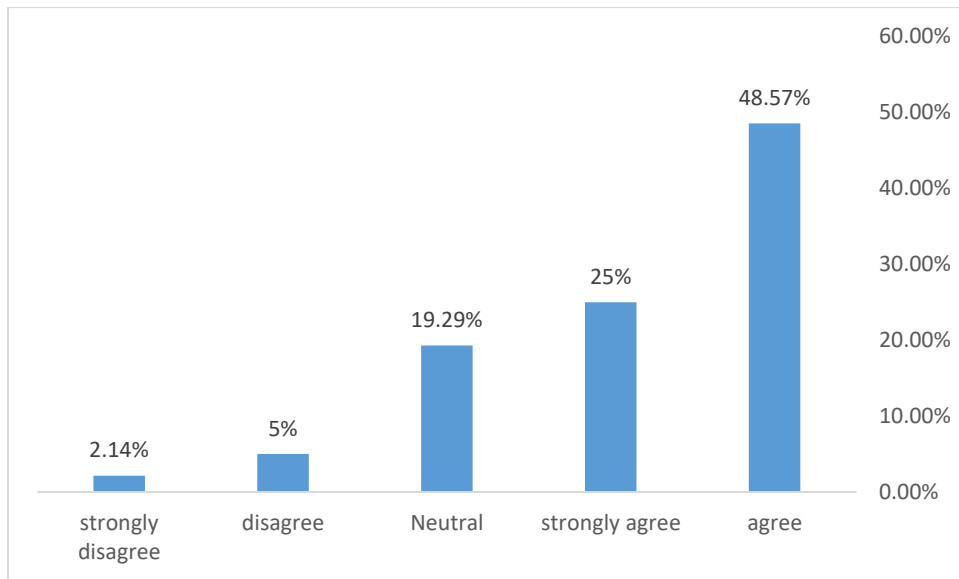
2.1. Policies and guidelines in use for curriculum planning

- *How do you plan the initiation of a course (e.g. needs analysis for demand and constraint identification etc.)*
- *What kind of goals are set in the organizational strategy and other governing documents for overall curriculum planning and development?*
- *Are the needs of working life and the industry somehow described in the governing documents? If they are, please describe, how?*
- *Is TEL/online learning part of the overall strategy for your institution's development and how?*
- *Do you foresee laboratory activities within curriculum planning?*
- *Which kind of laboratory activities do you use? (e.g. in presence, virtual, remote labs etc.).*
- *In case you use virtual/remote labs can you please describe them in terms of technological infrastructure and pedagogical model applied?*
- *Has the COV-19 pandemic affected your curriculum planning practices? In which way? (please describe any changes that occurred after covid pandemic broke out).*



How do you plan the initiation of a course (e.g. needs analysis for demand and constraint identification etc.)

Undoubtedly, if the curriculum is based on determining the needs and prioritizing them, it will definitely be a step towards achieving the predetermined goals and the success of the participants will be greatly increased. Therefore, many educators believe that to analyze needs, they must first identify the desired performance outcomes, then examine the current performance outcomes, and finally identify gaps and create and prioritize solutions.



As the diagram above shows, about 74% (the sum of strongly agree and agree) of professors assess students' expectations at the beginning of the online course by asking students' short-term and long-term goals. Only 7% of professors do not do this.

At a larger level, Iranian universities, based on needs analysis (labor 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 if necessarily, the MSRT revises. And finally offers to all universities.

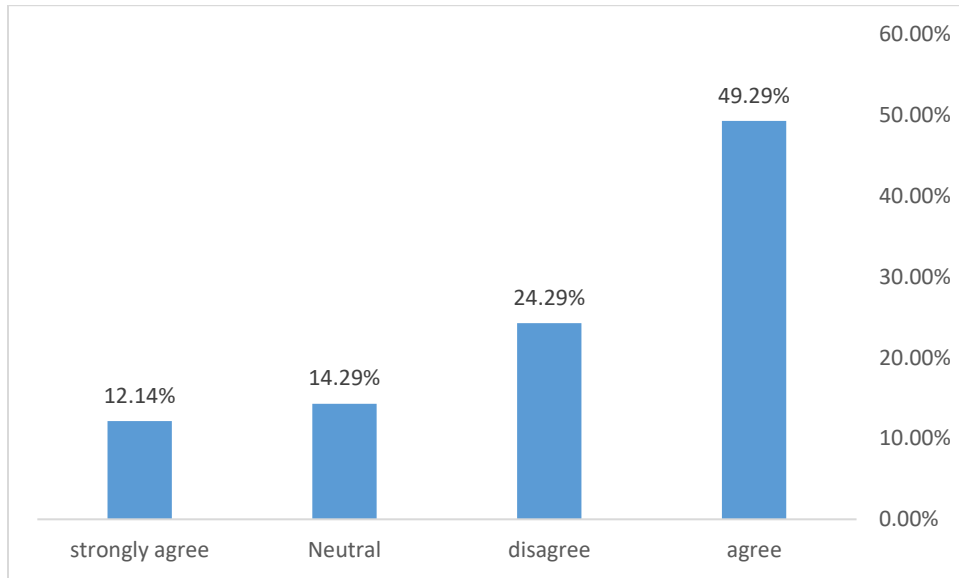
What kind of goals are set in the organizational strategy and other governing documents for overall curriculum planning and development?

The goals are set mainly in the light of the third and fourth generation of the university, qualitative development in parallel with quantitative expansion,

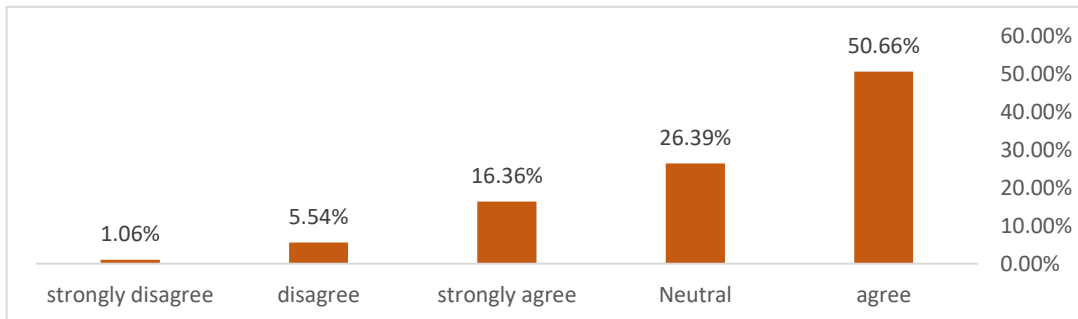


diversification of funding sources, commercialization of research and completion of science, technology and wealth chain, increasing international scientific and academic exchanges, entrepreneurship, needs and students' ethics.

Are the needs of working life and the industry somehow described in the governing documents? If they are, please describe, how?



As the diagram above shows, about 62% of the professors (the sum of strongly agree and agree) believe that in online education, teaching according to the individual interests and abilities of students is a difficult task.



Also, about 67% of students (the sum of strongly agree and agree) believe that in the online learning environment, more emphasis should be placed on teaching problem-solving skills in real life. While about 7% of students believe that online



learning environment should not focus on teaching problem-solving skills in real life. About 26% of them have no opinion in this regard.

However, there are no written directives or statutes in universities that encourage 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.

Is TEL/online learning part of the overall strategy for your institution's development and how?

Yes, TEL/online learning is part of overall strategy for Improving and expanding university functions. Many 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.

