Final Report of Intellectual output 1

A STEP-BY-STEP GUIDEBOOK ON HOW TO ESTABLISH AND IMPLEMENT A QUALITY ASSURANCE SYSTEM FOR E-LEARNING

**Summary of the e-learning challenges and the best practices solutions &
Creation of guidelines for the development and maintainability of the quality assurance system in e-learning**

Prepared by

Turkish DigiMates Team from Dokuz Eylül University, Turkiye

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INTRODUCTION

As COVID-19 pandemic is changing everything about life and work, HEIs also made a sudden shift to online and/or blended learning to best protect and support their students, academics, and communities in the face of this unfolding crisis. Many of the institutions were caught unprepared for teaching procedures as well as quality assurance of education in online learning. In this new setting, students originally in face-to-face education have experienced online delivery of the learning process, instructors adjusted their teaching methods and learning assessment, administrators made policies and faced challenges to support quality assurance of learning. E-learning has now become more closely aligned with the core of institutional practice during the COVID-19 online changeover. HEIs are expected to transfer their educational services to distance education platforms in the most effective way possible and without making any compromises with the learning outcomes (knowledge, skills, and competencies) that they promise to equip students with. This new process has led to several requirements as follows (YOKAK, 2020):

- Having synchronous and asynchronous learning means
- Monitoring instructors' and students' accessibility to distance education environments and resources and creating solutions to systemic problems.
- Determining potential learning strategies, methods and techniques or developing tailor-made hybrid approaches for distance education processes based on the institution's targeted learning outcomes and competencies and in consideration of theoretical and applied courses.
- Improving instructors' skills of using the learning management system, developing contents fit for distance education, teaching approaches/methods and evaluation methods.
- Establishing learning outcomes that can be acquired in distance or face-to-face environments according to the department in blended learning processes.
- Providing information security and ethical requirements in all interactive and sharing practices in distance education processes.

All these developments force HEIs to search solutions for the success and maintainability of newly established or existing quality systems. In the literature, there are various reference models, standards and toolkits that provide the requirements and means for establishing a quality assurance mechanism in higher education. However, there are no guidelines or step-by-step approach on how to establish and implement a quality assurance system in online education with a holistic perspective and such material for online education is limited. This kind of guidance can be accessed by the help of high-cost consulting services. The AIM of this IO1 is thus to develop a guidebook especially for beginners to assure quality in online education.

The specific objectives of IO1 are:

- To summarize the challenges and the best practices solutions
- To prepare comprehensive, internationally applicable step-by-step guidelines for development and maintainability of the quality assurance system in e-learning.

To fulfill the objectives of IO1, the tasks and related activities that are undertaken are explained in detailed as follows:

TASK A1: REVIEWING THE KNOWLEDGE BASE ON E-LEARNING

Reviewing the knowledge base on e-learning encapsulates collecting the challenges, alternative solutions, and best practices in e-learning from professional publications/journals, books, websites, and relevant institutional sources and retrieving relevant information.

Aim: Within the scope of this activity, a systematic literature review is conducted for a thorough evaluation and to collate and synthesize findings of the prior research on challenges, solutions, and best practices of e-learning.

Method: To enhance the validity and the reliability of the study, transparency and replicability principles were fully considered by applying guidelines from the literature about the procedures to follow while performing the SLR. Considering the validity and reliability of the study, a research panel consisting of the four researchers was established. This study utilized a three-step research methodology suggested by Tranfield vd. (2003) and Becheikh vd. (2006) to achieve a scientific and rigorous approach. In the first phase, the research methodology and the scope of the investigation is constructed. Scopus and Web of Science (WoS) are selected as research databases to explore and choose relevant papers on e-learning challenges, solutions, and best practices since these are the most extensively utilized digital databases - the largest repositories of business research- for searching for peer-reviewed literature (Chaudhary et al., 2022; Lu et al., 2022) and to ensure the quality of the related studies. In order to capture the pertinent studies in these databases, alternative keywords were searched in the planning phase and the preliminary results were discussed by the research panel and the set of search terms are identified as: Challenges, Issues, Barriers, Solutions, Best Practices, Predictors, Trends, and Potentials. These were complemented by a variety of similar keywords relevant to e-learning (i.e. "online education", "distance learning", "digital learning", "e-learning") to assure that all related studies are covered. In order to reduce bias, the researchers conducted two initial sessions to discuss and refine the inclusion and exclusion criteria as follows:

- Time, Location and Language Criteria: Full-text studies published in English are included without any time and location limit.

- Scope of the research discipline, topic, type of the publication: Full-text empirical and conceptual studies in peer-reviewed journals, books, proceedings to address e-learning challenges, solutions and best practices only in the context of School of Business are included.

The initial screening was conducted in accordance with the research protocol by the two authors and the other members of the research panel got engaged when there were instances of uncertainty. After scanning each database using every possible combination, a sample of 234 items were retrieved as seen in Figure 1. The duplicates of studies, as well as studies that did not have a full text are excluded which yielded to the number of 126 studies. Thereafter, the titles and abstracts of the remaining studies were investigated in accordance with the inclusion criteria. As a result, 70 non-business-related publications and studies which are out of scope were eliminated. Next, the full text studies were read for eligibility. This review produced 17 documents which contain problems that are extremely technical and complex. The reference lists of 39 eligible papers were then further reviewed in order to prevent omitting any relevant study on the topic, and this procedure led to the retrieval of five additional publications. Each article was evaluated individually in a blind procedure by each panelist in order to minimize subjectivity and increase validity. The total review process ended up with a final sample of 44 studies. Next, descriptive and content analysis were used to map current research on e-learning challenges, solutions and best practices and identify gaps.

Findings: The content analysis carried out in the current research is based on the TIPEC model developed by Ali et al. (2018). The challenges, solutions and best practices derived from analyzing 44

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papers are classified according to the TIPEC model. The model is composed of four dimensions: "Technology," "Individual," "Pedagogy," and "Enabling Conditions." The results of the content analysis yielded 585 challenges and 354 solutions/best practices which fall into "Technology", "Individual", "Pedagogy" and "Enabling Conditions" categories (third order themes), 28 sub-categories (second order themes) and 73 sub-elements (first order themes). Among the four main categories in terms of the distribution of challenges, "Individual" has the highest frequency with 11 sub-categories involving 197 challenges (34%). The rest of the categories in a descending order are "Pedagogy" (27%) encapsulating 158 challenges (27%) with nine sub-categories, "Technology" (22%) including 129 challenges under four sub-categories, and "Enabling Conditions" involving 101 challenges (17%) with four sub-categories. When the results are examined from the roles (unit of analysis i.e. learner, instructor, institution, country) perspective, it can be reported that the studies mainly focused on the challenges faced by instructors (f=148) and learners (f= 130) respectively.

Among the four main categories in terms of the distribution of solutions/best practices, "Pedagogy" has the highest frequency with nine sub-categories involving 157 solutions (44%). The rest of the categories in a descending order are "Technology" (34%) encapsulating 122 solutions with four sub-categories, "Individual" (11%) including 40 solutions under nine (9/11) sub-categories, and "Enabling Conditions" involving 35 challenges (10%) with four sub-categories.

Data collected from the systematic literature review is aggregated with the data gathered from the field study (Task- A2: Collecting the partner experiences on e-learning). The final summary of the findings regarding challenges, solutions/best practices are depicted in this aggregated table under Task 3. (see Tables 6 to 9). Last but not least, data is synthesized to develop an integrative conceptual framework of e-learning challenges. The "Individual" category involves challenges mainly faced by the learners whereas "Pedagogy" theme represents the challenges confronted by the institutions or the instructor. As new challenges emerge, during the categorization process it is observed that some challenges compiled in TIPEC Model overlap and need to be adapted especially in "Individual" and "Pedagogy" categories. Regardless of the different roles (i.e., learner, instructor) it is recognized that the same challenges are experienced by both the learners and the instructors. Thus, the same sub dimensions appear both on "Individual" and "Pedagogy" categories. For example, "Response to change" challenge was listed under the "Individual" dimension in TIPEC Model whereas "Resistance to change by instructors" barrier was under "Pedagogy". These barriers were combined and listed as "Response to change" under the "Individual" dimension. The same pattern was also identified in "Lack of ICT skills" which was grouped under "Individual", on the other hand "IT Skills of Faculty Members" was listed within the "Pedagogy" category. During the content analysis, it is recognized that two barriers were too general and consist of a bundle of subcategories hence, "Concern about the quality of e-courses" and "Applicability of the e-learning concepts in the university" challenges identified by Panda et al. (2007) and Fayyoumi et al. (2015) respectively were excluded from the further analysis. Another contribution to the TIPEC Model is the relocation of the "security" sub-dimension from "Enabling Conditions" to the "Technology" dimension since the challenges were relevant to technological security issues like virus attacks.

In order to eliminate the duplicates, a matrix format is created where the columns represent the unit of analysis (i.e., learner, instructor, institution, country and general) and the rows refer to categories and subcategories. Hence, this matrix format has provided us with a framework of challenges considering the unit of analysis (stakeholders). The challenges gathered from the studies are mapped into the associated unit of analysis. One of the outputs of this activity is an article concentrating on providing an integrated conceptual framework of e-learning challenges. The article titled "**An Integrative Framework of E-Learning Challenges: A Systematic Literature Review in Higher Education Context**" is under review. Details regarding the matrix format are provided in this article. In the following tables the description of the sub-elements under related sub-categories of main challenge categories are presented. (*See*

Table 1, Table 2,

Table 3 *and*

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Table 4).

Table 1. Technology Category: Sub-Categories and Sub-Elements

Sub-Category	Sub-Elements	Description
1.1. Technological Infrastructure	1.1.1. Hardware, Software, Facilities	Problems related to power cuts, power fluctuations and power distribution while having e-learning experiencing and the availability of hardware and software (also known as access to facilities)
	1.1.2. Network Capabilities - Bandwidth Issue and Connectivity	Slow speed of internet and high internet traffic during e-learning experience
	1.1.3. Poor Quality of Computers	Low quality computers that freeze frequently and outdated computer systems
1.2. System Design / Development Process	1.2.1. Software and Interface Design	Less user-friendly software and interface design during e-learning experience (i.e. design for everybody including disadvantaged groups)
	1.2.2. Complexity of Coordinating Multidisciplinary Teams of Domain-Experts, Instructors, Students, and Developers	Interoperability issues within the e-Learning ecosystem due to lack of agile-oriented and user-centered methodologies during the development process in multidisciplinary teams
	1.2.3. Long Release Cycles in The Software Development Times in LMS	The need to shorten release cycles of e-learning development so that rapid feedback can be provided to developers about the ability for system administrators to deploy, configure, and operate the new software.
	1.2.4. Incompatible Technology	Incompatibility of content with a variety of learning management systems/technology
	1.2.5. Weak Learning Management System	Learning management systems lacking interactivity and having vague features
	1.2.6. Language Barrier	Lack of conversion of e-learning content in other languages
1.3. Security	1.3.1. System Openness / Internet	Openness of e-learning systems challenging security of personal information of students/staff/faculty
	1.3.2. Virus Attacks	Virus attacks on e-learning systems during e-learning experience
1.4. Technical support	1.4.1. Insufficient Technical Support	Unavailability of technical staff (professional designer/specialist to develop e-course/content) and lack of facilities to perform various activities (installation, operation, maintenance, network

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		administration and security), and lack of individual support (Q&A) opportunity of users

Table 2. Individual Category: Sub-Categories and Sub-Elements

Sub-Category	Sub-Elements	Description
2.1. Motivation	2.1.1. Lack of Student Motivation	Students' motivation on the basis of their skills, attitudes, interest, behavior and activity
	2.1.2. Lack of Institutional Motivation	Lack of encouragement and motivation of universities to use, deliver, and develop e-learning and its components
	2.1.3. Lack of Ownership and Effort	Faculty stakeholders not taking ownership of successful implementation of e-learning technologies and lack of interest in meeting e-learning challenges
2.2. Self-Efficacy	2.2.1: Lack of Self-Efficacy	Lack of confidence in using e-learning technologies and believe in completion of e-learning course/responsibilities
2.3. Awareness and attitude towards ICT	2.3.1 Lack of Awareness and Negative Attitude Towards ICT	Lacking awareness of internet skills and reluctance of users in taking responsibility for their own e-learning
2.4. Individual culture	2.4.1. Individual Culture	Individual culture distresses attitudes towards distance learning. Each person has a unique learning style and expectation, which should be considered when designing e-learning.
2.5. Perceived usefulness	2.5.1. Perceived Usefulness (Easy of Use Perceptions)	Negative perceptions about usefulness of e-Learning
2.6. Support by peers and society	2.6.1. Lack Of Peers Support	Between-peers (students, lecturers) support in successful implementation of e-learning
	2.6.2. Lack Of Social Support	Support from family and employers for e-learning, conducive environment and devoid of distraction during e-learning sessions
2.7. Computer anxiety and technophobia	2.7.1. Computer Anxiety	Early misperceptions about the ease of use of an e-learning system
	2.7.2. Technophobia	Being afraid of operating e-learning systems/technologies
2.8. Conflicting priorities & commitments	2.8.1. Family Commitments	Family commitments taking up most time and resources, (e.g. inability to spare time for e-learning sessions to take care of his/her baby)
	2.8.2. Work Commitment	E-learners bringing up work commitments as justification for missing exams, assignments, and so on.
	2.8.3. Conflicting Priorities	Time devoted to e-learning causes priority conflicts
2.9. Readiness & Change	2.9.1. Insufficient Readiness	Possessing inconsistent e-learning readiness over time

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Management Issues	2.9.2. Poor Response to Change	Low response/resistance to changing e-learning
	2.9.3. Acceptance Level of E-Learning Technologies	Lacking technology acceptance
2.10. Individual's technical capability	2.10.1. Technological Difficulty	Facing technological difficulty in using e-learning technologies (i.e. higher age)
	2.10.2. Technology Experience	Lacking technology experience in solving problems and accomplishing basic tasks
	2.10.3. Computer Literacy	Lack of computer literacy
	2.10.4. Lack Of ICT Skills	Not having sufficient level of ICT skills (i.e. preparing digital content)
2.11. Academic and experiential relevance	2.11.1. Lack Of Knowledge and Experience In E-Learning	Having limited or no prior knowledge and experience related to e-learning
	2.11.2. Academic Confidence	Having insufficient level of academic experience and qualification

