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Impact of Covid 19 Pandemic on Maritime Education and Training

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Abstract. The COVID 19 Pandemic has had a negative impact on education activities worldwide. Most of the countries have switched to online education. 96 percent of the maritime schools could continue their education using the distance education methods, but the applications of simulator activities and practical trainings could not be realized to a large extent. The measures taken in emergency situations can partially solve the problems as well as these measures also lead to the development of new methods and procedures. If these measures taken and new applications are evaluated together, the currently applied system may be improved, and new inventions contribute to the development of MET delivery methods. The aim of this study is to solve the problems that have arisen during the COVID 19 pandemic and to provide proposals for the development and consummate of the MET considering applications in this emergency. In this study, it is aimed to evaluate the opinions and perceptions of the researchers and, MET lecturers and students conducting a survey to conceive the real situation. After discussion of the findings, the results of research and proposals will be produced rehabilitate the existing system. It is considered that the results of the study will be beneficial in providing effective distance education to all MET providers and developing alternative delivery methods for resilience of education.

Keywords: MET in Emergency, COVID 19 effect on Education, Online Education, Development of Delivery Methods, Resilience of Education in Emergencies Keywords:

1. Introduction

Education is the basic ingredient to transfer our culture and civilization to the next generations. Human history has faced wars, civil wars, and natural disasters in the past. However, human beings made great efforts to continue education even under these difficult conditions. While these efforts ensured the continuation of education, the experiences gained led to the determination of measures to be taken for some similar situations that could arise in the future.

In 2019 AMA (American Marketing Association) organized a conference on 'Higher Education for higher education marketers' mainly based best practices and fresh ideas for engaging diverse audiences, navigating tricky social changes, building strong teams, strengthening an institution's brand and more. The followings are highlighted in the conference.

- Higher education is about to enter an existential crisis: By 2025, the population of college-age students will drop by 15%, reducing enrolment across the board and possibly leading to school closures.
- Online programs and community colleges are great places to introduce these non-traditional programs and start recruiting students to hedge those 2025 doomsday scenarios (This scenario has already been realized after COVID-19 pandemics).

The followings are recommended for website design to get the best results from online programmes:

- Establish core foundational activities in which to partake when building something new
- Improve user experience and institutional impact
- Build new items on the site that expands its impact
- Create a culture of accessibility

The doomsday scenario has already happened after COVID-19 pandemics. However, the COVID 19 pandemic created a different situation than the previous ones. This time pandemic is affecting the whole world and has paralyzed life; people were closed at home or curfewed for prevention from the disease, some of the workplaces have become inoperable, face-to-face education and training that required collective participation became impossible to implement. Most of the educational institutions have switched to distance education with the help of Information Technology (IT). However, training that required laboratory, workshop and actual site work became very hard to do, almost impossible. The simulator trainings, which are necessary for some branches of science, were delayed or could not be done.

Training institutions made great efforts to mitigate the effects of this negative situation in a short time and they developed remedies to eliminate the shortcomings of distance education by improving the existing opportunities.

Compilation of widespread vaccination is estimated by the beginning of 2023 (The Economist, 2021). WHO’s director-general declared that the world was “on the brink of a catastrophic moral failure” because of the unequal international distribution of COVID-19 vaccines. “Ultimately,” he warned, “these actions will only prolong the pandemic, the restrictions needed to contain it, and human and economic suffering.”