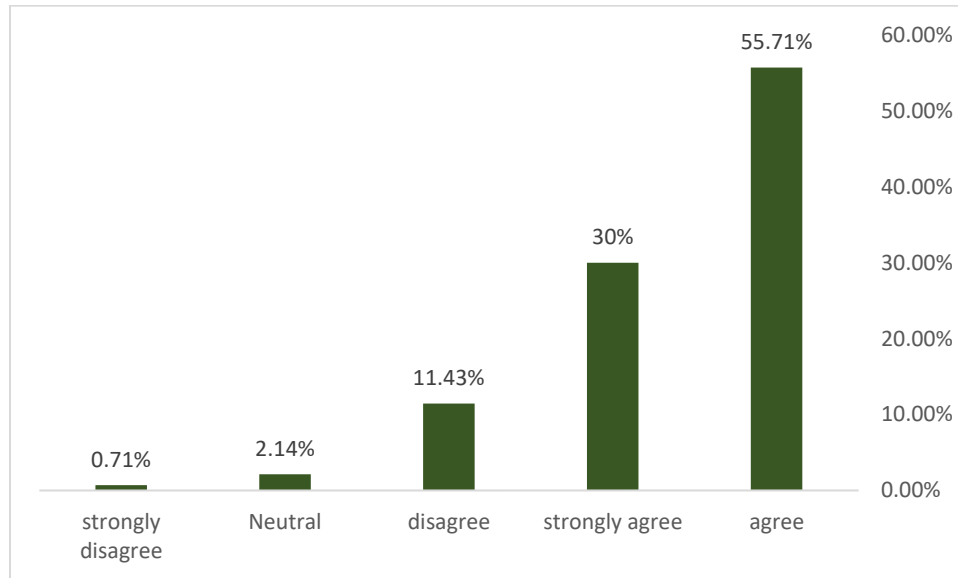
Finally, it can be concluded that due to changes in technology and curriculum in the last two years, online learning and TEL strategies is one of the main accepted strategies for the development of Iranian universities and universities are trying to Maintain this strategy for the future as well.

Do you foresee laboratory activities within curriculum planning?

Yes, Laboratory activities are always part of STEM programs. These may include engineering sciences (physics, chemistry, etc.) or specialized courses which require



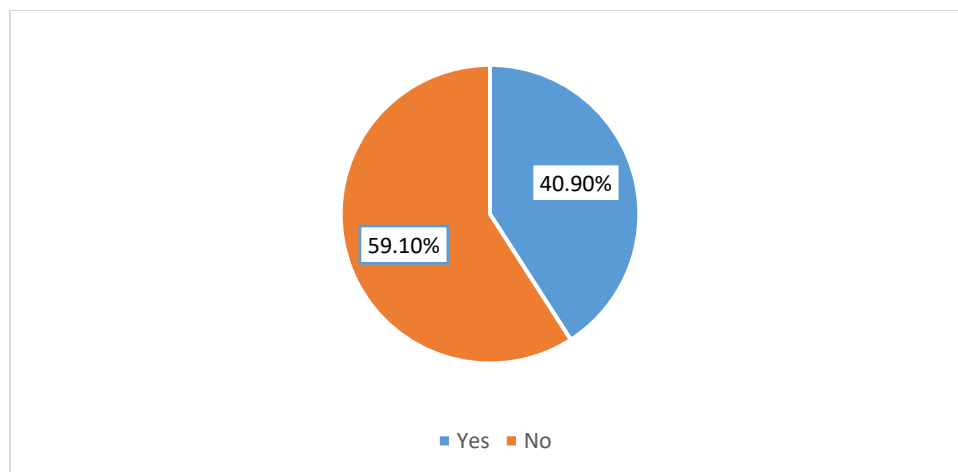
labs. But these laboratory activities are mostly done physically and in the laboratory.



However, as the diagram above shows, the majority of professors, about 86% of them (the sum of strongly agree and agree), believe that simulation tools and virtual or remote laboratories can help students learn engineering skills.

Which kind of laboratory activities do you use? (e.g. in presence, virtual, remote labs etc.).

The main laboratory activities are in presence some universities use virtual labs.



As the diagram above shows, about 59% of students do not know the difference between a virtual lab and a remote lab. While about 41% know the difference between the two laboratories.

generally, few universities, such as Shiraz University, have e-laboratories and offer their laboratory activities virtually. During the Corona period, the lack of virtual laboratories was very much felt. Therefore, many universities offer STEM programs and would like to be able to use the capabilities of virtual labs in the future.

In case you use virtual/remote labs can you please describe them in terms of technological infrastructure and pedagogical model applied?

As mentioned earlier, few universities have reported using virtual labs. These universities also do not use a specific educational model and mainly use virtual laboratories for better and more students to learn. In fact, most Iranian universities do not yet have the necessary technical infrastructure to run virtual laboratories. However, some universities have recently sought to provide related software and hardware to enable this.

Has the COV-19 pandemic affected your curriculum planning practices? In which way? (please describe any changes that occurred after covid pandemic broke out).

Covid-19 affects all teaching and learning activities, in fact all virtual learning activities take place. Among the changes that we have witnessed in the field of education and learning in the Covid-19 course are:

- Learner-centered: This means that online learning is encouraged so that teachers pay more attention to the needs and interests of students.
- Evaluation: Online learning has led to a variety of forms of evaluation, and instructors now use a variety of methods to evaluate learning.
- Group activities: Online learning has led to more attention to collaborative and participatory activities.
- Teaching: Online learning has led to more diverse teaching methods. For example, some instructors use flipped-classroom methods that they have not used before.
- Use of media: In face-to-face classes, instructors used little media in their curriculum, but in their e-learning, they use more diverse media such as film and animation.



In addition, offering lessons online has made it much better to use new technologies and lesson descriptions with diagrams, shapes, and illustrations, and to provide students with a better understanding of design lessons.

2.2. Curriculum planning in practice

- *How are different stakeholders (e.g. teachers, students, businesses and other actors in society) and their needs taken into account in the curriculum development?*
- *How is the content of the course designed?*
- *In faculty level, does the curricula design reflect any specific pedagogical practices and innovation?*
- *In faculty level, what way is working-life relevance discussed in the curricula?*
- *What is the teaching staff-student ratio?*

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

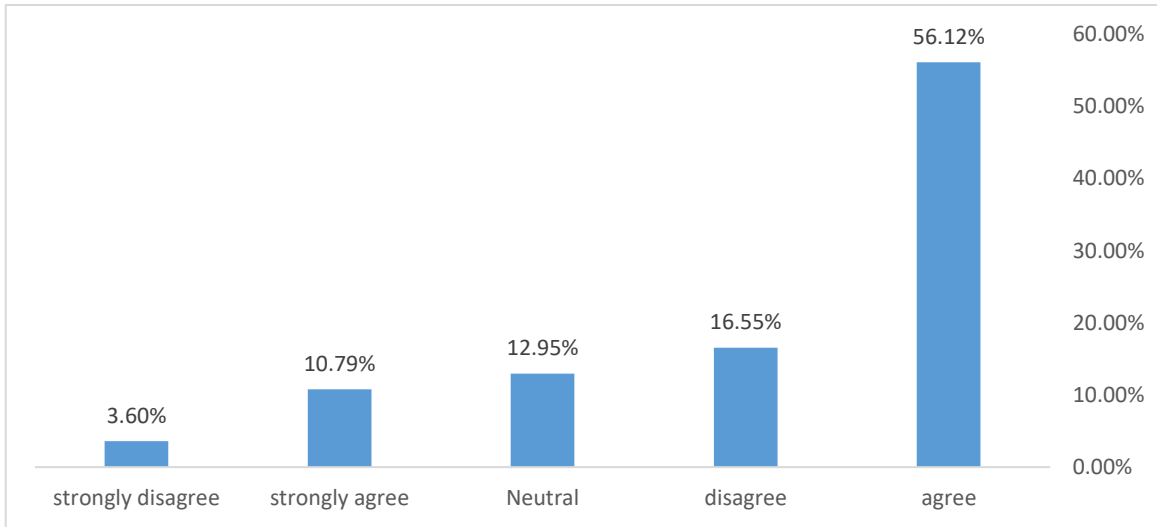
Universities offices such as Industry relations and planning and academic supervision are responsible for identifying business and society needs. also, recently faculty members must to spend a 6-month period at business to get familiar with business needs.