Table 3. Pedagogy Category: Sub-Categories and Sub-Elements

Sub-Category	Sub-Elements	Description
3.1. Faculty development and training	3.1.1. Faculty Development	Lack of progress in faculty and limited change in teaching methodology of faculty in response to ICT developments (i.e. Lack of acceptance new teaching culture)
	3.1.2. Training	Lack of trainings and guiding materials for stakeholders for internal stakeholders to enhance e-learning
3.2. Interactivity	3.2.1. Lack of Feedback	Putting little effort in giving feedback (e.g. late response of the student admission office/instructor to learners)
	3.2.2. Absence of Real-Time Feedback	Lack of immediate/prompt response from students to get answer of the query during the online sessions
	3.2.3. Engaging Students Online	Instructor facing difficulty in engaging students online
	3.2.4. Sense of Isolation Due Less Face to Face Interaction	Absence of face to face/social interaction between individual learner and instructor endorsing sense of isolation (i.e. Less social contact and network opportunity)
	3.2.5. Social Loafing	Working less diligently because of the relative absence of instructor-learner, instructor-instructor, and learner-learner interaction
	3.2.6. Tutor Support/Counseling Sessions (To Support by Peer & Society)	Lack of support/counseling sessions
3.3. Course Content and Quality	3.3.1. Poor Interactivity of Course Content	Not developing course content which motivates students to participate and contribute and capture their interest and attention
	3.3.2. Lack of Effective Course Content (Learning Outcome Relevance)	Lack of relevance, accuracy of course content and misalignment of course content with future employers' needs.
	3.3.3. Localization of Content	Lack of customization/adaptability of course content according to local culture, language and religious beliefs
	3.3.4. Appropriateness of the Nature of the Course to E-Learning	The difficulty participants experienced in comprehending courses that involve numerical content and theorems.
	3.3.5. Less Focus on Technical Requirements of Content	Technical requirements of course content available online (e.g. size of web pages, font, colors, quality of images) are not met

3.4. Pedagogical model (+skills)	3.4.1. Pedagogical Model (+Skills)	Use of instructor/learner centered approach in teaching (i.e. interactive/interesting methods)
3.5. Management and delivery of the course	3.5.1. Poor Flexibility in Delivery Mode	Lack of student empowerment concerning the decisions related to taking exams, selection of medium of content delivery, etc.
	3.5.2. Mode of Delivery	Barriers related to mode of delivery selected for e-learning (i.e. Modular Distance Learning (MDL), Online Distance Learning (ODL), and TV/Radio-Based Instruction)
	3.5.3. Different Time Zone	Logistical problems in utilizing the synchronous tool, when staff and students live in different time zones (discussion forums are supported)
	3.5.4. Speed of Course Delivery	Slower course delivery in e-learning when compared to face-to-face learning
	3.5.5. Managing Large Groups	Inability to manage online courses in the event of large groups of students.
	3.5.6. Lack of Pre-Course Orientation	Lack of pre-course orientation sessions provided by instructor
3.6. Recognition	3.6.1. Lack of Credibility	Less likely to hire someone with a TBL (Technology-Based Learning) certificate in business world unless provided by an accredited institution
	3.6.2. Lack of Public Awareness	Lack of information and awareness of the public about e-learning
3.7. Workload	3.7.1. Additional Workload	Extra workload caused by e-learning (e.g. additional time needed to communicate with students out-of-the-course; struggling with intensive/frequently given assignments; preparing/updating additional course material)
3.8. Assessing the Performance	3.8.1. Lack Of Reliability of Online Assessment Process	Lack of reliability of online process evaluating student performance (i.e. measuring instrument)
	3.8.2. Reluctance For Peer-To-Peer Evaluation	Some professors may fear the evaluation of their online courses by their peers.
	3.8.3. Lack Of Efficiency Measurement Tool	Lack of the measurement tools to evaluate the efficiency of the e-content
3.9. Hard to access e-learning materials	3.9.1. Hard To Access Digital Libraries	Problems faced in having access to digital libraries
	3.9.2. Material Accessibility	Difficulty in accessing to e-learning material

Table 4. Enabling Conditions Category: Sub-Categories and Sub-Elements

Sub-Category	Sub-Elements	Description
4.1. Administrative commitment and support	4.1.1. Administrative Commitment and Support	Lack of administrative support in crafting e-learning related policies, incentives, and resources. Institutional policy and organizational culture are crucial to the way e-learning is adopted or embedded in universities
4.2. Cost of E-Learning Technology & Financing	4.2.1. Economy (Financial Situation)	Financial difficulty for taking up e-learning courses
	4.2.2. Cost Of Using Technology	Students facing high cost of using technologies
	4.2.3. Cost Of Multimedia Learning Materials	Cost of producing high quality multimedia learning materials
	4.2.4. Setup Cost/Limited Funds	High cost of setting up the e-learning system and unavailability of low-cost ICT alternatives
	4.2.5. Cost Perception	People in the school who believe that e-learning is too expensive an activity
4.3. Inequality	4.3.1. Inequality In Access to Internet Connectivity	Inequalities in access to the internet and few people have internet connection
	4.3.2. Inequality In Access to Technology	Inequality of access to the technology itself by all the students
4.4. Law & Ethics	4.4.1. Rules And Regulation	Limitations in national and institutional policies, regulations and strategies
	4.4.2. Ethical Barriers	Absence of maintaining confidentiality by the e-learning services providers (i.e. written permission from participants)

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TASK A2: COLLECTING THE PARTNER EXPERIENCES ON E-LEARNING.

This activity entails gathering challenges in the field of e-learning as well as alternative solutions developed in response to these challenges.

Aim: The aim of this activity is to collect data on e-learning challenges and solutions/best practices from the field. Experiences of partner institutions are used to observe and primarily collect the challenges faced by internal stakeholders (i.e. students, instructors, administrators and technical experts) and alternative solutions of an e-learning system.

Method: Data is collected via focus group studies and e-Gemba Visits. Gemba Visit Table is a tool to collect the voice of the customer in a well-known methodology in quality management and service development, Quality Function Deployment (QFD). QFD initially emphasizes on driving continuous improvement of the user-oriented services towards end-user satisfaction and can be used for translating user needs into design characteristics. It is a tailored process to analyze customer needs in detail and translate them into the designers' language.

Focus Group Methodology

The focus group study is conducted to synthesize and consolidate the stream of research on challenges, solutions, and best practices of e-learning. As part of the Erasmus+ DIGIMATES project, the study was conducted entirely online with the involvement of students and instructors from higher education institutions in Turkey, Poland, Spain, Germany, and Slovenia, which are partners of the current Erasmus + Project. An online training on how to conduct a focus group study is provided, and a comprehensive guideline (see Annex A) was developed and sent to the participant partners. Data is collected from different internal stakeholders in e- learning to gather as many different perspectives as possible. In this regard, the focus group studies are conducted with students, instructors, administrators, and LMS experts in each partner university.

Table 5. Number of Focus Group Participants

	Student	**Instructor**	**Administrator**	**LMS Experts**
Gdansk University	7 (one focus group)	4 (one focus group)	5 (one focus group)	1*
Heilbronn University	12 (two focus groups)	13 (two focus groups)	5 (one focus group)	3 *
Leon University	7 (one focus group)	7 (one focus group)	2*	4 (one focus group)
Ljubljana University	4 (one focus group)	5 (one focus group)	5 (one focus group)	1*
Dokuz Eylül University	**13 (two focus groups)**	**7 (one focus group)**	**7 (one focus group)**	**8(one focus group)**

* In some partner universities enough participants for a focus group could not be attained. Therefore, in-depth interviews with the same questions are conducted in such cases.

In total, 18 focus group studies are conducted, and the number of participants is summarized in Table 5. Participants are selected based on their engagement in online learning, curiosity, and willingness to participate in the study, as well as the authors' estimation of their abilities to contribute to the research. Data collected by partner institutions is transcribed verbatim and translated into English and saved in

the excel document that was provided. The focus group studies were conducted between 17-30 June 2021. Content analysis is carried out to identify challenges, solutions/best practices.

E-Gemba Visit Methodology

Gemba visits within Blitz® QFD are conducted online with the participation of students and faculty members of the universities from Turkey, Poland, Spain, Germany, and Slovenia. Participants are purposefully selected based on their involvement in online learning, interest, and willingness to participate in the study, and on the authors' perception of their ability to contribute to the study. Gemba Visits is the most promising way to collect the experiences of the project partners on e-learning. e-Gemba Visits were planned and performed as explained below.

Gather Voice of the Customer

The gathering phase is composed of two steps: designing the VoC collection method and executing the method. The DEU team prepared a plan to collect the VoC. This step includes determining logistics, E-Gemba Visits were planned in each partner university to see the users at least in one online course while they were e-teaching or e-learning before ending the 2021 Spring semester. During the visits, both lecturer and learners were to be interviewed and observed online. For conducting the Online Gemba Visits, two people from lecturers and administrators were identified by each partner university considering the candidates' knowledge about the e-learning/e-teaching and the users. These two people have been assigned as moderator and listener in the Gemba Team to conduct the visits.

A gemba visit guide is prepared for the Gemba Teams to follow the procedure easily. The defined procedure for Gemba Visits and its complementary documentation were tested first by interviewing and observing one of the DEU lecturers to ensure that the effort produces the expected results. The online training about the methodology and its tools was given to equip Gemba Team Members from each of the partner universities. Dr. Kapucugil İkiz from DEU trained them through an extensive course using realistic examples from online education and with the co-authors, Dr. Demirel and Dr. Durukan Salı, acted as facilitators with helping the partners in their Gemba Visits. As Blitz ® QFD advocates the tailoring of the QFD process to fit the needs of the organization, Gemba Visits were also adapted to the needs of each partner in DIGIMATES. The guidelines and required template files are provided to the Gemba Team Members after training (see Annex B). Thus, online Gemba Visits were planned as including two main activities: interviewing and observing. The aim of the interviews is to collect the data (i.e. verbatim from users) which will enable us to understand the user's (i.e., lecturers and learners) teaching and learning processes. In other words, the world of each user is to be modeled to explore the steps or decisions the user is trying to do their job. Here, customer process modeling is used to get ready for Gemba Visits, since this structured process model can reveal the elements that influence end-users' cognitive attitudes. The suggested Customer Process Model (CPM) does not have to completely comply with the user's actual process, as most users quickly begins to correct the process. Moreover, by establishing a defined approach for the visits, the chance of becoming trapped on a single topic for the duration of the visit can be reduced (Mazur and Bylund, 2009).

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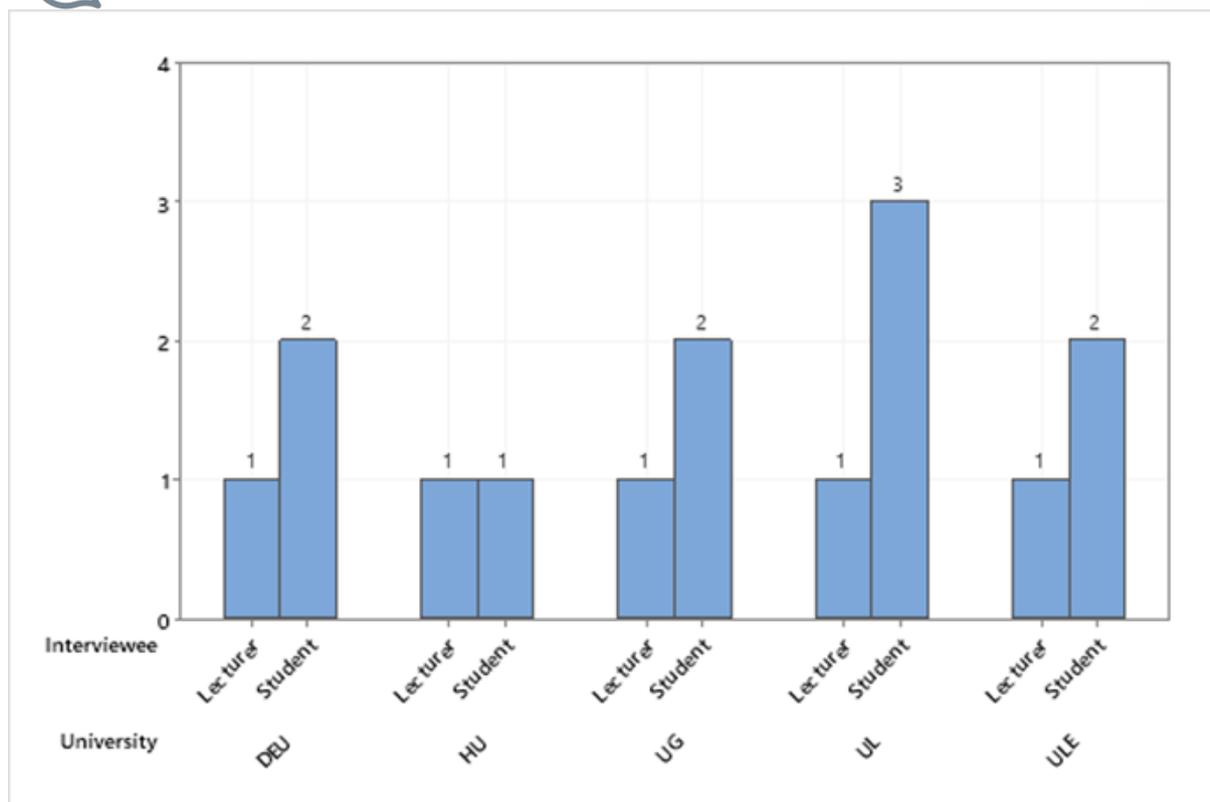
Figure 1. Gemba Visit Participants