In addition, university professors have the authority to design their own curriculum based on the needs of the students. Also, based on their experiences in society and industry, professors can tailor their curriculum to the needs of society and industry.

How is the content of the course designed?

As the diagram below shows, about 67% of the professors (the sum of strongly agree and agree) stated that the university holds short-term seminars or specific workshops to increase the professors' skills in designing TEL-based courses. In contrast, about 20 percent of them stated that the university does not hold short-term seminars or specific workshops to increase the skills of professors in designing TEL-based courses.



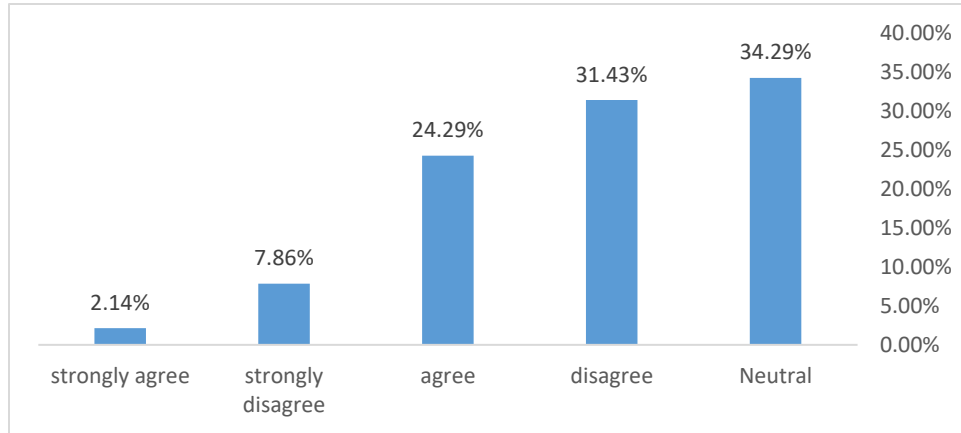


It should also be noted that for most courses, the Ministry of Science, Research and Technology (MSRT) lists Courses, Modules, and as well as Syllabuses. However, some flexibilities are acceptable made by academics who are experts in that specific field. But for planning a new module and syllables, the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

In faculty level, does the curricula design reflect any specific pedagogical practices and innovation?

As the diagram below shows, about 39% of professors believe that the university does not have a specific plan to support and enhance their competence in new teaching and assessment methods online. In contrast, about 27 percent of them believe that the university has a specific plan to support and enhance their competence in new online teaching and assessment methods.

In

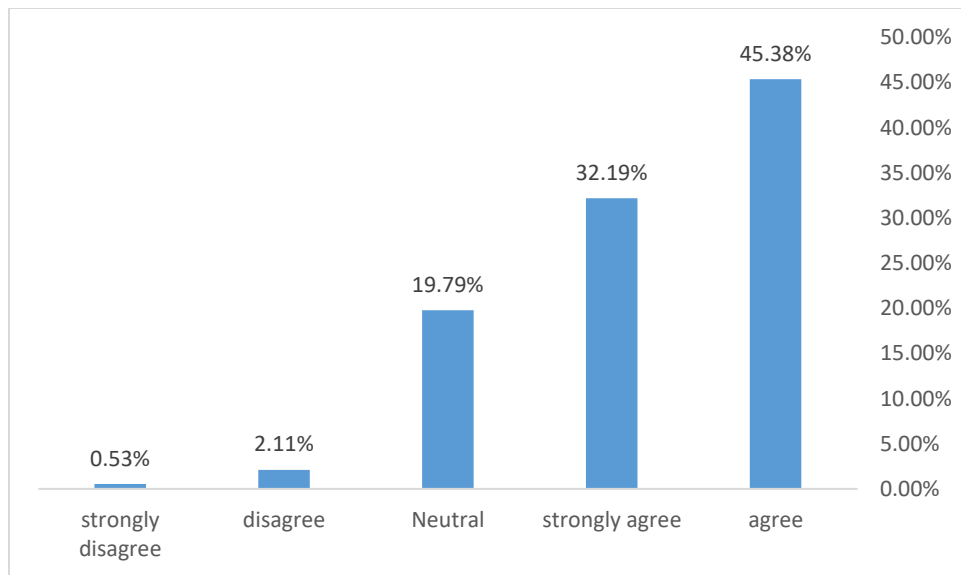


general,

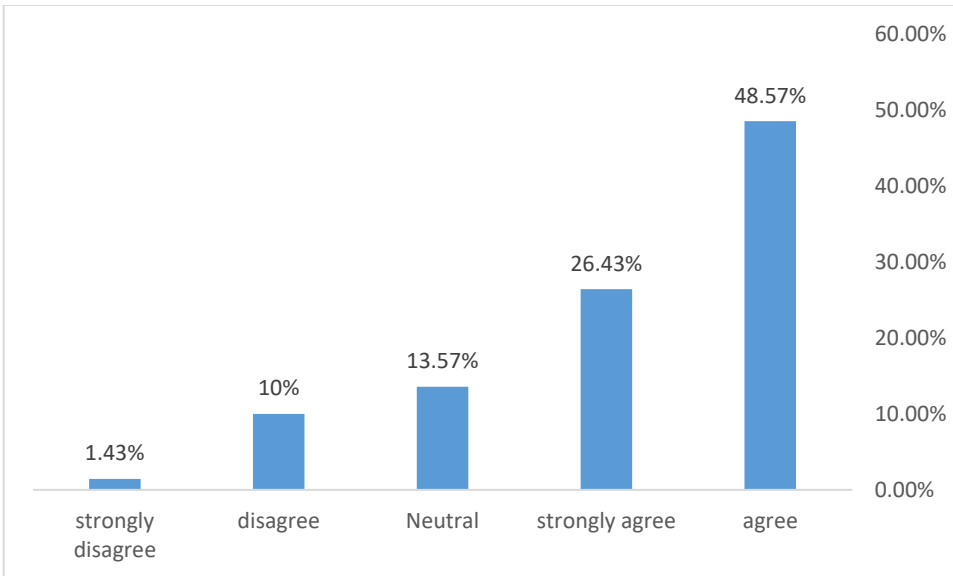
universities do not have a specific and uniform procedure in this field, and each university pays attention to some methods and innovations in teaching according to its own taste.

In faculty level, what way is working-life relevance discussed in the curricula?

As the diagram below shows, approximately 78% of students expect the curriculum to place more emphasis on teaching real-life problem-solving skills. While less than 3% of students are against this issue. About 15% of them have no opinion in this regard.



As the diagram below shows, about 75% of faculty members believe that the curriculum needs to be revised to better meet the needs of students online.



In general, it can be said that the 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. Alumni collaboration should be used in the planning of education and services. The curriculum normally includes internship at least as an option, if not mandatory.

What is the teaching staff-student ratio?

Because different universities have participated in this project, the exact rate can't be stated about them, but the 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.

Chapter 3. Designing and implementing and a TEL course

3.1. TEL as a practice in your institution

- *Is TEL or online courses a usual practice in your university, or do you organize teaching like this only due to pandemic?*
- *How many, in what level? (e.g. graduate/postgraduate).*
- *Is TEL part of the overall strategy for your institution's development and how?*

- *Is there a strategy in your institution for digital innovation, TEL being a part of it? Is this strategy known within the institution at all levels?*

Is TEL or online courses a usual practice in your university, or do you organize teaching like this only due to pandemic?

Before 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 its continuous development.

How many, in what level? (e.g. graduate/postgraduate).

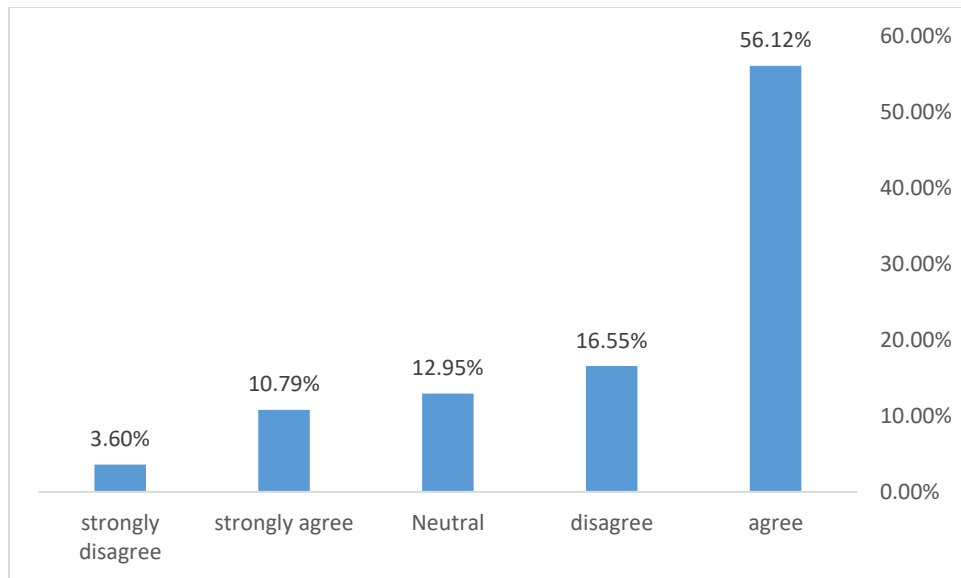
- UI: 4000 classes each week in all levels.
- UT: during last autumn semester (2020), 42687 users (32825 students) worked with the platform. 8371 courses were offered online (101321 sessions).
- SCU:

2021-2022	BA.	MA.	Ph.D.	D.V.S.	Sum total
Online classes	NR	NR	NR	NR	3396
Offline classes	4223	1946	885	392	7446

As seen in the table above, online learning is used in all levels of teaching in different ways. Moodle platform is used at least as a way to deliver course materials in most courses. Often also collaborative tools of Moodle are used, e.g. peer feedback. More and more often the lectures are recorded with the technology which is available in some lecture halls. Electronic exams in different modes are used more and more. Some courses are fully online. Due to pandemic the use of videoconferencing has increased dramatically.

Is TEL part of the overall strategy for your institution's development and how?

Yes, TEL is part of the university's strategy, but no clear and relevant details have been reported. However, as the chart below shows, about 67% of professor's state that the university holds short-term seminars or specific workshops to enhance professors' skills in designing TEL-based courses. In contrast, about 20 percent of them stated that the university does not hold short-term seminars or specific workshops to increase the skills of professors in designing TEL-based courses.



Is there a strategy in your institution for digital innovation, TEL being a part of it? Is this strategy known within the institution at all levels?

Yes, all universities have reported pursuing digital innovation strategies. Of course, there is no unity of procedure between different universities, and 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.

3.2. Technology in use

- *What kind of technology are you using (e.g. platforms, videoconferencing etc.)*

What kind of technology are you using (e.g. platforms, videoconferencing etc.).

- **Online platforms:** According to received data most Iranian universities are using Adobe Connect, Big Blue Button and Skyroom platforms for online and synchronous communications. Adobe Connect & Big Blue Button are popular worldwide but Skyroom is a domestic platform which has been designed and implemented by an Iranian company. This VC also is widely used by K12 schools.
- **Offline platforms:** The universities commonly are using Moodle for asynchronous communications and for uploading videos, homework, assignments, creating discussion enlivenments and taking quiz.



Electronic tests are also conducted in two ways:

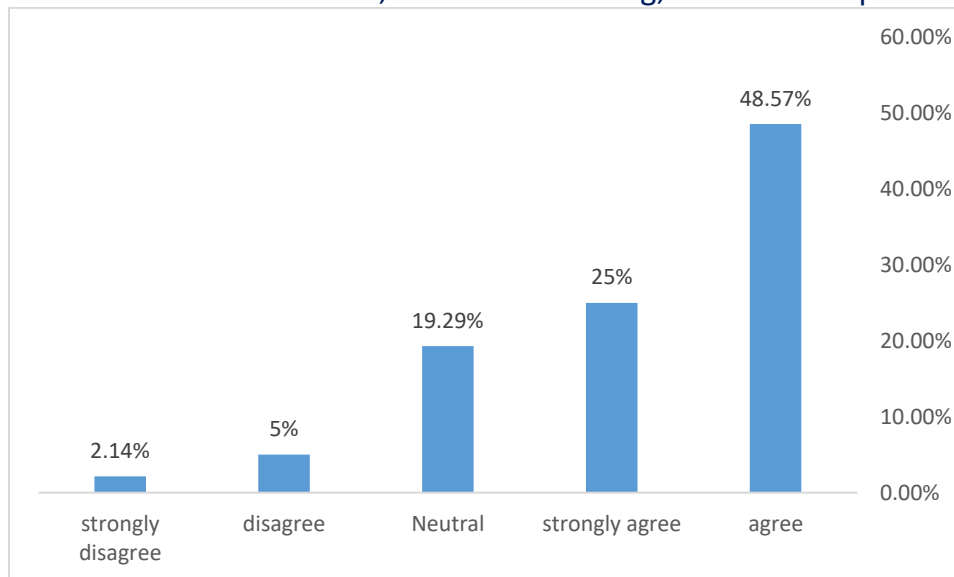
- **Simultaneous face-to-face electronic test:** In this test, all students are present at the same time and on the site equipped with computer systems at the same time and answer questions through the electronic test system.
- **Asynchronous electronic test:** In this test, all students answer the questions at the same time and without the need to attend a physical place or test site from different places simultaneously online through the electronic test system.

3.3. Course development process

- *How do you plan 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?*

How do you plan 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?

There is no difference between online and face-to-face curriculum, however, the faculty members are trained to use the LMS, videoconferencing, and other required software.



As the table above shows, about 74% of faculty members (the sum of strongly agree and agree) examines students' expectations at the beginning of the online course compared to the face-to-face course by asking students' short-term and long-term goals. Only 7% of professors do not do this.