As depicted in Figure 1, at least one lecturer and a student have been interviewed during the e-gemba visits in each partner university. In total, Gemba Team members conducted online interviews with 10 students and 5 lecturers. The questions for interviews were determined as flowing from general to process-specific questions and presented as a guideline to the Gemba Teams by the authors. These questions asked mainly to concentrate on the problems faced, and the benefits sought in online education with respect to the processes undertaken by learners and lecturers. For every partner university, CPM is reviewed and revised in collaboration with the Gemba Team members. The duration of Gemba visits ranged between 60 and 150 minutes and the visits were performed from May to July 2021. A revised lecturer process model from one of the partner universities is illustrated in Figure 2.
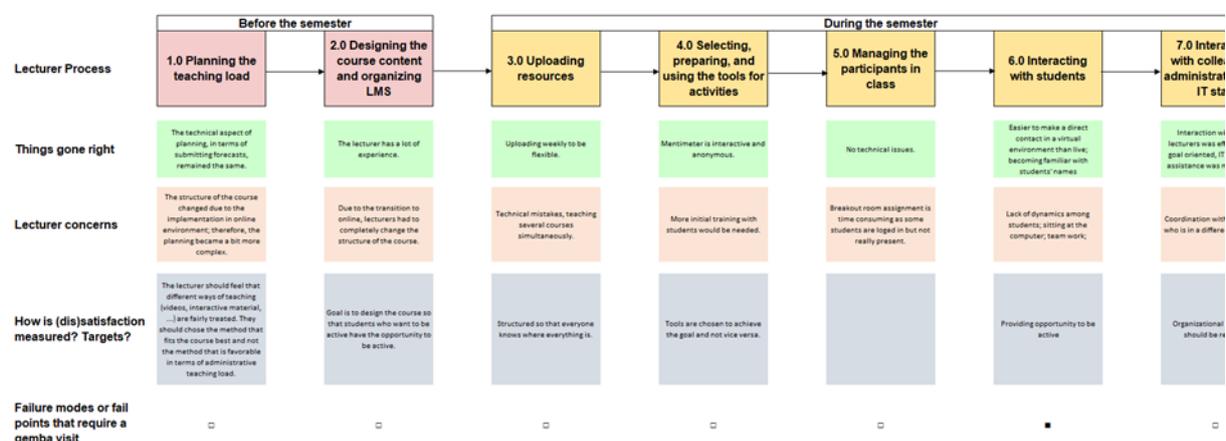
Figure 2. An Excerpt from Lecturer Process Model of a Partner University

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For observing what challenges and opportunities the online education needs to address, the Gemba teams also participated in online classes. The Gemba Visit Table (GVT) is used to describe observations, refer to pertinent documents or instructions used, take evidence provided by the user, and record verbatim from the users visited. In order to capture all sources of data including visual observations, anomalies, complaints, wishes of the lecturer or learner as well as abnormal sounds indicating system problems, GVT is quite useful. The Gemba Team members transcribed verbatim and recorded transcripts and observations in the Gemba Visit Table template provided. A distinct advantage of hiring Gemba Team members from each country is that the moderator could speak directly to the consumer in their native language during the visits and the interviews, reducing the translation bias. Figure 3 illustrates an excerpt including a partial demonstration of the GVT obtained from one of the visits.

Gemba Visit Table

| Interviewee: Contact info:	B.A.		Interviewer(s): Date and Time: Place:	A.K.I. 28 May 2021, at 13.00 Online Class of MBA (Quality Management course) via https://online.deu.edu.tr/portal
Interviewee Characteristics (*memorable):	Associate Professor in Marketing, Teaching Quality Management and Innovation, Very passionate to teach the learners, But not like so much technological devices, Has little experience in using the online system and conducting online exams			
Situation:	During online midterm exam, 15 students taking the class			

Step, Task #	Process Step, Tasks	Observations	Verbatims	Documents, Data	Team Notes
T1	4.0 Completing the Course Content and Assesing the Performance / While arranging online midterm assessment	Many students reported problems during the exam. Many of them reported to the lecturer on the live chat page or by sending an e-mail. Instructor receives too many messages of this kind at once, and has little experience in using the system and conducting online exams, Due to the poor internet connection caused by their personal environment, the pages were loading slowly during the loading of their exams.	I was very stressed during the exam. Because there are both systemic problems and students started to use these problems as an excuse for the exams they did not study. The reason students make these excuses is that they do not consider distance education seriously. Since we cannot be in the same environment, we do not know whether the student is actually listening to the lesson or whether they are actually participating in the examinations. No such security component is also provided in the system or process definitions that we use.	Messages including evidences in a form of snapshot in which error message shown that the exam file loading was unsuccessful.	During the exam students sent too many system-error messages. Instructor didn't try to find a technical support, solve the problem Instructor is not willing to do online exam, because she thinks it is unsafe. The students seem to be involved in online activities, but not certainly known if they are really there. Instructor thinks the students are not engaged with online education Exam security needs to be defined.

Figure 3. An Excerpt from Sample Gemba Visit Table

Understand Voice of the Customer

In order to understand the voice of the customer, data gathered is organized, analyzed and interpreted subsequently. Data provided with the e-gemba visits (i.e. verbatim quotes, anecdotes) are condensed into brief statements and clarified. The clarification process is conducted by the two authors separately based on a protocol. Then they examined clarified items together through making discussions. Discrepancies were discussed and clarified items were revised until 100% agreement was reached.

The Coupling Process

Shiba et al. (1993) have posed a good method to analyze the VOC and transmit it into customer requirements. The proposed model comprises four steps in which data gathered from Gemba visits (i.e. verbatims, observations.) are the input. In the first step data is linked with the context, then the key items are extracted and translated to customer requirements. The last step ensures that extracted customer requirements are a reflection of the customer experience (GOAL/QPC Research Committee Report, 1995). For this research, the basic reason for analyzing user input and interpreting information is to obtain the challenges and alternative solutions in e-learning and e-teaching processes. Thus, the

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Coupling Process was used to extract these specific elements from the data gathered from CPM and GVT. Verbatim obtained from interviews and observations, i.e. Voice of the User, were clarified as single items. These clarified items based on the processes that instructors and students undertake are then categorized in accordance with the framework of challenges which is adapted from the TIPEC Model.

Findings:

Focus Group Findings: Findings of the content analysis reveal that among the four main categories of TIPEC model in terms of the distribution of challenges and solutions/best practices, e-learning experts mentioned 42 challenges and 18 solutions/best practices under the Category of "Technology". When the sub-categories are examined it is obtained that there are 8 challenges and 3 solutions/best practices regarding "Technological Infrastructure". Experts claimed 21 challenges and 7 solutions/best practices about "System Design/Development Process", 4 challenges and 1 solutions/best practices pertaining to "Security" and 9 challenges and 7 solutions/best practices for "Technical support".

"Individual" category encapsulates 13 challenges and 6 solutions/best practices where 1 challenge and 1 solution/best practice belongs to the "Motivation" sub-category. There are 1 challenge and 1 solution/best practice regarding "Awareness and attitude towards ICT", 1 challenge and no solutions/best practices in "Individual culture", 1 challenge and 1 solution/best practice for "Computer anxiety and technophobia", 3 challenges and no solutions/best practices under "Readiness & Change Management Issues" and 6 challenges and 3 solutions/best practices pertaining to "Individual's technical capability" sub-categories.

Under the "Pedagogy," category 17 challenges and 10 solutions/best practices are identified. 4 challenges and 3 solutions/best practices belong to "Faculty development and training", 2 challenges and 1 solutions/best practices regarding "Interactivity", 3 challenges and 3 solutions/best practices under "Pedagogical model (+skills)", 2 challenges and no solutions/best practices for "Management and delivery of the course", 1 challenge and 1 solution/best practice in "Recognition", 1 challenge and no solutions/best practices regarding "Workload", 2 challenges and 1 solution/best practice under "Assessing the Performance" and 1 challenge and 1 solution/best practice pertains to "Hard to access e-learning materials" sub-categories.

"Enabling Conditions" as the last category is composed of 12 challenges and 6 solutions/best practices mentioned by the experts. Among these 6 challenges and 3 solutions/best practices belong to "Administrative commitment and support", 2 challenges and 1 solutions/best practices belong to " Cost of E-Learning Technology & Financing", 2 challenges and 1 solutions/best practices belong to "Inequality" and 2 challenges and 1 solutions/best practices belong to "Law & Ethics" sub-categories.

Instructors are found to experience 43 challenges and 16 solutions/best practices under the "Technology" category. When the sub-categories are examined it is seen that there are 14 challenges and 5 solutions/best practices regarding "Technological Infrastructure". Instructors expressed 24 challenges and 4 solutions/best practices about "System Design/Development Process", and 5 challenges and 7 solutions/best practices for "Technical support".

The "Individual" category yielded 36 challenges and 2 solutions/best practices where 12 challenges and 2 solution/best practices belong to the "Motivation" sub-category. There are 2 challenge and no solution/best practice regarding "Awareness and attitude towards ICT", 2 challenge and no solutions/best practices in "Individual culture", 7 challenges and no solutions/best practices under "Readiness & Change Management Issues" 12 challenges and 0 solutions/best practices pertaining to "Individual's technical capability", and 1 challenge and no solution/best practice for "Conflicting priorities & commitments" sub-categories.

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Under the "Pedagogy," category 80 challenges and 31 solutions/best practices are identified. 2 challenges and 4 solutions/best practices belong to "Faculty development and training", 37 challenges and 7 solutions/best practices regarding "Interactivity", 2 challenges and 2 solutions/best practices under "Course Content and Quality", 13 challenges and 12 solutions/best practices under "Pedagogical model (+skills)", 8 challenges and 4 solutions/best practices for "Management and delivery of the course", 2 challenge and no solution/best practice in "Recognition", 6 challenge and no solutions/best practices regarding "Workload", 9 challenges and 2 solution/best practice under "Assessing the Performance" and 1 challenge and no solution/best practice pertains to "Hard to access e-learning materials" sub-categories.

"Enabling Conditions" as the last category is composed of 14 challenges and 5 solutions/best practices mentioned by the instructors. Among these 7 challenges and 4 solutions/best practices belong to "Administrative commitment and support", 3 challenges and no solutions/best practices belong to "Cost of E-Learning Technology & Financing", 1 challenges and 1 solutions/best practices belong to "Inequality" and 3 challenges and no solutions/best practices belong to "Law & Ethics" sub-categories.

Students as the third internal stakeholder of e-learning claimed 38 challenges and 8 solutions/best practices for the category of "Technology". When the sub-categories are observed it is seen that there are 13 challenges and 2 solutions/best practices regarding "Technological Infrastructure". Students claimed 23 challenges and 6 solutions/best practices about "System Design/Development Process", 2 challenges and no solutions/best practices pertaining to "Technical support".

The "Individual" category embodies challenges and solutions/best practices where 36 challenges and 15 solution/best practices belong to the "Motivation" sub-category. There are 1 challenge and no solution/best practice regarding "Self-Efficacy", 1 challenge and 3 solution/best practice for "Awareness and attitude towards ICT", 11 challenge and 3 solutions/best practices in "Individual culture", 1 challenge and no solution/best practice for "Perceived usefulness and ease of use perceptions" 6 challenge and no solution/best practice for "Support by peers and society", 1 challenge and no solution/best practice for "Computer anxiety and technophobia", 2 challenge and no solution/best practice for "Conflicting priorities & commitments", 4 challenges and 1 solutions/best practices under "Readiness & Change Management Issues" and 10 challenges and 4 solutions/best practices pertaining to "Individual's technical capability", 1 challenge and no solution/best practice for "Academic and experiential relevance" sub-categories.

Students under the "Pedagogy," category mentioned 118 challenges and 42 solutions/best practices. 4 challenges and 1 solutions/best practices belong to "Faculty development and training", 47 challenges and 15 solutions/best practices regarding "Interactivity", 9 challenges and 6 solutions/best practices under "Course Content and Quality", 9 challenges and 1 solutions/best practices for "Pedagogical model (+skills)", 14 challenges and 8 solutions/best practices for "Management and delivery of the course", 1 challenge and no solution/best practice in "Recognition", 10 challenge and 1 solutions/best practices regarding "Workload", 23 challenges and 10 solution/best practice under "Assessing the Performance" and 1 challenge and no solution/best practice pertains to "Hard to access e-learning materials" sub-categories.

"Enabling Conditions" as the last category is composed of challenges and solutions/best practices mentioned by the students. Among these 1 challenges and no solutions/best practices belong to "Administrative commitment and support", 1 challenges and no solutions/best practices belong to "Cost of E-Learning Technology & Financing", 2 challenges and 1 solutions/best practices belong to "Inequality" and 2 challenges and no solutions/best practices belong to "Law & Ethics" sub-categories.

Finally, administrators claimed 32 challenges and 11 solutions/best practices under the category of "Technology". When the sub-categories are examined, it is observed that there are 17 challenges and 5 solutions/best practices regarding "Technological Infrastructure". Administrators stated 6 challenges

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and 5 solutions/best practices about "System Design/Development Process", 1 challenge and no solutions/best practices pertaining to "Security" and 8 challenges and 1 solutions/best practices for "Technical support".

The "Individual" category encapsulates 39 challenges and 10 solutions/best practices where 8 challenges and 1 solution/best practice belong to the "Motivation" sub-category. There are 1 challenge and no solution/best practice regarding "Awareness and attitude towards ICT", 1 challenge and no solution/best practice regarding "Self-Efficacy", 1 challenge and 3 solution/best practice for "Awareness and attitude towards ICT", 3 challenge and no solutions/best practices in "Individual culture", 1 challenge and 3 solution/best practice for "Support by peers and society", 1 challenge and no solutions/best practices in "Individual culture", 1 challenge and no solution/best practice for "Computer anxiety and technophobia", 9 challenges and 1 solution/best practice under "Readiness & Change Management Issues", 5 challenges and no solution/best practice for "Conflicting priorities & commitments", 5 challenges and 1 solutions/best practices pertaining to "Individual's technical capability" and 3 challenge and 1 solution/best practice for "Academic and experiential relevance" sub-categories.

Under the "Pedagogy," category 53 challenges and 18 solutions/best practices are identified. 8 challenges and 6 solutions/best practices belong to "Faculty development and training", 16 challenges and 3 solutions/best practices regarding "Interactivity", 2 challenges and no solutions/best practices under "Course Content and Quality", 6 challenges and 2 solutions/best practices under "Pedagogical model (+skills)", 5 challenges and 1 solutions/best practices for "Management and delivery of the course", 2 challenge and no solution/best practice in "Recognition", 6 challenge and 1 solutions/best practices regarding "Workload", 7 challenges and 4 solution/best practice under "Assessing the Performance" and 1 challenge and 1 solution/best practice pertains to "Hard to access e-learning materials" sub-categories.

"Enabling Conditions" as the last category is composed of 32 challenges and 9 solutions/best practices mentioned by the administrators. Among these 8 challenges and 5 solutions/best practices belong to "Administrative commitment and support", 7 challenges and 1 solutions/best practices belong to " Cost of E-Learning Technology & Financing", 6 challenges and 1 solutions/best practices belong to "Inequality" and 11 challenges and 2 solutions/best practices belong to "Law & Ethics" sub-categories.

E-Gemba Visit Findings:

In this section, the challenges and solutions/best practices gathered from e-gemba visits are summarized based on the processes that instructors and students undertake which are categorized in accordance with the framework of challenges.

Instructors in the process of "Planning for e-teaching" have come across with 4 Technological problems regarding these challenges. The problems within the "Technology" category are about "Technical support" (f=2) and "System Design/Development Process" (f=2) and mentioned 2 solutions regarding "System Design/Development Process". "Individual's technical capability" (f=3) and "Motivation" (f=2) are the sub-categories that belong to "Individual" category of challenges and no solutions are expressed by the instructors in this process.

"Planning for e-teaching" process of the instructors is also found to have 3 "Faculty development and training" challenges and 2 solutions, 4 "Pedagogical model (+skills)" challenges and 3 solutions, 5 "Workload" challenges and 1 solution. Therefore, under the "Pedagogy" category 12 challenges and 6 solutions are determined.

Regarding this process instructors claimed no "Administrative commitment and support" challenges but on the other hand they have identified 2 solutions regarding this challenge sub-category. There are also

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1 "Cost of E-Learning Technology & Financing" challenge and no solutions, 1"Law & Ethics" challenge and no solutions in the "Enabling Conditions" category.

The second process that instructors go through in e-learning is "Preparing E-learning tools and Building the Course Content". Within this process, instructors claim 10 Technological challenges where all of these challenges are about the "System Design/Development Process" sub-category. And only 3 solutions were retrieved in this category. 1 challenge regarding "Motivation" and no solution is identified in the "Individual" category.

In the "Pedagogy" category 7 challenges and 6 solutions are obtained where "Faculty development and training" (fsolution=1), "Course Content and Quality" (f challenge= 2; fsolution=2), "Pedagogical model (+skills)"(f challenge= 1; fsolution=1), "Management and delivery of the course" (fsolution=1), "Workload" f challenge= 2), "Hard to access e-learning materials"(f challenge= 1; fsolution=1) are the main challenges observed for "Preparing E-learning tools and Building the Course Content" process.

For "Managing the Course and Online Delivery Environment process that instructors undertake, 8 technological challenges and 2 solutions regarding these technological challenges are obtained. In this category "Technological Infrastructure" (f challenge= 4; fsolution=2), "System Design/Development Process" (f challenge= 4) are the sub-categories where the challenges are identified. "Individual" category consists of "Motivation" (f challenge= 7), "Individual culture" (f challenge= 2) and "Support by peers and society" (f challenge= 2; fsolution=1) sub-categories for this process. "Pedagogy" category involves "Faculty development and training" (f challenge= 7), "Interactivity" (f challenge= 12; fsolution=2), Pedagogical model (+skills) (f challenge= 6; fsolution=5), "Management and delivery of the course" (f challenge= 4), "Workload" (f challenge= 1; fsolution=1), "Assessing the Performance" (fsolution=1) sub-categories of challenges. Finally, within this process 8 challenges and 2 solutions are retrieved for the "Enabling Conditions" category.

The fourth process that instructors go through in their e-learning process is "Completing the Course Content and Assessing the Performance ". Within this process they come across "Technology" (fchallenge=1), "Individual" (fchallenge=2) and "Pedagogy" (fchallenge=9 ; solution=4) categories and no challenges regarding "Enabling Conditions' are obtained for this process.

"Closing and Reporting" is the last process that instructors undertake in e-learning. "Technology" (fchallenge=1), "Individual" (fchallenge=3) and "Pedagogy" (fchallenge=7 ; solution=1) categories are the points that the challenges stem from. Once again, no challenges regarding "Enabling Conditions" are identified for this process.

The processes that students undertake during e-learning process are "Preparing and troubleshooting for e-learning Students", "Accessing the course content and the messages", "Interacting in Online Delivery Environment", "Completing the Course Content and Achieving the Learning Outcomes", "Reporting". Among these processes, students claim challenges and solutions for only three processes. "Preparing and troubleshooting for e-learning "Students" process embodies "Technology" (fchallenge=7; fsolutions=2), "Individual" (fchallenge=2) and "Pedagogy" (fchallenge=4 ; solution=1) and "Enabling Conditions" (fchallenge=1) categories of challenges.

For the "Completing the Course Content and Achieving the Learning Outcomes" process, students mentioned 1 challenge for "Enabling Conditions" about "Law and Ethics". Likewise, for the "Reporting" process only 1 challenge and 1 solution appeared pertaining to "Enabling Conditions" more specifically in "Administrative commitment and support" sub-category.

The study on E-gemba visits for e-learning is one of the unique works in related area. It is presented and published as a proceeding titled as "***Identifying Challenges and Alternative Solutions in e-learning and e-teaching via Online Gemba Visits in Business Schools***" in International Symposium on Quality Function Deployment 2021 (ISQFD'21). (Kapucugil-Ikiz, Demirel and Durukan-Salı, 2021).

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TASK A3: AGGREGATING THE THEORETICAL KNOWLEDGE AND PRACTICAL EXPERIENCE

Aggregating the theoretical knowledge and practical experience task is comprised of four activities which are:

- Listing comprehensively all the challenges and alternative solutions

- Extracting the best practices from the challenge-solution relationship by using Modern Quality Function Deployment (QFD) methodology

Aim: The aim of this task is to list all the challenges and solutions gathered from systematic literature review and the field study and aggregate the findings. The aggregated data paves the way for identification of the quality assurance requirements to be used in setting policies and procedures/processes.

Methodology: The excel databases of challenges and solutions which are retrieved from systematic literature review and the field study are aggregated in another excel file by classifying the challenges and solutions with the framework of challenges which is adapted from the TIPEC Model.

Findings: Aggregated table of challenges and solutions provided us with the total number of challenges and solutions. The frequencies of challenges and solutions that are matched with the TIPEC framework of challenges are provided for each category in subsequent tables (See Table 6 for "Technology" category, Table 7 for "Individual" category, Table 8 for "Pedagogy" category, Table 9Table 6 for "Enabling Conditions" category). The findings reveal that there are 287 challenges gathered from the literature review and the field study whereas there are 121 solutions regarding the "Technology" category. There are also 394 challenges and 40 solutions for "Individual", 484 challenges and 157 solutions for "Pedagogy" and 154 challenges and 35 solutions for "Enabling Conditions" categories. The full version of the aggregated findings including the sub-elements can be seen in Annex C.

Table 6. Aggregated Challenges and Solutions for Technology Category

Technology **F (%F) of Challenges:** 287 (22%) **F (%F) of Solutions:** 122 (34%)			
Technological Challenges (Sub-Category)	**F of Challenge**	**F of Solution**	**Solutions /Best Practices Examples**
Technological Infrastructure	102	14	**Hardware, Software, Facilities:** availability of the technological labs for e-content production **Network Capabilities - Bandwidth Issue and Connectivity:** configuring courses for broadband access or dial-up modem Internet speed
System Design and Development	126	81	**Software And Interface Design:** availability of the system function of automatic monitoring of the exam answers **Complexity Of Coordinating Multidisciplinary Teams of Domain-Experts, Instructors, Students, And Developers:** cooperation among Student Affairs and Faculty Administration during the system development process **Long Release Cycles in The Software Development Times In LMS:** integrating DevOps approach and tools to reduce the system development times/developing the system by

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			building connection between DevOps and Cloud Computing through set of tools. **Incompatible Technology:** compatibility among all forms of e-content, LMS and different technologies **Weak Learning Management System:** developing tools for collaborative group works
Security	23	2	**System Openness / Internet:** developing strategies preserve the security of information **Virus Attacks:** providing support to users for Internet and cyber risks
Technical Support	36	25	**Insufficient Technical Support:** training of faculty by software suppliers (e.g. easy Internet communication interface suppliers WebCT, Blackboard, eCollege)

Table 7. Aggregated Challenges and Solutions for Individual Category

Individual			
F (%F) of Challenges: 394 (30%) **F (%F) of Solutions:** 40 (11%)			
Individual Challenges (Sub-Category)	**F of Challenge**	**F of Solution**	**Solutions /Best Practices Examples**
Motivation	134	11	**Lack of Student Motivation:** developing a community management model to emphasis on common purposes, interests and friendships among students **Lack Of Ownership and Effort:** building balanced scorecard approach and incentive system to motivate lecturers
Self-Efficacy	13	2	**Lack of Self-Efficacy:** showing students how they succeeded for their self-esteem and self-efficacy
Awareness and attitude towards ICT	20	10	**Lack of Awareness and Negative Attitude Towards ICT:** creating a "communication coordinator" position for e-learning processes
Individual culture	37	1	**Individual Culture:** contacting unwilling learner for the discussion/group through private channels (e.g. calls or e-mails)
Perceived usefulness	12	2	**Perceived Usefulness (Ease of Use Perceptions):** designing more interactive and practical courses to be applicable to students' employability
Support by peers and society	18	7	**Lack Of Students (Peer) Support:** encouraging peer support of students for sharing ideas, giving feedback/support to each other and collaborative work **Lack Of Social Support:** organizing home dynamics to be proper and quite for e-learning
Computer anxiety and technophobia	18	0	N/A

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Conflicting priorities & commitments	15	1	**Work Commitment:** providing regular support for stress and work-life balance throughout the semester through assignments and program newsletters
Readiness & Change Management Issues	46	3	**Poor Response to change:** introducing the advantages of e-learning in advance (e.g. ease of achieving information) and bringing innovative concepts to attract users **Acceptance level of e-learning technologies:** introducing the advantages of e-learning in advance (e.g. ease of achieving information) and bringing innovative concepts to attract users
Individual's technical capability	63	3	**Technological difficulty:** providing training for the users of e-learning technologies to overcome the technical difficulties **Technology experience:** encouraging students against e-learning and its technologies through better usage of LMS by lecturers **Lack of ICT skills:** ensuring the digital capability/ICT skills of lecturers is sufficient for e-learning through exam (e.g. e-content production)
Academic and experiential relevance	18	0	N/A

Table 8. Aggregated Challenges and Solutions for Pedagogical Category

Pedagogical **F (%F) of Challenges:** 484 (36%) **F (%F) of Solutions:** 157 (45%)			
Pedagogical Challenges (Sub- Category)	**F of Challenge**	**F of Solution**	**Solutions /Best Practices Examples**
Faculty development and training	24	8	**Faculty Development:** identifying the shortcomings of existing online teaching, capabilities of the lecturers and type of students before planning and designing the online courses and infrastructures. **Training:** training the users in advance to enhance their knowledge of e-learning and e-learning technologies
Interactivity	187	26	**Lack Of Feedback:** bringing obligation for lecturers to give feedback about the exam questions and answers after the exam to ensure learning occurs **Absence Of Real-Time Feedback:** real-time assessment of students through verbal questions regularly during the virtual session to monitor whether the learning occurs (e.g., simple answers via "chatbox", or summarizing the session at the end) **Engaging Students Online:** establishing a discussion club for students to avoid sense of social isolation Sense Of Isolation Due Less Face To Face Interaction: **Social Loafing:** integrating a video conference system enabling simultaneous display of both screensharing (slides) and the

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			person speaking in a large format to avoid sense of isolation due to missing facial expressions **Tutor Support/Counselling Sessions (To Support By Peer & Society)**: tracking students activities through analytical tools to measure progress and give support/counseling in parallel
Course Content and Quality	44	11	**Poor Interactivity Of Course Content:** using up-to-date and interactive online multimedia tools when designing the course content (e.g. podcasts, videos, discussions, various articles and blogs, along with various assessment methods, such as tests, quizzes and project learning activities) **Lack Of Effective Course Content (Learning Outcome Relevance):** updating course content in parallel to the trends and changes in business world **Less Focus On Technical Requirements Of Content:** using an additional computer monitor for displaying both the session and the application which the lecturer works on simultaneously
Pedagogical Model (+Skills)	55	48	**Pedagogical Model (+Skills):** implementing gamified grading system where extra points for participation to in-class activities, or for advance answers/concepts to questions
Management and delivery of the course	41	14	**Poor Flexibility In Delivery Mode:** taking student preferences into consideration in the selection of the type of communication utilized in e-learning **Speed Of Course Delivery:** limiting session duration to 20 minutes and integrating more interactive activities **Managing Large Groups:** designing break-out room activities creating smaller size of groups with few students **Lack Of Pre-Course Orientation:** informing students in advance about to-do's when in need of help (e.g., contact information of the instructor, technical support and academic assistance)
Recognition	11	4	**Lack Of Credibility:** promote e-learning programs to a much larger recruiting territories. **Lack Of Public Awareness:** integrating enterprise resource planning systems into LMS, about to increase the collaboration among HEI and business world
Workload	50	3	**Additional Workload:** acceptance of digital signatures across the HEI to prevent bureaucratic workload for lecturers
Assessing the Performance	59	27	**Lack Of Reliability Of Online Assessment Process:** encouraging the use of proctoring systems in assessment process **Lack Of Efficiency Measurement Tool:** effective online assessments techniques involving weekly assignments with immediate feedback, self-assessments, projects, portfolios, quizzes, peer evaluations, and grading of a variety of communications such as discussion postings
Hard to access e-learning materials	13	16	**Hard To Access Digital Libraries:** developing a profile page for each learner, where students' works during semester are accumulated as means of CV for post-graduation, published if desired, criticized by peer reviews, even create a library within the course