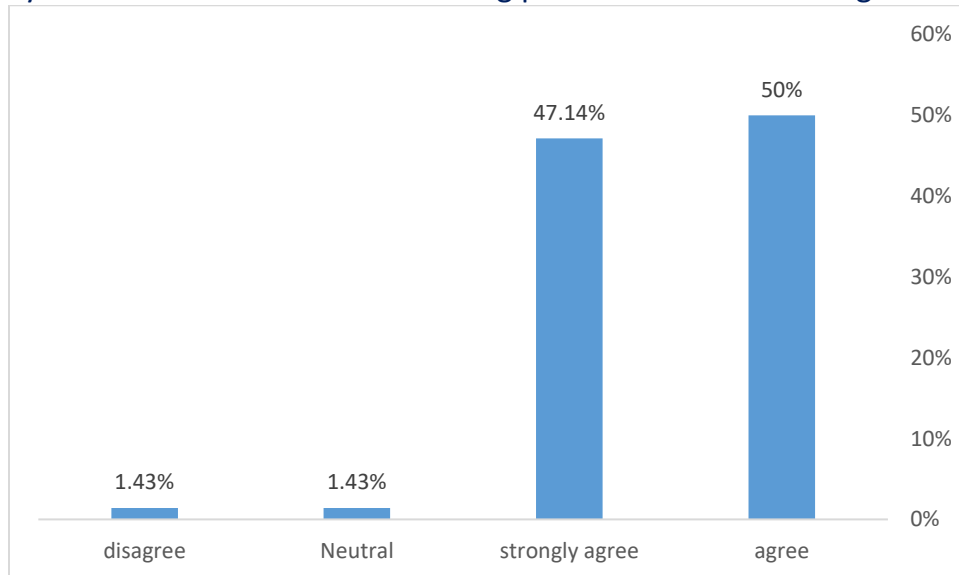


3.4. Stakeholders involved and their roles and tasks

- *Do you involve students in TEL/online course design?*
- *How is the content of the course designed?*
- *Is there any technical support for teachers in course design? Is support given at university, faculty or department level?*
- *Are there any facilitators that support the learners? If there are, please elaborate: describe their role, tasks and the cooperation with the lecturer.*

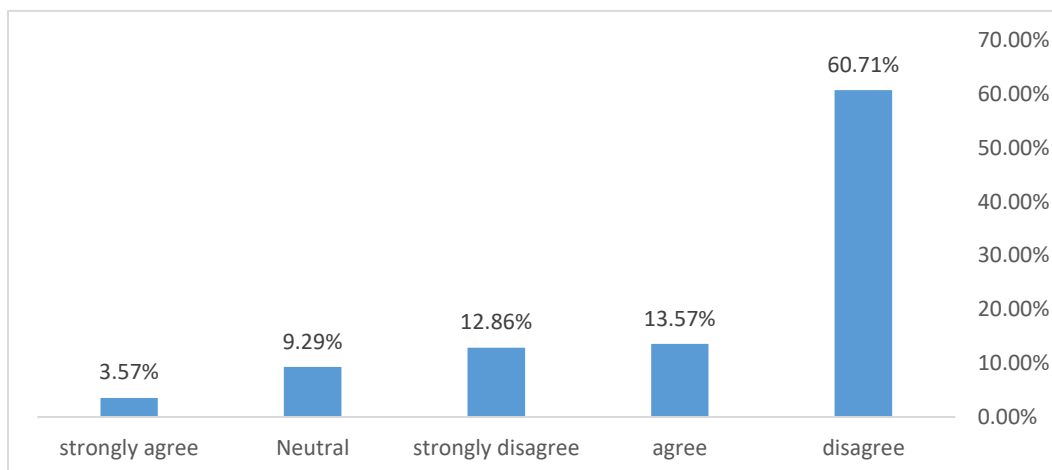
Do you involve students in TEL/online course design?

Not totally, some universities receive students' feedback and report them to faculty members, and encourage them to use it in course design. However, as the table below shows, most faculty (approximately 97%) believe that in order to motivate students, they need to play a more active role in the learning process and course design.



How is the content of the course designed?

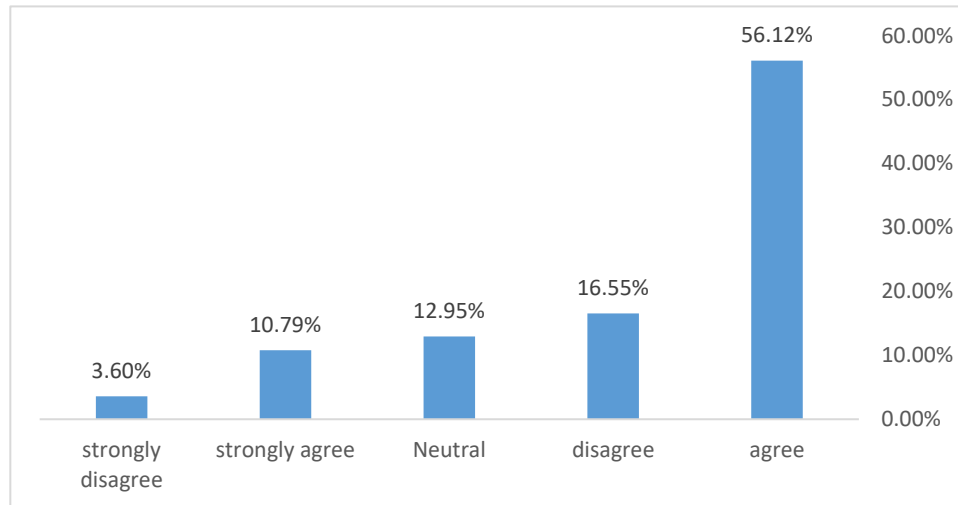
As the table below shows, the majority of professors, about 74%, believe that TEL needs specific content and that traditional classroom content cannot be used for online instruction. In contrast, about 17% of them believe that TEL does not require specific content and that traditional classroom content can be used for online learning.



Of course, the qualitative findings show the opposite, as the majority of participants believed that the TEL content was designed as a face-to-face course. Some other participants believed that 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.

Is there any technical support for teachers in course design? Is support given at university, faculty or department level?

There is some technical support at the university level to help better design the course. In fact, there is an office or center called the Teaching Development Center or the Office of Educational Planning in universities that conducts 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. There is no support material on the university intranet to help design courses.



As the table above shows, about 67% of the professors stated that the university holds short-term seminars or specific workshops to increase the professors' skills in designing TEL-based courses. In contrast, about 20 percent of them stated that the university does not hold short-term seminars or specific workshops to increase the skills of professors in designing TEL-based courses.

Are there any facilitators that support the learners? If there are, please elaborate: describe their role, tasks and the cooperation with the lecturer.

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.

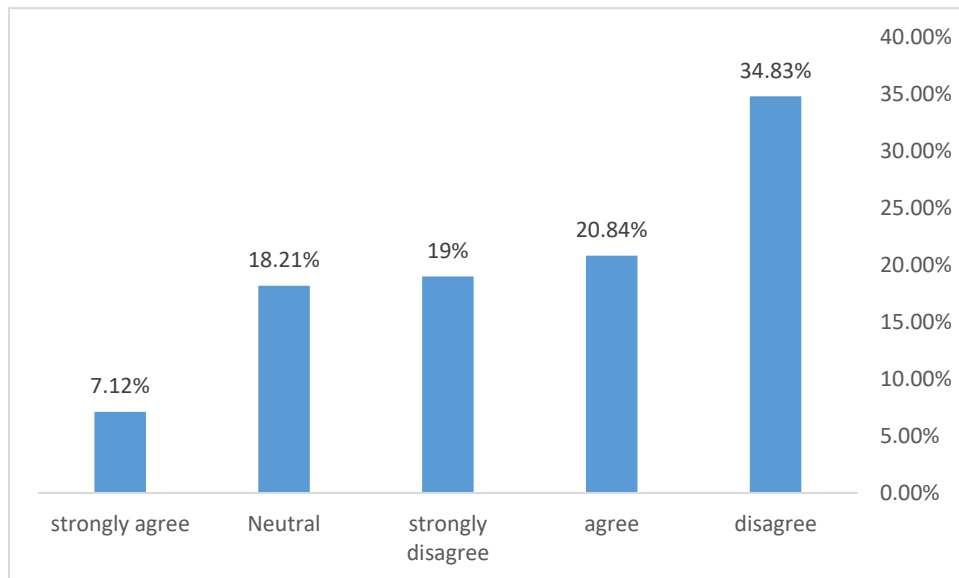
3.5. Protocol of course assessment

- *How do you evaluate the course: Is there a systematic institutional process / protocol? Are students involved at this stage?*
- *How is evaluation performed after the course is taught/delivered?*
- *How is data collected?*
- *Do students give feedback on teaching? If, please describe how.*
- *Who is informed about the evaluation?*
- *What measures can be taken for improvement?*

How do you evaluate the course: Is there a systematic institutional process / protocol? Are students involved at this stage?