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			Material Accessibility: searching Internet to find ready-to-use attractive content/videos to share with student instead of preparing a new one

Table 9. Aggregated Challenges and Solutions for Enabling Conditions Category

Enabling Conditions			
F (%F) of Challenges: 154 (12%) **F (%F) of Solutions:** 35 (10%)			
Enabling Conditions Challenges (Sub-Category)	**F of Challenge**	**F of Solution**	**Solutions /Best Practices Examples**
Administrative commitment and support	46	20	**Administrative Commitment and Support:** forming partnerships with expert online learning schools
Cost of E-Learning Technology & Financing	36	4	**Cost Of Using Technology:** government-contracted campaigns for students to rent/purchase equipment or network connection at discounted prices with their Student ID/Certificate **Cost Of Multimedia Learning Materials:** incentives (e.g., project funds) for digital teaching to promote motivation among teachers in improving the learning material quality. **Setup Cost/Limited Funds:** utilizing HEI facilities as much as possible to meet e-learning requirements
Inequality	46	2	**Inequality In Access to Technology:** enabling e-learning students to use faculty equipment
Law & Ethics	26	9	**Rules And Regulation:** digitalization of the files of individual students (already digitalized the enrollment process, but student applications must be digitalized as well)

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TASK A4. PREPARING THE GUIDELINES FOR THE QUALITY ASSURANCE FOR E-LEARNING

This activity aims to prepare comprehensive, internationally applicable step-by-step guidelines for development and maintainability of the quality assurance system in e-learning. Within this activity, relevant reference models and standards for quality assurance in online education have been reviewed to comprehend the quality assurance requirements as well as criteria to meet those requirements. To create this guidebook, very comprehensive and detailed analyses have been done as mentioned in previous three tasks. Consolidated findings of Task A1, Task A2 and Task A3 were used to define the Steps for Developing a Customized Quality Assurance System for E-learning. The methodology and overall process of Task A4 is already explained within the following guideline.

Quality Assurance Guidelines

1. Introduction

Defining quality in e-learning is challenging because it has different meanings for various stakeholders and can be seen from a variety of different perspectives. Despite the existence of numerous instruments, government or national policies, standards, and individual frameworks, no parameters for the design of quality assurance (QA) systems are provided. It is up to institutions to decide which quality assurance instruments or procedures to use, at which organizational levels and within which organizational management processes they will be implemented, and which resources and competencies will be assigned to internal quality assurance organizational units.

In this project, how quality assurance for e-learning processes in higher education can be designed from the perspective of each internal stakeholder (i.e. learner, instructor, administrator, and technical experts) is one of the specific goals. Considering e-learning challenges faced by each stakeholder and corresponding solutions to these challenges in literature and practice, we developed the Quality Assurance Guidelines for online education for use in business schools. Final output does not refer to a specific model or standard, instead the institutions (business schools or any other having similar educational environment) will find their own way to establish a customized quality assurance system by following suggested guidelines. In other words, it specifies what must be considered to meet the fundamental requirements for quality in e-learning but does not demonstrate how something must be done to meet the requirements. The technology that enables e-learning is rapidly changing, but the guidelines presented here are broad enough to be applicable for a longer period. Even though these guidelines were designed with full-time e-learning in mind, most of the items also apply to hybrid teaching.

As a result, the guidelines provided here are intended to assist administrators in Higher Education Institutions in developing and implementing a quality assurance system in e-learning. They specify the processes of key stakeholders and corresponding quality assurance points that administrators should define, understand, and track to prevent, detect, and correct quality problems. The Guidelines are presented in three formats:

- Main processes and their steps as tasks.
- Checklists - outlines for administrators to identify the quality assurance points.

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- Guidelines - text for administrators and other staff who would like more descriptive guidance about the processes and corresponding checklists.

2. Basic Elements to Set up an E-Learning Quality Assurance System

Quality assurance (QA) is defined as planned and systematic actions carried out within the quality system and demonstrated as necessary to provide adequate confidence that a product or service will meet specified quality requirements (ISO 9000:2015). The focus of QA is directly on quality-related processes and product outcomes (Juran et al. 1999). From the standpoint of Higher Education, quality assurance of an academic program gives customers and other stakeholders confidence that academic quality requirements will be met, and the academic program will serve its intended purpose, i.e., providing high-quality education (Asif and Raouf, 2013). A quality online learning environment is firmly based on the pedagogical needs of the course and its learners, is reliable and robust, is aligned with the technical infrastructure of the institution, and is regularly subjected to internal evaluations, updating and improvements as needed (Uvalic-Trumbic and Daniel, 2020: p.9).

There are many discussions on common aspects of a quality experience in the traditional and online learning environments. The diversity of the existing knowledge base and practices can lead to confusion when determining the most appropriate QA criteria. Instead, it is advisable to consider two essential prerequisites: identifying the desired quality characteristics and deciding on their attainment using quantitative measures and/or qualitative judgments (TEQSA, 2017). As a result, the QA guidelines were developed based on these two requirements to assist administrators in developing a customized QA framework for their own institutions.

3. Steps for Developing a Customized Quality Assurance System for E-learning

3.1. Identifying quality characteristics

The first requirement for establishing a system that ensures the quality of e-learning is to identify the quality characteristics that must be met. Each stakeholder in the e-learning system may expect different quality characteristics from the system and corresponds to a different segment. An understanding of the processes by which key stakeholders participate in the e-learning system helps to identify the quality characteristics.

3.1.1 Determining stakeholders and their processes.

Within the e-learning system, different stakeholders interact with each other. The major ones are learners, instructors, administrators, and technical experts (Figure 4). Each expects different quality characteristics from the system and corresponds to a different segment.

Learners are of prime importance among the stakeholders of the system as they are the main reason for all teaching and learning activities and the end-user who can experience the quality of online educational service. Instructors both structure the course content and provide resources and assessments in such a way of satisfying student needs thereby increasing effectiveness on the learning process. In virtual classes, their role is to give lectures and to moderate discussions using Web-based learning environments (i.e. Learning Management System). Learners use the resources and participate in activities. Administrators are responsible for the development and maintainability of online education services. They determine strategies, policies, and procedures for e-learning, facilitating access to resources and applications, and tracking all kinds of records during the activities performed by each stakeholder.

Technical experts mainly integrate the user interface design with instructional design, providing support, training, and direction related to e-learning technologies, evaluating LMSs for improvements, and assisting with technical issues of all stakeholders involved in the process.

Figure 4. Key Stakeholders in E-Learning System

Understanding the processes that key stakeholders use to participate in the e-learning system aids in identifying quality characteristics. These processes can be defined by exploring the steps or decisions taken by each stakeholder.

To create a process model, answers to the following questions can be obtained by observing or directly asking stakeholders explain what they do in their own words:

- *What do they do?*
- *What 'tasks' are they trying to do?*
- *What decisions must they make?*

In this project, these process models were developed using information from field studies (i.e. Task A2) carried out in collaboration with partner universities. Draft versions of the stakeholder processes are reviewed and revised by each partner. Final definition of these processes is given in the following tables (Tables 10 to 13).

It should be noted that these process definitions represent examples for the institutions to use in determining their own processes. Other institutions may define their own processes by asking the questions mentioned above for each stakeholder.

Table 10. Learner Process Model

Main Step of the **Learner Process**	Learner Process Tasks
1. Preparing and troubleshooting for e-learning	1.1. Accessing the campus network by using their own devices
	1.2. Accessing electronic learning platform (LMS) and other required software to support their learning
	1.3. Taking administrative, academic and technical support at flexible hours and locations
2. Accessing the course content and the messages	2.1. Accessing appropriate learning resources and student information online
	2.2. Getting messages and announcements
3. Interacting in Online Delivery Environment	3.1. Attending interactive group activities including online forums, virtual meetings and online chat rooms
	3.2. Interacting socially and academically with staff and other students
4. Completing the Course Content and Achieving the Learning Outcomes	4.1. Getting assessment tasks
	4.2. Achieving the intended learning outcomes and required standards
5. Reporting	5.1. Providing feedback for online education

Table 11. Instructor Process Model

Main Step of the **Instructor Process**	Instructor Process Tasks
1. Planning for e-teaching	1.1. Taking technical and pedagogical support for professional development
	1.2. Planning topics and activities based on learning objectives
	1.3. Planning measurement and assessment based on learning objectives
	1.4. Determining weekly tasks and dates
	1.5. Preparing/updating course syllabus
2. Preparing E-learning tools and Building the Course Content	2.1. Organizing the infrastructure (LMS)
	2.2. Selecting tools (measurement and assessment)
	2.3. Preparing and uploading conventional / digital content
	3.1. Schedule live meetings/Virtual class for synchronous e-teaching

3. Managing the Course and Online Delivery Environment	3.2. Access virtual class environment, Delivery of topics, Manage the participants in class (for example, using the chatbox)
	3.3. Using asynchronous interaction tools (Send/Display Announcements and Messages, Chat tool, Forum tool)
	3.4. Interacting with students individually/as a group, and monitoring of study group interactions
	3.5. Taking technical, pedagogical, administrative support for sustainability / reliability of e-teaching
4. Completing the Course Content and Assessing the Performance	4.1. Assessment (Pre-test and provide training for students, Define/Display Assignments; Access Tests/Quizzes)
	4.2. Providing the feedback to students
5. Closing and Reporting	5.1. Course evaluation (Learning objectives, teacher competency, assessment methods, infrastructure…)
	5.2. Learning Analytics for continuous improvement

Table 12. Technical Expert Process Model

Main Step of the Technical Expert Process	Technical Expert Process Tasks
1. Customizing e-learning software (LMS) for courses or tools	1.1. Creating and supporting the best learning, teaching, and collaboration environment
	1.2. Working with staff/faculty to incorporate e-learning tools into curriculum
2. Providing one-to-one support, training, and direction related to e-learning technologies.	2.1. Develop and deliver support materials for subject matter experts
	2.2. Helping users to explore and use of e-learning technologies
	2.3. Training users about properties/changes in the e-learning software (i.e. LMS)
	2.4. Day-to-day technical and operational support for the e-learning software and applications
3. Evaluating and maintaining or re-designing LMSs	3.1. Identifying and enacting opportunities for process and quality improvements
	3.2. Providing customer service through troubleshooting and assisting with technical issues
	3.3. Prioritizing and evaluating technical support issues and elevating when necessary.

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Table 13. Administrator Process Model

Main Step of the **Administrator** Process	Administrator Process Tasks
1. Determining strategies, policies, and procedures for e-learning	1.1. Determining strategies, policies, procedures related to e-learning for all stakeholders including the ones with special needs in line with school's mission
	1.2. Determining incentives for instructors teaching online
	1.3. Support for copyright considerations and legal services, code of conduct preparation, ethical issues
	1.4. Admission & graduation procedures and requirements
2. Infrastructure and Resource Management	2.1. Technical and technological support to learners and instructors and technical staff
	2.2. Financing and funding investment in resources and infrastructure and training
	2.3. Trainings provided to technical staff
	2.4. Trainings provided to learners
	2.5. Instructional design support and training
	2.6. Security, copyright provision, ethical issues
3. Curriculum Management	3.1. Program design
	3.2. Implementation of the program
	3.3. Assurance of Learning (AoL)
	3.4. Performance evaluation
4. Communication & Relationship Management	4.1. Communication with potential students
	4.2. Communication with learners
	4.3. Communication with instructors
	4.4. Communication with alumni
	4.5. Communication with technical and administrative staff
	4.6. Communication with other stakeholders (employers, government, etc.)

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	4.7. Communication with upper management (Graduate School Director/Dean/Rectorate)
5. Data Management and Control	5.1. Learner Database Management
	5.2. Alumni Database Management
	5.3. Collection and management of data related to course effectiveness and lecturers
	5.4. Collection and management of data related to infrastructure and program evaluations
6. Quality Management	6.1. External Monitoring Mechanisms (e.g. Accreditation)
	6.2. Internal Monitoring Mechanisms
	6.3. Problem Solving and Continuous Improvement

3.1.2 Understanding the context and extracting the quality characteristics

To identify the quality characteristics, the key question to be asked here is "what are the expectations of each stakeholder from the online educational system?"

In the online education system, stakeholders can have multiple value items such as problems, opportunities, look-good and feel-good issues with different priorities. The problems may not be complaints or problems with the system, and opportunities may not be system features or solutions. Rather, problems prevent stakeholders from achieving their personal or professional goals while opportunities bring advantages different from the competitors. These value items should be analyzed for greater breadth and depth of meaning to identify the quality characteristics. Institutions can benefit from a variety of data collection methods, including Gemba visits, surveys, interviews, focus groups, quality records, and even reviews on websites and social networks.

In this project, we collected these value items by using three methods including literature review, gemba visits, and focus group studies, as explained in Tasks 1 and 2. Our focus was on understanding the problems and opportunities of each stakeholder and exploring what went wrong and right. Findings from a systematic literature review and the experiences of partner institutions are used to identify the challenges faced by internal stakeholders (i.e., learners, instructors, administrators, and technical experts) and alternative solutions for an online education system. A variety of challenges were defined in the three-level hierarchical structure of an integrated framework. The framework identifies e-learning challenges under four main dimensions: "technology," "individual," "pedagogy," and "enabling conditions." This framework is used to define the quality characteristics for each stakeholder, which will then serve as quality assurance indicators for e-learning in higher education.

To define quality characteristics for each stakeholder process, the clarified statements obtained from field studies are sorted into the relevant categories of the E-learning Challenges Framework and matched with related process tasks. The clarified statements basically reflect the needs and perceptions of stakeholders regarding their experiences during their own process tasks in the online education system.

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By looking at the matching between process steps and TIPEC sub-categories and sub-elements, the most frequently observed challenges at sub-category level are determined as the important quality assurance points or characteristics. The sub-elements of these characteristics are specified as possible risks that can occur on each process step. Among them, the vulnerable and most vulnerable barriers (those highlighted in "**bold**" and "**bold*** (bold with star)" characters, respectively, in Tables 14 to 17) can also be accepted as potential problems or issues to be addressed in future monitoring. In these tables, N/A refers to the data not available.

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Table 14. Quality Characteristics and Risks in Learner Process Model

Main Step of the **Learner** Process	Learner Process Tasks	Key Risk Areas	Quality Characteristics	Identified Risks and Issues
1. Preparing and troubleshooting for e-learning	1.1. Accessing the campus network by using their own devices	**Technology***	**1.1. Technological Infrastructure*** 1.2. System Design/Development Process	**1.1.2. Network Capabilities - Bandwidth Issue and Connectivity*** 1.2.5. Weak Learning Management System
	1.2. Accessing electronic learning platform (LMS) to support their learning	Technology **Individual** Enabling Conditions	1.1. Technological Infrastructure 2.1. Motivation 2.9. Readiness & Change Management Issues 2.10. Individual's technical capability 4.4. Law & Ethics	1.1.1. Hardware, software, facilities 2.1.1. Lack of Student motivation 2.9.1. Insufficient Readiness 2.10.1. Technological difficulty 4.4.1. Rules and regulation
	1.3. Taking administrative, academic and technical support at flexible hours and locations.	**Individual** **Pedagogy**	**2.1. Motivation** **2.3. Awareness and attitude towards ICT** **3.2. Interactivity**	**2.1.3. Lack of ownership and effort** **2.3.1 Lack of Awareness and Negative attitude towards ICT** **3.2.1. Lack of feedback** 3.2.6. Tutor support/counselling sessions (to support by peer & society)

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2. Accessing the course content and the messages	2.1. Accessing appropriate learning resources and student information online	**Technology***	**1.1. Technological Infrastructure***	**1.1.1. Hardware, software, facilities*** 1.1.2. Network Capabilities - Bandwidth Issue and Connectivity
		Pedagogy	3.2. Interactivity	3.2.1. Lack of feedback 3.2.3. Engaging Students Online 3.5.6. Lack of Pre-course orientation
			3.9. Hard to access e-learning materials	3.9.2. Material accessibility
	2.2. Getting messages and announcements	**Technology**	1.2. System Design/Development Process	1.2.5. Weak Learning Management System
		Pedagogy*	**3.2. Interactivity***	**3.2.1. Lack of feedback***
3. Interacting in Online Delivery Environment	3.1. Attending interactive group activities including online forums, virtual meetings and online chat rooms	Technology	1.1. Technological Infrastructure	1.1.2. Network Capabilities - Bandwidth Issue And Connectivity
		Individual*	**2.1. Motivation***	**2.1.1. Lack of Student motivation***
		Pedagogy	**3.2. Interactivity**	**3.2.3. Engaging Students Online**
			3.4. Pedagogical model (+skills)	3.2.4. Sense of isolation due less face to face interaction
				3.4.1. Pedagogical model (+skills)
			3.5. Management and delivery of the course	3.5.4. Speed of course delivery
	3.2. Interacting socially and academically with staff and other students	Individual	2.6. Support by peers and society	2.6.1. Lack of Students (Peer) Support
		Pedagogy*	**3.2. Interactivity***	3.2.1. Lack of feedback

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				3.2.4. Sense of isolation due less face to face interaction*
4. Completing the Course Content and Achieving the Learning Outcomes	4.1. Getting assessment tasks	Technology	1.1. Technological Infrastructure	1.1.2. Network Capabilities - Bandwidth Issue and Connectivity
		Individual	**2.1. Motivation**	**2.1.1. Lack of Student motivation**
		Pedagogy*	**3.7. Workload***	**3.7.1. Additional workload***
			3.8. Assessing the Performance	3.8.3. Lack of efficiency measurement tool
	4.2. Achieving the intended learning outcomes and required standards	**Individual**	**2.4. Individual culture**	**2.4.1. Individual culture**
			2.11. Academic and experiential relevance	2.11.1. Lack of knowledge and experience in e-learning
		Pedagogy*	**3.8. Assessing the Performance***	**3.8.1. Lack of reliability of online assessment process***
				3.8.3. Lack of efficiency measurement tool
5. Reporting	5.1. Providing feedback for online education	**Pedagogy**	3.8. Assessing the Performance	3.8.1. Lack of reliability of online assessment process
				3.8.3. Lack of efficiency measurement tool

Table 15. Quality Characteristics and Risks in Instructor Process Model

Main Step of the Instructor Process	Instructor Process Tasks	Key Risk Areas	Quality Characteristics	Identified Risks and Issues
1. Planning for e-teaching	1.1. Taking technical and pedagogical support for professional development	Technology **Individual** Pedagogy	1.4. Technical Support 2.9. Readiness & Change Management Issues **2.10. Individual's technical capability** 3.1. Faculty development and training	**1.4.1. Insufficient Technical Support** 2.9.2. Poor Response to change 2.10.1. Technological difficulty 2.10.2. Technology experience 3.1.1. Faculty development
	1.2. Planning topics and activities based on learning objectives	**Pedagogy**	**3.4. Pedagogical model (+skills)**	**3.4. Pedagogical model (+skills)**
	1.3. Planning measurement and assessment based on learning objectives	Pedagogy	3.7. Workload	3.7.1. Additional workload
	1.4. Determining weekly tasks and dates	Pedagogy	3.5. Management and delivery of the course	3.5.4. Speed of course delivery
	1.5. Preparing/updating course syllabus	N/A		
2. Preparing E-learning tools and Building the Course Content	2.1. Organizing the infrastructure (LMS)	**Technology** Individual	**1.2. System Design/Development Process** 2.1. Motivation 2.10. Individual's technical capability	**1.2.1. Software and interface design** 2.1.3. Lack of ownership and effort 2.10.2. Technology experience

	2.2. Selecting tools (measurement and assessment)	Technology	1.2. System Design/Development Process	1.2.5. Weak Learning Management System
		Pedagogy	3.4. Pedagogical model (+skills)	3.4.1. Pedagogical model (+skills)
			3.7. Workload	3.7.1. Additional workload
	2.3. Preparing and uploading conventional / digital content	Technology	**1.2. System Design/Development Process**	1.2.1. Software and interface design 1.2.4. Incompatible technology
		Individual	2.10. Individual's technical capability	2.10.4. Lack of ICT skills
		Pedagogy	**3.3. Course Content and Quality**	3.3.1. Poor Interactivity of Course Content 3.3.2. Lack of Effective Course Content (Learning outcome relevance)
			3.7. Workload	**3.7.1. Additional workload**
			3.9. Hard to access e-learning materials	3.9.2. Material accessibility
3. Managing the Course and Online Delivery Environment	3.1. Schedule live meetings/Virtual class for synchronous e-teaching	**Pedagogy**	**3.5. Management and delivery of the course**	3.5.3. Different Time Zone 3.5.4. Speed of course delivery
	3.2. Access virtual class environment, Delivery of topics, Manage the participants in class (e.g., by using chatbox)	**Technology**	**1.1. Technological Infrastructure**	**1.1.2. Network Capabilities - Bandwidth Issue and Connectivity**
			1.2. System Design/Development Process	**1.2.1. Software and interface design**
		Individual	**2.1. Motivation**	**2.1.1. Lack of Student motivation***
		Pedagogy*	**3.2. Interactivity***	**3.2.2. Absence of real-time feedback** **3.2.3. Engaging Students Online**
			3.4. Pedagogical model (+skills)	3.4.1. Pedagogical model (+skills)

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		Enabling Conditions	**3.5. Management and delivery of the course** 4.3. Inequality	**3.5.5. Managing large groups** 4.3.2. Inequality in access to technology
	3.3. Using asynchronous interaction tools (Send/Display Announcements and Messages, Chat tool, Forum tool)	Technology	1.2. System Design/Development Process	1.2.5. Weak Learning Management System
		Individual	2.1. Motivation	2.1.3. Lack of ownership and effort
			2.9. Readiness & Change Management Issues	2.9.3. Acceptance level of e-learning technologies
			2.10. Individual's technical capability	2.10.3. Computer literacy
	3.4. Interacting with students individually/as a group, and monitoring of study group interactions	**Individual**	**2.1. Motivation** 2.6. Support by peers and society	**2.1.1. Lack of Student motivation** 2.6.1. Lack of Peers Support
		Pedagogy*	**3.2. Interactivity***	**3.2.2. Absence of real-time feedback** **3.2.3. Engaging Students Online*** **3.2.4. Sense of isolation due less face to face interaction**
			3.4. Pedagogical model (+skills)	**3.4.1. Pedagogical model (+skills)**
		Enabling Conditions	4.4. Law & Ethics	4.4.1. Rules and regulations

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4. Completing the Course Content and Assesing the Performance	3.5. Taking technical, pedagogical, administrative support for sustainability / reliability of e-teaching	**Technology**	**1.1. Technological Infrastructure**	**1.1.2. Network Capabilities - Bandwidth Issue And Connectivity**
		Individual	2.1. Motivation	2.1.3. Lack of ownership and effort
		Pedagogy	3.4. Pedagogical model (+skills)	3.4. Pedagogical model (+skills)
		Enabling Conditions*	**4.1. Administrative commitment and support***	**4.1.1. Administrative commitment and support***
			4.3. Inequality	**4.3.2. Inequality in access to technology**
			4.4. Law & Ethics	4.4.2. Ethical barriers
	4.1. Assessment (Define/Display Assignments; Access Tests/Quizzes)	Technology	1.2. System Design/Development Process	1.2.5. Weak Learning Management System
		Pedagogy*	3.7. Workload	3.7.1. Additional workload
			3.8. Assessing the Performance*	**3.8.1. Lack of reliability of online assessment process*** **3.8.3. Lack of efficiency measurement tool**
	4.2. Providing the feedback to students	Pedagogy	3.2. Interactivity	3.2.1. Lack of feedback
5. Closing and Reporting	5.1. Course evaluation (Learning objectives, teacher competency, assessment methods, infrastructure…)	Technology	1.2. System Design/Development Process	1.2.1. Software and interface design
		Pedagogy	**3.7. Workload**	**3.7.1. Additional workload**
			3.8. Assessing the Performance	3.8.3. Lack of efficiency measurement tool
	5.2. Learning Analytics for continuous improvement	Technology	1.2. System Design/Development Process	1.2.5. Weak Learning Management System
		Individual	2.1. Motivation	2.1.3. Lack of ownership and effort
		Pedagogy	3.8. Assessing the Performance	3.8.3. Lack of efficiency measurement tool

Table 16. Quality Characteristics and Risks in Technical Expert Process Model

Main Step of the **Technical Expert** Process	Technical Expert Process Tasks	Key Risk Areas	Quality Characteristics	Identified Risks and Issues
1. Customizing e-learning software (LMS) for courses or tools	1.1. Creating and supporting the best learning, teaching, and collaboration environment	**Technology***	**1.2. System Design/Development Process***	1.2.1. Software and interface design **1.2.2. Complexity of coordinating multidisciplinary teams of domain-experts, instructors, students, and developers*** 1.2.5. Weak Learning Management System
		Enabling Conditions	4.2. Cost of E-Learning Technology & Financing	4.2.2. Cost of using technology 4.2.4. Setup cost/limited funds
	1.2. Working with staff/faculty to incorporate e-learning tools into curriculum	**Technology***	**1.2. System Design/Development Process***	**1.2.1. Software and interface design***
		Pedagogy	3.1. Faculty development and training	3.1.1. Faculty development
			3.2. Interactivity	3.2.4. Sense of isolation due less face to face interaction
			3.5. Management and delivery of the course	3.5.2. Mode of delivery
			3.9. Hard to access e-learning materials	3.9.2. Material accessibility

2. Providing one-to-one support, training, and direction related to e-learning technologies.	2.1. Develop and deliver support materials for subject matter experts	Individual Pedagogy	2.1. Motivation 3.7. Workload	2.1.3. Lack of ownership and effort 3.7.1. Additional workload
	2.2. Helping users to explore and use of e-learning technologies	**Individual** Enabling Conditions	2.3. Awareness and attitude towards ICT **2.9. Readiness & Change Management Issues** 4.1. Administrative commitment and support 4.4. Law & Ethics	2.3.1 Lack of Awareness and Negative attitude towards ICT **2.9.2. Poor Response to change** 4.1.1. Administrative commitment and support 4.4.1. Rules and regulation
	2.3. Training users about properties/changes in the e-learning software (i.e. LMS)	Individual	2.3. Awareness and attitude towards ICT	2.3.1 Lack of Awareness and Negative attitude towards ICT 2.10.4. Lack of ICT skills
	2.4. Day-to-day technical and operational support for the e-learning software and applications	**Technology*** Individual	1.2. System Design/Development Process **1.4. Technical support*** 2.10. Individual's technical capability	1.2.5. Weak Learning Management System **1.4.1. Insufficient Technical support*** 2.10.2. Technology experience
3. Evaluating and maintaining or re-designing LMSs	3.1. Identifying and enacting opportunities for process and quality improvements	Technology **Enabling Conditions**	1.1. Technological Infrastructure 4.2. Cost of E-Learning Technology & Financing	1.1.1. Hardware, software, facilities 4.2.2. Cost of using technology 4.2.4. Setup cost/limited funds 4.2.3. Cost of multimedia learning materials
	3.2. Providing customer service through troubleshooting and assisting with technical issues	**Technology***	**1.1. Technological Infrastructure*** 1.4. Technical support	**1.1.1. Hardware, software, facilities*** 1.4.1. Insufficient Technical support