According to the table above, for about 54% of students, professors do not know the proper way to evaluate students in the online learning environment. About 28% of

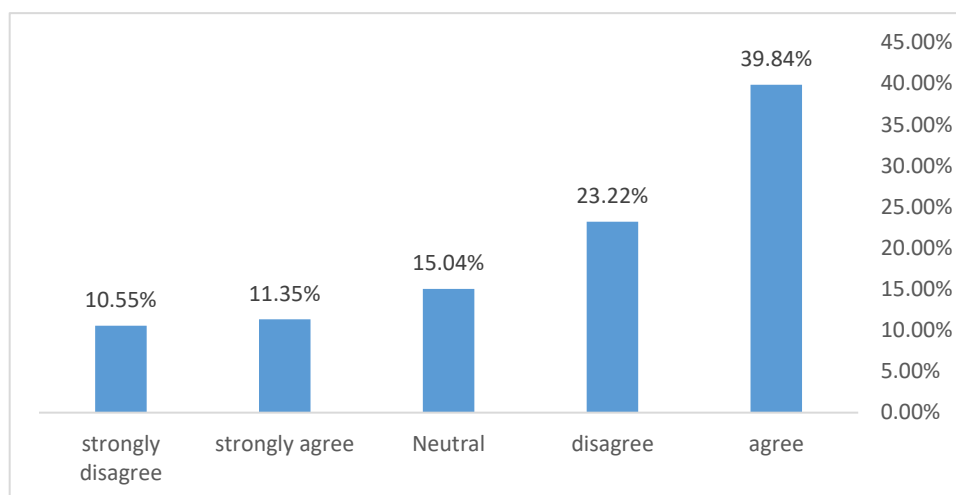
students also believe that professors know the proper way to evaluate students in the online learning environment. About 18% of them did not have an opinion in this regard.



Qualitative findings also show that Although Faculty members are free to select their evaluation methods, there are some standards and regulations which every teacher must take into account.

How is evaluation performed after the course is taught/delivered?

According to the below diagram, according to about 51% of students, professors use new and diverse methods (projects, oral questions, peer evaluation, electronic portfolio, etc.) for evaluation in the online learning environment. About 34% of students believe that professors do not use new and diverse methods (projects, oral questions, peer evaluation, electronic portfolio, etc.) to evaluate in the online learning environment. About 15% of them did not have an opinion in this regard.



Qualitative data also show that based on university LMS and by different tools the courses are evaluated.

How is data collected? Data collection is not done at the faculty level but rather centrally by The University Educational Planning Office is assembled. In other words, the university's educational planning office is responsible for collecting and analyzing data. Of course, 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.

Do students give feedback on teaching? If, please describe how.

Students usually do not give feedback on faculty teaching during the semester, and if they do, it is informal. But at the end of the semester, a survey is conducted to evaluate the course based on students' opinions. Students will not be allowed to take the exam if they do not evaluate the professors' teaching at the end of the semester. Therefore, they must participate in this work.

Who is informed about the evaluation?

The evaluation results are statistically analyzed by the system. Each faculty member will have access to the results through the designed platform. Here, he/she receives the feedbacks, his/her rank in the department. These data are also available to the head of the department, dean of the college, and the office of vice-president in educational affairs.

What measures can be taken for improvement?

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.

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

- *Is your Institution using Quality standards/frameworks for TEL/online?*
- *If no, what are the reasons?*
- *Are you planning to use one in the future?*
- *If yes, which are they?*
- *What quality areas do they cover? How long have you been using them?*
- *Does your Institution collect data in order to evaluate TEL/online programs?*
- *Is there a strategy on the use and purpose of learning analytics within the institution?*
- *Does your institution consider ethical norms and government policy with respect to data protection and the privacy of students?*

Is your Institution using Quality standards/frameworks for TEL/online?

There is a quality assurance system which is not customized for TEL-based learning.

If no, what are the reasons?

There can be several reasons for this. But the most important reason is that universities are mainly using online learning recently and because of the Corona pandemic. As a result, in the last two years, most universities have been involved in preparing for online learning and have not yet had the opportunity to improve the quality of online teaching based on a specific standard or framework.

Are you planning to use one in the future? Not at the moment.

If yes, which are they? -

What quality areas do they cover? How long have you been using them? -

Does your Institution collect data in order to evaluate TEL/online programs?

Yes, data is collected. Among the data collected in this field are: 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.

Is there a strategy on the use and purpose of learning analytics within the institution?

No, there is no “Learning analytics policy” in any of the universities and no action has been taken yet. Faculty members are the only source for collecting data. And at the end of semester, they will be informed about the result.

Does your institution consider ethical norms and government policy with respect to data protection and the privacy of students?

Yes, the university is very strict in this regard. The university always strives to protect data while respecting the privacy of students and faculty. In other words, data protection is accompanied by compliance with ethical norms.

3.7. Process of continuous improving of educational provision

- *Are TEL/online programs reviewed, updated, and improved and how?*
- *Are there any Institutional policies, structures, processes, and resources in place to guarantee the successful teaching and learning process of students with special educational needs?*
- *Is there an institutional policy and code of practice to ensure academic integrity and freedom and ethical behavior?*
- *Are there any electronic security measures set by your institution’s policy/code of practice?*

Are TEL/online programs reviewed, updated, and improved and how?

Given that the Tel program has been recently emphasized and used in most universities, it has not yet been reviewed and updated. But, TEL-based programs are treated the same as face-to-face programs. Normally Each program is updated every 5 years.

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

No unified and clear answer was received.

Is there an institutional policy and code of practice to ensure academic integrity and freedom and ethical behavior?

There are no practical guidelines at the university or college level for this issue. But, MSRT provides some policies and codes of practice to ensure academic integrity and freedom and ethical behavior. As a result, universities are committed to following these policies.

Are there any electronic security measures set by your institution's policy/code of practice?

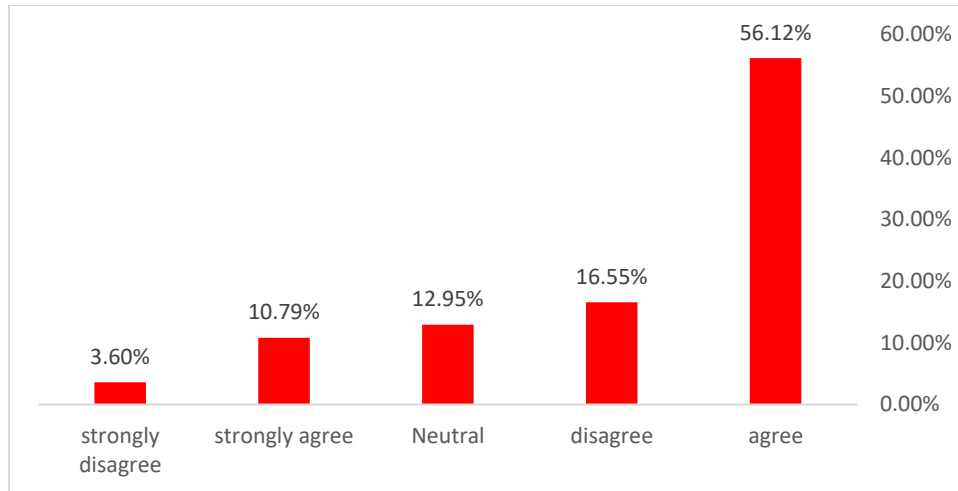
University's informatics and information center is responsible for electronic security. They may have procedures for this.

3.8. Professional development of teachers and instructional designers

- *In faculty level, do people involved in designing/ developing/ evaluating TEL/online programs have specific expertise in academic and technical aspects and which?*
- *Is the teaching staff involved in designing/ developing/ evaluating educational programs familiar with the advantages/disadvantages of using TEL/online in particular course contexts?*
- *Is the teaching staff trained and proficient in the use of learning technologies and (e-) assessment methods?*
- *Are there any particular training activities for new staff?*
- *Has the institution developed procedures to identify the support requirements of the teaching staff?*
- *What workshops are available for your teachers to attend? (for example: professional development, enhancement of faculty competence in skills, enhancement of faculty competence in pedagogy and enhancement of faculty competence in TEL)*

In faculty level, do people involved in designing/ developing/ evaluating TEL/online programs have specific expertise in academic and technical aspects and which?

As the chart below shows, about 67% of faculty members stated that the university conducts short-term seminars or specific workshops to enhance faculty skills in designing TEL-based courses. In contrast, about 20 percent of them stated that the university does not hold short-term seminars or specific workshops to increase the skills of professors in designing TEL-based courses.



Furthermore, there are some faculty members who have expertise in the design/development/evaluation of online programs.

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

They recently during the covid-19 pandemic got familiar with the advantages/disadvantages of using TEL/online in particular course contexts.

Is the teaching staff trained and proficient in the use of learning technologies and (e-) assessment methods?

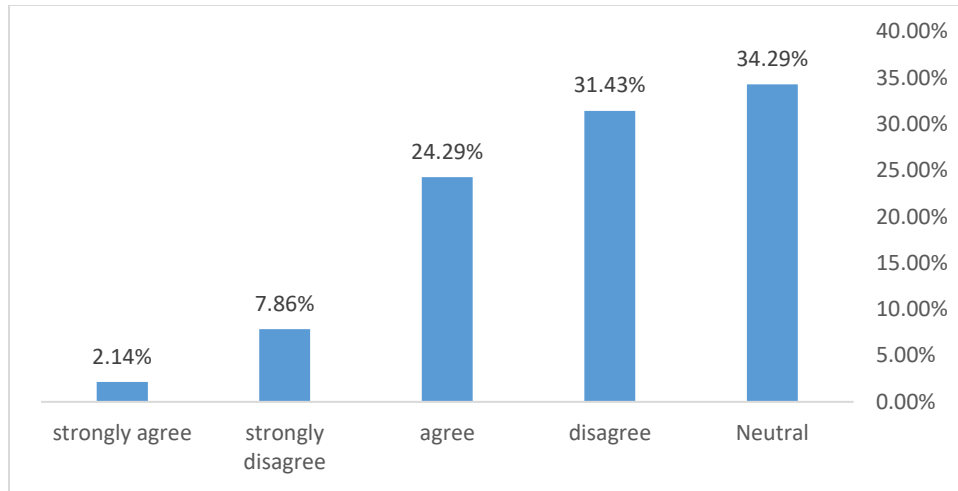
Training courses are offered by e-learning center in order to help staff make use of electronic facilities. Also, the university's virtual training center also holds workshops for staff to learn and master more.

Are there any particular training activities for new staff?

Yes, all new incoming staff are invited to meetings for the enhancement of teaching capabilities.

Has the institution developed procedures to identify the support requirements of the teaching staff?

As the chart below shows, about 39% of professors believe that the university does not have a specific plan to support and enhance their competence in new online teaching and assessment methods. In contrast, about 27 percent of them believe that the university has a specific plan to support and enhance their competence in new online teaching and assessment methods.



Also, the results of qualitative findings show that there are some centers in the university that are to identify the support requirements of the teaching staff.

What workshops are available for your teachers to attend? (for example: professional development, enhancement of faculty competence in skills, enhancement of faculty competence in pedagogy and enhancement of faculty competence in TEL)

Faculty competency skills such as: teaching methods, motivating students, assessing learning, writing lesson plans, creating lessons on the Moodle platform, interaction in e-learning and so on.

Chapter 4. Industry relevance

4.1. Policy and action plan for industry-relevance

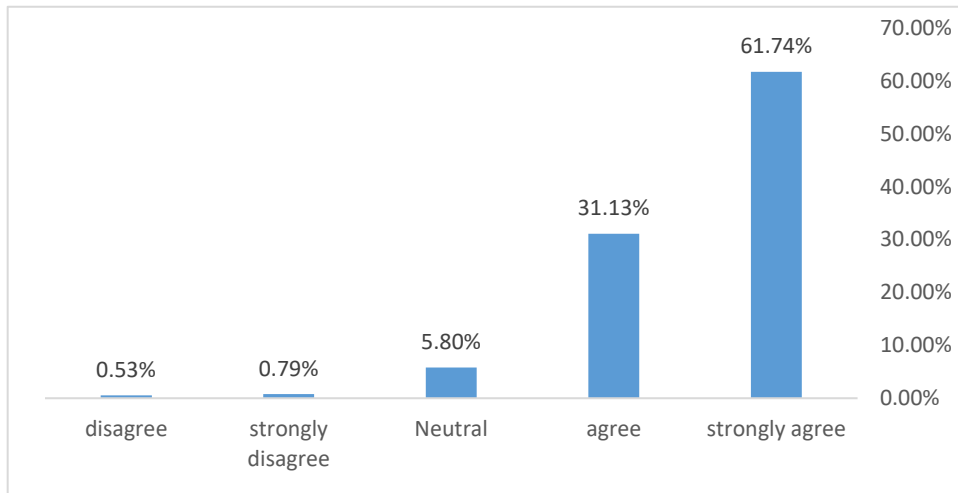
- *Are industry needs considered when developing the learning model and the curricula design?*
- *How is industry and other stakeholders involved in the process? Are there specific needs considered for STEM education in your institution when transferring courses to technology enhanced learning or online learning? If so, please explain how.*

Are industry needs considered when developing the learning model and the curricula design?

In University of Turku, there are several ways of university-industry collaboration, both on university level as well as departmental level.



As the chart below shows, about 93% of university students think that they should offer more opportunities to do projects in industrial environments. While less than 1% of students are against. About 21% of them have no opinion in this regard.



Qualitative findings also show that different sectors have their own ways of cooperating with industry. These approaches may be based on organizational or personal relationships.

How is industry and other stakeholders involved in the process? Are there specific needs considered for STEM education in your institution when transferring courses to technology enhanced learning or online learning? If so, please explain how.

Industry and other stakeholders are not directly involved in this process. But when transferring courses to the online learning environment, some attention is paid to some of the needs for STEM education. This was the case before the Covid-19 era and has developed further since the epidemic. Also, industrial and social needs must be met when designing, developing and updating the curriculum.

4.2. Infrastructure

- *Is the technical infrastructure aligned with the teaching methodology, learning activities, and e-assessment methods? If so, please explain how.*
- *Does the mentioned infrastructure and used online tools support student active learning and collaboration?*



Does the mentioned infrastructure and used online tools support student active learning and collaboration?

The Iranian universities have attempted to adapt teaching and learning activities with their existing infrastructure, but such platforms are most aligned with theoretical courses. The most LMSs have a plugin for creating assessments. Unfortunately, there has not been an opportunity or a platform for creating authentic evaluation.