Table 17. Quality Characteristics and Risks in Administrator Process Model

Main Step of the **Administrator** Process	Administrator Process Tasks	Key Risk Area	Quality Characteristics	Identified Risks and Issues
1. Determining strategies, policies and procedures for e-learning	1.1. Determining strategies, policies, procedures related to e-learning for all stakeholders including the ones with special needs in line with school's mission	**Individual** Enabling Conditions	**2.8. Conflicting priorities & commitments** 4.1. Administrative commitment and support	**2.8.3. Conflicting priorities** 4.1.1. Administrative commitment and support
	1.2. Determining incentives for instructors teaching online	Individual	2.8. Conflicting priorities & commitments	2.8.1. Family commitments 2.8.3. Conflicting priorities
	1.3. Support for copyright considerations and legal services, ethical issues	N/A		
	1.4. Admission & graduation procedures and requirements	N/A		
2. Infrastructure and Resource Management	2.1. Technical and technological support to learners and instructors and technical staff	**Technology*** Individual	**1.1. Technological Infrastructure*** 1.2. System Design/Development Process **1.4. Technical support** 2.9. Readiness & Change Management Issues **4.3. Inequality**	**1.1.1. Hardware, software, facilities*** **1.1.2. Network Capabilities - Bandwidth Issue And Connectivity*** 1.2.1. Software and interface design **1.4.1. Insufficient Technical support** 2.9.2. Poor Response to change

				4.3.1. Inequality in access to Internet connectivity
	2.2. Financing and funding investment in resources and infrastructure and training	**Enabling Conditions**	**4.2. Cost of E-Learning Technology & Financing**	**4.2. Cost of E-Learning Technology & Financing**
	2.3. Trainings provided to technical staff	Pedagogy	3.1. Faculty development and training 3.7. Workload	3.1.2. Training 3.7.1. Additional workload
	2.4. Trainings provided to learners	Pedagogy	3.1. Faculty development and training	3.1.2. Training
	2.5. Instructional design support and training	**Individual** **Pedagogy***	**2.9. Readiness & Change Management Issues** **3.1. Faculty development and training***	**2.9.1. Insufficient Readiness** **2.9.2. Poor Response to change** **3.1.2. Training***
	2.6. Security, copyright provision, ethical issues	Pedagogy Enabling Conditions	3.8. Assessing the Performance 4.4. Law & Ethics	3.8.1. Lack of reliability of online assessment process 4.4.1. Rules and regulations
3. Curriculum Management	3.1. Program design	Pedagogy	3.3. Course Content and Quality 3.5. Management and delivery of the course	3.3.4. Appropriateness of the Nature of the Course to E-Learning 3.5.2. Mode of delivery

	3.2. Implementation of the program	**Individual Pedagogy***	**2.1. Motivation**	**2.1.1. Lack of Student Motivation**
			3.2. Interactivity*	3.2.3. Engaging Students Online **3.2.4. Sense of isolation due less face to face interaction***
			3.4. Pedagogical model (+skills)	3.4.1. Pedagogical model (+skills)
			3.7. Workload	3.7.1. Additional workload
	3.3. Assurance of Learning (AoL)	**Pedagogy**	**3.8. Assessing the Performance**	**3.8.3. Lack of efficiency measurement tool**
	3.4. Performance evaluation	Enabling Conditions	4.4. Law & Ethics	4.4.1. Rules and regulation
4. Communication & Relational mechanisms	4.2. Communication with learners	**Pedagogy**	**3.2. Interactivity**	3.2.1. Lack of feedback 3.2.2. Absence of real-time feedback 3.2.2. Absence of real-time feedback 3.2.6. Tutor support/counselling sessions (to support by peer & society)
	4.7. Communication with upper management (Graduate School Director/Dean/Rectorate)	Enabling Conditions	4.4. Law & Ethics	4.4.1. Rules and regulation
5. Data Management and Control	5.1. Learner Database Management	Technology	1.2. System Design/Development Process	1.2.1. Software and interface design 1.2.4. Incompatible technology
	5.3. Collection and management of data related to course effectiveness and lecturers	Technology	1.2. System Design/Development Process 1.3. Security	1.2.1. Software and interface design 1.3.1. System openness / Internet

6. Quality Management	6.1. External Monitoring Mechanisms (e.g. Accreditation)	Pedagogy	3.6. Recognition	3.6.1. Lack of credibility
	6.2. Internal Monitoring Mechanisms	**Enabling Conditions**	**4.1. Administrative commitment and support** **4.4. Law & Ethics**	**4.1.1. Administrative commitment and support** **4.4.1. Rules and regulation**
	6.3. Problem Solving and Continuous Improvement	Technology	1.4. Technical support	1.4.1. Insufficient Technical support
		Individual	**2.1. Motivation**	**2.1.3. Lack of ownership and effort**
		Pedagogy	3.7. Workload	3.7.1. Additional workload

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3.2 Deciding of Attainment

This step involves evaluating the consistency of the outputs in relation to the expected quality characteristics using quantitative and/or qualitative judgments. Activities in this step can include gathering stakeholder feedback about the e-learning experience, staff performance evaluation, and the overall process performance against the expectations of all stakeholders through various types of evidence. After consolidating all stakeholder feedback and collecting data, the institutions can use this information as a means for continual improvement.

Quality Assurance (QA) checklists can be used by the administrators to ensure the application of the standards and guidelines identified throughout the stakeholder process steps. And, to ensure the appropriateness, comprehensiveness, and consistency of the content, some pre-designed content collection templates can be used. These templates should include the critical elements of the stakeholder process steps. Once created, such tools are useful for self-assessment and improvement as well as for fostering a culture of quality since they facilitate QA implementation, monitoring, and reporting.

Understanding the context of stakeholder dictates the standards used during that process, particularly when translating the existing standards into operational checklists. As the challenges and solutions obtained are the main source of quality characteristics, we formed Quality Assurance checklists covering all the dimensions of the general framework of TIPEC model as given in Tables 18 to 21.

The following quality assurance activity is deciding how to mitigate with the identified risks. Taking the contextual information about the process into consideration, these checklists can also be customized to evaluate and monitor the stakeholder process steps in relation to the identified quality characteristics and risks for maintaining quality assurance of e-learning. After monitoring the processes by the help of these tools, some improvements would be needed. In this stage, the solutions (in Annex C) extracted from theory and practice in this project can be consulted.

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Table 18. Quality Assurance Checklist for Technological Attributes

Elements	Sub-Elements	Quality Assurance Checklist Questions
1.1. Technological Infrastructure *How do you ensure the sufficiency and enable the improvement of the technological infrastructure?*	1.1.1. Hardware, software, facilities	*How do you assure the sufficiency and enable the improvement of the hardware, software, and facilities within the institution?* *How is the access to hardware, software and facilities organized, including access for those with special needs?*
	1.1.2. Network Capabilities - Bandwidth Issue and Connectivity	*How do you assure the sufficiency and enable the improvement of the network capabilities in terms of bandwidth and connectivity issues within the institution?*
	1.1.3. Poor quality of computers	*How do you assure the sufficiency and the quality of the computers within the institution?*
1.2. System Design / Development Process *How do you manage the system design and development process?*	1.2.1. Software and interface design	*Is your software and interface design user friendly?* *Does your software and interface design assure the accessibility by internal stakeholders, including those with special needs?*
	1.2.2. Complexity of coordinating multidisciplinary teams of domain-experts, instructors, students, and developers	*How do you guarantee the consistent collaboration between the multidisciplinary teams of administrators, learners, technicians, and instructors?*
	1.2.3. Long release cycles in the software development times in LMS	*How do you identify and enact opportunities for process and improvement, providing feedback on usage, defects and suggested enhancements?* *How rapidly do you incorporate feedback into the deployment, configuration and operation of the LMS?*
	1.2.4. Incompatible technology	*How do you handle the issue of incompatibility between LMS, technologies and devices that may be used by the internal stakeholders?*
	1.2.5. Weak Learning Management System	*How do you ensure the interactivity in LMS?* *How do you ensure the clarity of the functions of different LMS tools?*

	1.2.6. Language barrier	*Does your LMS provide options for other languages?*
1.3. Security ***How do you ensure the technological security?***	1.3.1. System openness / Internet	*How do you assure the security of the personal information of LMS users?*
	1.3.2. Virus attacks	*How do you assure provision of continuous service (24/7), accessibility, robustness, and safety?*
1.4. Technical support ***How do you provide support, training, and direction related to e-learning technologies?***	1.4.1. Insufficient Technical support	*How do you address the sufficiency and the competency of the technical staff (professional designer/specialist to develop e-course/content)?* *How do you address installation, operation, maintenance, network administration and security issues?* *How do you organize technical and operational support for individual users?*

Table 19. Quality Assurance Checklist for Individual Attributes

Elements	Sub-Elements	Quality Assurance Checklist Questions
2.1. Motivation **How do you initiate and sustain the motivation of all stakeholders of e-learning?**	2.1.1. Lack of Student Motivation	*How do you identify and cultivate the motivational factors of students in e-learning experience?*
	2.1.2. Lack of Institutional Motivation	*How do the mission, goals and objectives of the institution align with the delivery of quality e-learning?* *How motivated is the institution to adapt to the developments in e-learning?*
	2.1.3. Lack of ownership and effort	*How do you identify and cultivate the motivational factors of instructors in taking ownership of quality e-learning experience?*
2.2. Self-Efficacy **How do you address self-efficacy issues of internal stakeholders of e-learning?**	2.2.1: Lack of Self-Efficacy	*How do you encourage learners and instructors to improve their self confidence in using e-learning technologies and fulfilling requirements of e-learning?*
2.3. Awareness and attitude towards ICT **How do you enhance awareness towards ICT and address negative attitudes?**	2.3.1 Lack of Awareness and Negative attitude towards ICT	*How do you encourage learners and instructors in taking their own responsibility in e-learning (i.e. improving digital skills)?*
2.4. Individual culture **How do you address attitudes stemming from individual cultural factors?**	2.4.1. Individual culture	*How do you incorporate different learning styles and expectations in designing e-learning?* *Does the institution have clear rules and expectations that define how to act and communicate in an online environment, i.e., the code of conduct?*
2.5. Perceived usefulness	2.5.1. Perceived usefulness (ease of use perceptions)	*Which efforts can be undertaken to change the negative perceptions towards the usefulness of e-learning?*

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How do you address negative perceptions towards the usefulness of e-learning?		
2.6. Support by peers and society	2.6.1. Lack of Students (Peer) Support	*How do you create a supportive environment among peers?*
During the implementation of e-learning is there a sufficient level of support by the individuals' peers and society?	2.6.2. Lack of Social support	*How do you take lack of social support into consideration in designing e-learning (sessions)?*
2.7. Computer anxiety and technophobia	2.7.1. Computer anxiety	*How do you handle misperceptions about the ease of use of an e-learning system?*
How do you address computer anxiety and technophobia?	2.7.2. Technophobia	*How do you assist individuals in overcoming their fear of e-learning systems and technologies of an e-learning system?*
2.8. Conflicting priorities & commitments	2.8.1. Family commitments	*How do you take family commitments into consideration in designing e-learning (sessions)?*
	2.8.2. Work Commitment	*How do you take workplace commitments into consideration in designing e-learning (sessions)?*
How do you address conflicting priorities & commitments of e-learning users?	2.8.3. Conflicting priorities	*How do you manage priority conflicts due to additional time required for e-learning?*
2.9. Readiness & Change Management Issues	2.9.1. Insufficient Readiness	*How do you handle inconsistent e-learning readiness over time?*
How do you respond to readiness & change management issues pertaining to e-learning?	2.9.2. Poor Response to change	*How do you manage the response and resistance to changes in the e-learning environment?*
	2.9.3. Acceptance level of e-learning technologies	*How do you respond to the low level of acceptance of e-learning technologies?*
2.10. Individual's technical capability	2.10.1. Technological difficulty	*How do you handle technological difficulties faced by individuals?*
	2.10.2. Technology experience	*How do you assist individuals in gaining technology experience in solving problems and accomplishing basic tasks?*

How do you manage the diversity of an individual's technical capability in e-learning?	2.10.3. Computer literacy	*How do you contribute to the improvement of users' computer literacy?*
	2.10.4. Lack of ICT skills	*How do you contribute to the advancement of individuals' ICT skills?*
2.11. Academic and experiential relevance	2.11.1. Lack of knowledge and experience in e-learning	*How do you assist individuals in enhancing their knowledge and experience pertaining to e-learning?*
How do you address the lack of knowledge and experience in e-learning?	2.11.2. Academic confidence	*How do you contribute to the academic experience and qualifications of individuals?*

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Table 20. Quality Assurance Checklist for Pedagogical Attributes

Elements	Sub-Elements	Quality Assurance Checklist Questions
3.1. Faculty development and training *How do you provide support for faculty development and training for e-learning?*	3.1.1. Faculty development	*How do you enforce progress and change in teaching practices in response to ICT developments?*
	3.1.2. Training	*Do you provide training and assistance for internal stakeholders to enhance e-learning?*
3.2. Interactivity *How do you address issues of interactivity among internal stakeholders?*	3.2.1. Lack of feedback	*How do you enforce timely responses to inquiries by individuals?*
	3.2.2. Absence of real-time feedback	*How do you encourage prompt responses from students to instructors during e-learning sessions?*
	3.2.3. Engaging Students Online	*How do you contribute to the instructors in engaging students online?*
	3.2.4. Sense of isolation due less face to face interaction	*How do you handle a sense of isolation due to less social contact and networking opportunities in e-learning?*
	3.2.5. Social loafing	*How do you handle social loafing due to the relative absence of interaction in e-learning?*
	3.2.6. Tutor support/counseling sessions (to support by peer & society)	*How do you manage the sufficiency of tutor support and counseling sessions?*
3.3. Course Content and Quality *How do you ensure quality course content in e-learning?*	3.3.1. Poor Interactivity of Course Content	*How do you contribute to the instructional design and support course development to increase the interactivity of course content?*
	3.3.2. Lack of Effective Course Content (Learning outcome relevance)	*How do you ensure the alignment of course content with learning outcomes?*
	3.3.3. Localization of content	*How do you ensure the customization and adaptability of course content according to diverse cultures?*

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	3.3.4. Appropriateness of the Nature of the Course to E-Learning	How do you address the appropriateness of the nature of the course to e-learning?
	3.3.5. Less focus on technical requirements of Content	How do you address the technical requirements of course content?
3.4. Pedagogical model (+skills) *How do you determine and implement the pedagogical model (+skills) used in e-learning?*	3.4.1. Pedagogical model (+skills)	How do you establish an instructor and learner centered approach to teaching? How do you encourage instructors to use or develop innovative teaching methods?
3.5. Management and delivery of the course *How are the management and delivery of the course structured?*	3.5.1. Poor flexibility in delivery mode	How much empowerment do you provide learners in delivery mode such as selection of medium of content delivery, determination of examination format, etc.?
	3.5.2. Mode of delivery	How do you handle barriers related to the mode of delivery selected for e-learning?
	3.5.3. Different Time Zone	How do you handle logistical problems in utilizing the synchronous tool, when staff and students live in different time zones?
	3.5.4. Speed of course delivery	How do you manage the speed of course delivery in e-learning compared to face-to-face learning?
	3.5.5. Managing large groups	Which mechanisms are in place to manage online courses with large groups of students?
	3.5.6. Lack of Pre-course orientation	Are there pre-course orientation sessions provided to the students? How are pre-course orientation sessions organized?
3.6. Recognition *What do you do to improve the recognition of e-learning by employers and society?*	3.6.1. Lack of credibility	How do you address the lack of credibility of e-learning certificates by employers?
	3.6.2. Lack of public awareness	How do you address the lack of awareness of the public about e-learning?

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3.7. Workload ***How do you recognize the additional workload created by e-learning?***	3.7.1. Additional workload	*How do you address the extra workload caused by e-learning for all internal stakeholders?*
3.8. Assessing the Performance ***How do you assess performance in e-learning?***	3.8.1. Lack of reliability of online assessment processes	*How do you address the reliability of online assessment processes for student performance?*
	3.8.2. Reluctance for Peer-to-Peer Evaluation	*How do you implement peer-to-peer evaluation?*
	3.8.3. Lack of efficiency measurement tool	*How do you assess the effectiveness of e-content?*
3.9. Hard to access e-learning materials ***How do you ensure the accessibility of e-learning materials?***	3.9.1. Hard to access digital libraries	*How do you provide access to digital libraries?*
	3.9.2. Material accessibility	*How do you provide access to e-learning materials?*

Table 21. Quality Assurance Checklist for Enabling Conditions

Elements	Sub-Elements	Quality Assurance Checklist Questions
4.1. Administrative commitment and support *How committed are the administrators to e-learning and to providing support?*	4.1.1. Administrative commitment and support	*How are strategies, policies, procedures related to e-learning determined?* *How are strategies, policies, procedures related to e-learning implemented?*
4.2. Cost of E-Learning Technology & Financing *How are the costs of e-learning and required technology financed?*	4.2.1. Economy (financial situation)	*What are the mechanisms utilized for funding e-learning courses?*
	4.2.2. Cost of using technology	*What are the support mechanisms provided to students for the cost of using e-learning technologies?*
	4.2.3. Cost of multimedia learning materials	*How do you address the cost of producing high quality multimedia learning materials?*
	4.2.4. Setup cost/limited funds	*How do you finance the setup and maintenance of e-learning systems and ICT alternatives?*
	4.2.5. Cost perception	*How do you address the perception that e-learning is costly?*
4.3. Inequality *How do you address inequalities in e-learning?*	4.3.1. Inequality in access to Internet connectivity	*How do you address inequality in access to internet connectivity?*
	4.3.2. Inequality in access to technology	*How do you address inequality in access to technology?*
4.4. Law & Ethics *How responsive are the current rules and regulations to the needs of e-learning?*	4.4.1. Rules and regulation	*How do you address the limitations in national policies and strategies in fulfilling the needs of e-learning?* *How do you address the needs of e-learning in your institutional policies, regulations, and strategies?*
	4.4.2. Ethical barriers	*How do you address ethical issues (i.e. maintaining confidentiality, sharing personal information) in e-learning?*

CONCLUSION

In the quality management area, there are big and detailed manuals and step-by-step guidelines for the same purpose. However, they are so wide, generic, and comprehensive in terms of content. The innovative segment of IO1 is in a customized quality assurance solution for e-learning in business schools. The guidebook is developed for use in business schools mainly based on the challenges faced by internal stakeholders (i.e., learners, instructors, administrators, and technical experts) and the alternative solutions for an online education system which both obtained from a systematic literature review plus the experiences of partner institutions. A variety of challenges were defined in the three-level hierarchical structure of an integrated framework. The framework identifies e-learning challenges under four main dimensions: "technology," "individual," "pedagogy," and "enabling conditions." This framework is used to define the quality characteristics for each stakeholder, which then served as quality assurance indicators for e-learning in higher education.

To define quality characteristics for each stakeholder process, the relevant categories of the TIPEC E-learning Challenges Framework and matched with related process tasks. By looking at the matching between process steps and TIPEC sub-categories and sub-elements, the most frequently observed challenges at sub-category level are determined as the important quality assurance points or characteristics. Among them, the most vulnerable barriers are also indicated as potential problems or issues to be addressed in future monitoring.

For deciding how to mitigate with the identified risks, Quality Assurance checklists covering all the dimensions of the general framework of TIPEC model are provided. These QA checklists can be used directly or customized in similar manner by the administrators to evaluate and monitor the application of the standards and guidelines identified throughout the stakeholder process steps. After monitoring the processes by the help of these checklists, improvement areas can be identified. The solutions (in Annex C) extracted from theory and practice in this project can be consulted to determine alternative courses of actions for the improvement.

Thus, final output does not refer to a specific model/standard, instead the institutions will find their own way to establish a customized quality assurance system by following the guidelines. As this guide is written in simple language, it is expected to be applicable internationally and can be understood by non-experts. Given the emerging demand for quality online learning programs, university administration and all stakeholders of this education system in the management area will benefit from having such guidance. Administrators are mainly responsible for development and maintainability of the quality assurance (QA) system in online education. The proposed IO is expected to guide administrators from conception through final development of the quality assurance system. By easy-to-use form, the guidelines would increase the number of higher education institutions which can easily and cost-efficiently increase the quality of e-learning. Having an international approach to developing the guidelines will enable applicability to different national quality assurance systems. Every similar educational environment at schools of business (or any other) can adapt the structure of the quality assurance system suggested by these guidelines.

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APPENDICES

Annex A: An online training on how to conduct a focus group study is provided, and a comprehensive guideline.

GUIDELINE FOR FOCUS GROUP STUDIES

Focus group studies must be completed between 17 May- 30 June 2021. Excel documents are required to be uploaded to Teams -Intellectual Outputs- IO1- "Focus Group Studies" folder until 15 July 2021. Let us know when you complete the excel documents by emailing.

I. **TARGET GROUPS:** Four different focus groups will be conducted separately with the following target groups:
   a. Students (Undergraduate/Graduate, preferably those taking lectures with gamification, if exists)
   b. Lecturers (preferably those involved in gamification, if exists)
   c. Administrators (Online Program Director, Administrative Staff)
   d. Learning Management System Experts/Technical staff

   Group size will be 6-8 people per group, participants of the focus group can be selected via convenience sampling. Time required for the meetings will be 45-90 min.

II. **CONDUCTING THE FOCUS GROUP**

   ➢ **Welcoming the participants:**
      • Moderator should:
   ✓ introduce self and assistant moderator
   ✓ explain the purpose of the project and focus group discussion.
      The purpose of this study is to synthesize and consolidate the stream of research on challenges, solutions and best practices of e-learning
   ✓ provide information about the estimated duration of the discussion (45-90 min).
   ✓ state that discussions will be recorded by (video camera) or audio recorder.
   ✓ state that these records will be reported the names of the participants will not be included or referenced in these reports.
   ✓ ask each participant to introduce him/herself

   ➢ **Introductory Questions (For all Target Groups)**
   ✓ What do you think about distance education/online education?
   ✓ What do you like best about distance education/online education?

   ➢ **Key Questions (Only for Student Group)**
   ✓ According to your experiences how would you evaluate the infrastructure of the learning management system provided in your institution?
   ✓ What about the e-teaching skills and competencies of the lecturers?
   ✓ What will make you feel more motivated to participate in online classes?
   ✓ What do you think are the major challenges in e-learning?
   ✓ Suppose that you were in charge and could make changes that would make the online education better. What would you do?

> ➤ **Key Questions (Only for Lecturer Group)**
> ✓ According to your experiences how would you evaluate the infrastructure of the learning management system provided in your institution?
> ✓ How would you compare online education to face-to face education?
> ✓ What do you think about the skills and competencies required for e-teaching?
> ✓ What do you think are the major challenges in e-teaching?
> ✓ Suppose that you were in charge and could make changes that would make the online education better. What would you do?

> ➤ **Key Questions (Only for Administrator Group)**
> ✓ According to your experiences how would you evaluate the infrastructure of the learning management system provided in your institution?
> ✓ What do you think about the skills, competencies and resources required for administrating distance education/online education processes?
> ✓ How are online education strategies formulated and the performance indicators are determined in your institution?
> ✓ What do you think are the major challenges in distance education/online education?
> ✓ What are the solutions you provide for the challenges you experienced?

> ➤ **Key Questions (Only for LMS Expert/Technical Staff Group)**
> ✓ According to your experiences how would you evaluate the technical infrastructure to support online/distance education in your institution?
> ✓ What needs improvement?
> ✓ What do you think are the major challenges in establishing, managing and maintaining the learning management system?
> ✓ What are the resources required to support the learning management system?
> ✓ How do you think the learning management system quality can be enhanced?

> ➤ **Ending Questions (For all Target Groups)**
> ✓ Have we missed anything? Would you like to add anything?
> ✓ The moderator should end the discussion by summarizing the strategic points.
> ✓ The moderator should sign off by thanking

III. AFTER THE FOCUS GROUP STUDIES
> ➤ The recordings will be transcribed verbatim into an excel document for data analysis
> ✓ Transcription needs to be word for word and not a summary.
> ✓ Translation should always be done from the transcription and not translated and transcribed in one step from the recording.
> ➤ Save the excel document as **Country _Date** (e.g. Turkey_03.04.2021)

The Gemba Visit Training

Assoc.Prof. Aysun KAPUCUGİL İKİZ
Dokuz Eylül University Faculty of Business
May 2021

Intellectual Output 01:

Quality Assurance Guidelines for Digital Education: Summary of challenges and best practices in e-learning in e

1.2 Collecting the partner experiences on e-learning (and teaching)

* *Collecting the challenges and alternative solutions from the field*

Gemba Visit Agenda (*Flow*)

1

Obtain Verbatims from Users

• Explore user's world (interview)
• Discuss the process (interview)

2

Observe the Scene

• Review the process model and update it from your observations
• Confirm what they actually do
• Explore 'to be investigated' issues.

3

Document the Visit

• Capture what you learn

What is expected from our partners?

- Gemba Visits at online courses
  - (At least) 1 online course preferably including gamification, if exist.
- From two perspectives:
  - Lecturers
  - Learners (Undergraduate, Graduate)

What to submit?

- User Segments Table
- Gemba Visit Planning
- User Process Models (both for Instructor and for Learner)
- Gemba Visit Table with related documents, data, records, etc.
- Gemba Visit Log

All these templates are available in Excel format

and...

already uploaded in Teams Folder (IO0)1

Guidelines for interview

The **aim** of the interviews is to collect the data which will enable us to understand the user's (i.e., lecturers and learners) teaching and learning processes. We aim to model the world of the users by:

- exploring the steps or decisions the users are trying to make,
- understanding their problems and opportunities,
- exploring what went right and wrong,
- identifying the gembas to observe.

Some **tips** for conducting the interviews:

- Discussion should be clear, not tricky, unbiased, focused on benefits.
- Avoid asking leading (i.e., suggestive) and negative questions.
- Avoid criticizing, instructing, and highlighting the mistakes.
- Paraphrase the user and express positively.
- Start with general and continue with more specific questions (5-whys method).
- Pay attention to nonverbal signals.

Context of the interviews:

- Project: Development of Innovative, Gamified and Interactive Method for Advanced e-Teaching and E-learning of Skills (DigiMates)
- Intellectual Output 1: Quality Assurance System for E-Learning (Establishment and Maintainability)
- Activity 1.2: Collecting the partner experiences on e-learning (and e-teaching)
- Coordinator: Dokuz Eylül University Faculty of Business, Izmir, Turkey

Questions for interviews with lecturer and learners

Warning

The interview is recorded solely for the purpose of preparing the transcript of what was said. Only researchers present in the meeting will have access to the recording. Transcripts of the meeting will be shared with researchers from DEU. We will not reveal learner identities in the transcripts.

Warm up questions

- What are your most important educational or personal concerns? (Note: do not talk about the process).
- Please share with us the potential problems/opportunities/image issues that you might have.
- Please highlight three biggest challenges that you have encountered in online education (e.g. changes in the process, materials, technology, competition).
- How are you addressing these challenges?
- What are your most important educational or personal goals?

Process related question

- What goes right and why? How do you measure success? (Note: for each phase)
- What goes wrong and why? (Note: for each phase)
- How are errors, exceptions, or failures handled? (Note: for each phase)
- What is the current, minimum, and maximum level of satisfaction? (Note: for each phase)
- What is the current, minimum, and maximum level of dissatisfaction? (Note: for each phase)
- Can you provide some suggestions for addressing quality assurance issues?
- Do you have any other concerns and challenges (e.g., student satisfaction, curriculum design, administration, resources and facilities, technical support)?
- How do you feel about the process?
- How do you feel about yourself?

Annex C: The full version of the aggregated findings including the sub-elements.

Provided as separate excel file.