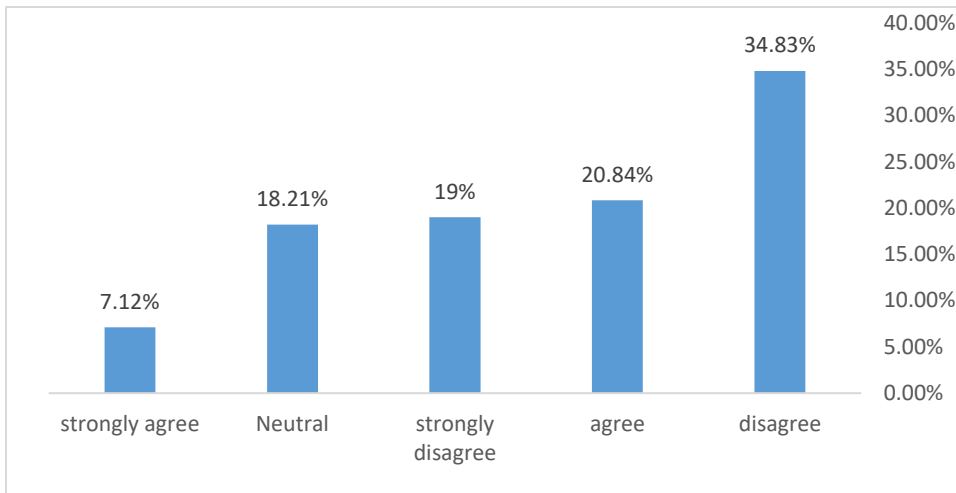
The existing technical infrastructure is suitable for providing theoretical lessons and learning activities. Evaluation is also possible in these systems. However, evaluation methods are limited due to the technical infrastructure provided and there is a possibility of fraud in these methods.

4.3. Assessment of learning

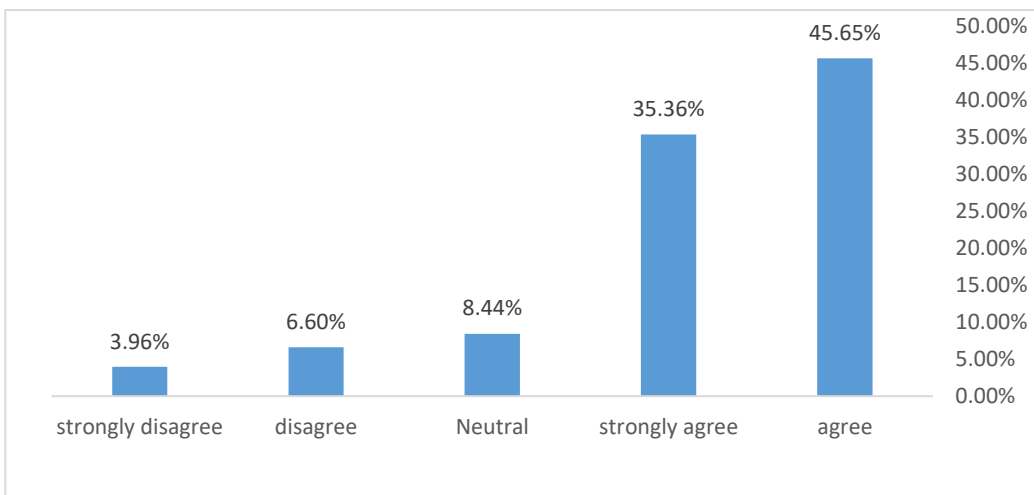
- *Are (e-) assessment methods fit for purpose, allowing students to demonstrate the extent to which the intended learning outcomes have been achieved?*
- *How are they designed?*

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

According to the table below, for about 54% of students, professors do not know the proper way to evaluate students in the online learning environment. About 28% of students also believe that professors know the proper way to evaluate students in the online learning environment. About 18% of them did not have an opinion in this regard.



The table below also shows that, for about 81% of students, learning takes place better when professors conduct assessment periodically and during the semester and not just once at the end of the course. About 10 percent of students also disagree, arguing that learning does not get better when professors conduct assessment periodically, not just once at the end of the course. About 9% of them did not have an opinion in this regard.



Qualitative data also show that due to the pandemic the university was forced to quickly move to e-assessment. Accordingly, several workshops were organized about e-assessment programs, designing and implementing e-assessment as well as formative assessment. There is not any formal data about success or failure of e-assessment.



How are they designed? Usually, student learning is assessed on the LMS platform. Different types of questions such as multiple-choice, true-false, easy, and so on have been used.

4.4. Functionalities of the technical infrastructure

- *Does the virtual learning environment, VLE (if any) support specific pedagogical methods and tools?*
- *Is the VLE based on non-proprietary web standards and is it updated to reflect technological changes? How often?*
- *Does the technical infrastructure ensure the accessibility of the TEL/online programme by students with special educational needs and how?*

Does the virtual learning environment, VLE (if any) support specific pedagogical methods and tools?

It seems the existing VLE supports only direct pedagogical methods. For instance, the lecture method has been used frequently by departments. It seems that the platform used to create a virtual learning environment in most universities is a model platform and how it is used depends to a large extent on the skills and knowledge of professors in this field.

Is the VLE based on non-proprietary web standards and is it updated to reflect technological changes? How often?

The majority of the Iranian Universities use open sources web standards. They customize VLE according to their needs and circumstances. The web standards are frequently updated at the end of the academic year.

Does the technical infrastructure ensure the accessibility of the TEL/online programme by students with special educational needs and how?

Not specifically, since the universities have no long background in e-learning such required tools have not been considered.

4.5. Use of virtual and remote laboratories

- *Does the institution provide students with an e-library?*
- *Does the institution have virtual labs?*
- *Does the institution have remote labs?*

Does the institution provide students with an e-library? Yes, all universities provide e-library.

Does the institution have virtual labs?

According to the received data, only the university of Tehran and Shiraz university have virtual Labs. The rest did not report any such tools.

Does the institution have remote labs? Only Shiraz University has remote labs.

Chapter 5. TEL quality practices and support

5.1. Staff professionalization

- *Has your institution procedures for recruiting and hiring teaching staff?*
- *Do you offer pedagogical training for teaching staff? Do you have courses specific for technology-enhanced learning? How is it organized?*
- *How is the teaching staff coordinated during course delivery?*
- *Do you have support materials available on the intranet for online learning and teaching?*
- *Is pedagogical training mandatory for teaching staff?*

Has your institution 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. In addition to the usual procedures, the university has criteria and requirements for recruiting and hiring teaching staff. Such as specialized knowledge, skills, knowledge and teaching motivation.

Do you offer pedagogical training for teaching staff? Do you have courses specific for technology-enhanced learning? How is it organized?

Every year, the University Planning Office or any other center organizes courses for faculty members on teaching methods, lesson plan, test design, and the use of technology in teaching. With the occurrence of the corona pandemic, some training courses were further emphasized and held such as teaching online & offline, interacting with students virtually, using different tools and technologies in teaching, and e-assessing. Usually, the 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.



How is teaching staff coordinated during course delivery? The university educational planning office schedules training courses and usually courses are presented at the weekend or at the free times.

Do you have support materials on the intranet for online learning and teaching?

Many training materials are available on the university LMS and can be accessed by any teaching staff. Training materials are available in a separate section on the intranet for teachers and they can use these materials if necessary. Some of these materials are: how to build a virtual room, methods of creating and conducting tests, methods of accessing different parts and systems and the like.

Is pedagogical training mandatory for teaching staff?

Yes, such trainings are mandatory. Training on producing instructional materials, interaction with students, e-assessment, motivating students to learn online and teaching online have been designed, developed and presented.

Chapter 6. Opportunities and challenges for adoption of TEL practices

- *Name of the partner*
- *Names of respondents, positions, departments*
- *Provide a short introduction describing the methodology you used and the number and types of sources*
- *Please keep your answer short, maximum 1-1 ½ page per question*

- *After describing the current state of art in previous chapters, identify opportunities and barriers for transformation of education. Put them in order: **the most important first.***

6.1. Opportunities

- 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.).

Facilitating design and development of new interdisciplinary programs

6.2. Barriers

- 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.
- Lower interaction between the faculty member and student.