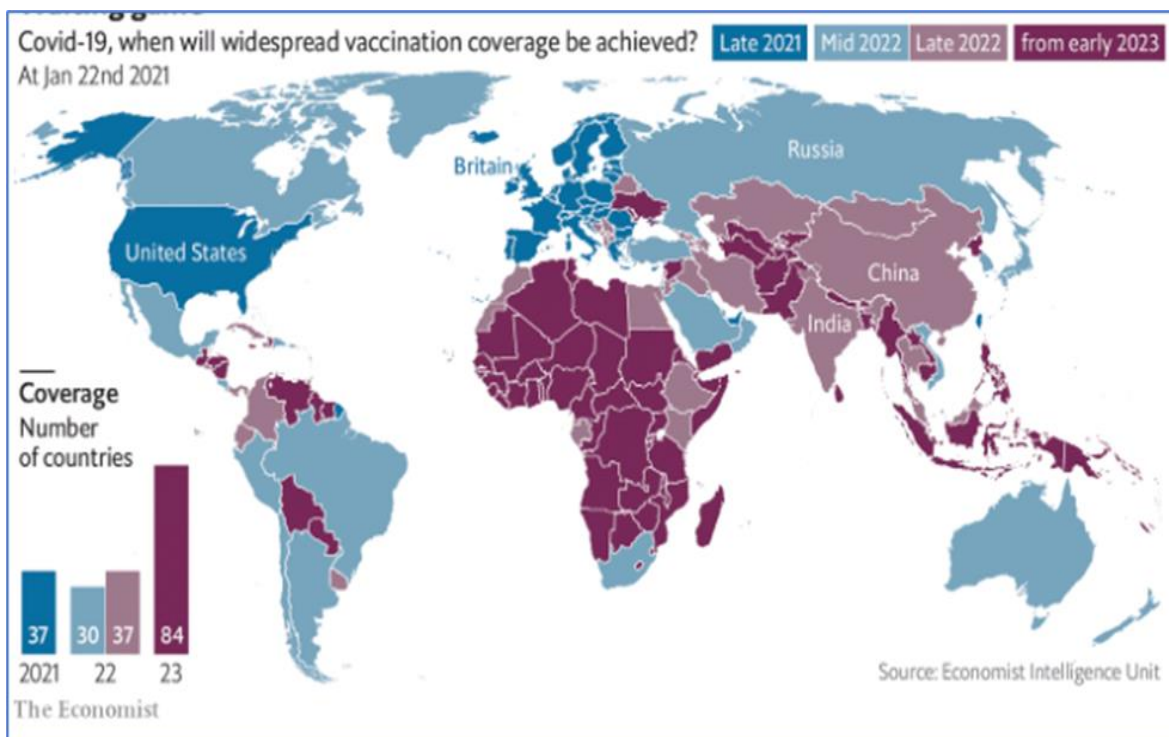


Figure 1. Compilation of widespread COVID-19 vaccination (Source: The Economist, 2021)

As of 4 February 2021, there have been 103.631.793 confirmed cases of COVID-19, including 2.251.613 deaths, reported to WHO. No authority can give an exact prediction as to when the pandemic will end. Even the most optimistic estimates believe that the pandemic cannot be over before 2022. Despite all the measures taken, it is very difficult to create a safe sterile environment for face-to-face training. In particular, the constant mutation of COVID 19 and the change in its spread makes it necessary to constantly review existing measures.

All education providers conduct scientific research and work on new systems and tools to ensure the quality of distance education in their fields. Beyond that, psychological approaches on students who are undergoing a different education system for the first time are evaluating and solutions to these psychological problems that directly affect learning activities are under investigation. Teachers who deliver courses also have difficulties in adapting to online education methods with which they were not familiar before. There are many debates about the reliability of exams administered in distance education. The reduction or closure of many workplaces seriously limits on-the-job training opportunities, which are essential for some professions.

In order to maintain world maritime trade should be continued uninterruptedly, Maritime Education and Training (MET) should be continued effectively even under these difficult conditions. Maritime training is a training system that includes laboratory studies, various simulator trainings and practical application at special facilities and requires sea training on ships for almost a year.

In this study it is intended that to investigate root cases of difficulties met and best practices in many countries which may overcome the deficiencies. To achieve that it is the best way to reach the lecturers and students and get benefit from their perceptions and experiences.

2. Research Method

The COVID 19 Pandemic has had a negative impact on education activities worldwide. Most of the countries have switched to online education. 96 percent of the maritime schools could continue their education using the distance education methods, but the applications of simulator activities and practical trainings could not be realized to a large extent. The measures taken in emergency situations can partially solve the problems as well as these measures also lead to the development of new methods and procedures. If these measures taken and new applications are evaluated together, the currently applied system may be improved, and new inventions contribute to the development of MET (Maritime Education and Training) delivery methods.

The aim of this study is to solve the problems that arise during the COVID 19 pandemic and to provide proposals for the development and consummate of the MET considering applications in this emergency.

The objectives of this study are:

- To review all available studies on the deficiencies met during online teaching and learning applications
- To conceive the opinions and perceptions of the lecturers and students on online delivery suitability, applicability, and acceptability of CPD methods for mariners.
- To evaluate the feasible methods for matching the career expectations of mariners
- To propose a planning and conduct cycle for people to get maximum benefit from online delivery
- To evaluate personal and institutional efforts to o improve the quality of online delivery

In this study, it is aimed to evaluate the opinions and perceptions of the researchers and, conducting a survey to MET lecturers and students to conceive the real situation. After discussion of the findings, the results of research and proposals will be produced rehabilitate the existing system.

It is considered that the results of the study will be beneficial in providing effective distance education to all MET providers and developing alternative delivery methods for resilience of education. Analysis of qualitative research data method is used. This analysis aims to understand the meaning of the data collected and aims to facilitate understanding of the content through a systematic classification that can be divided into categories or included in the responses by counting words and term. A content analysis can be made as a basis for qualitative analysis.

3. Research and Discussion

In these study three issues will be investigate and evaluated:

- The inevitable requirements of MET
- Deficiencies met and proposed solutions in the other education fields
- Perception and experiences of the MET teachers and students

3.1. Inevitable Requirements of MET and Negative Impacts of COVID-19 Pandemic

Maritime business is an international field of activity. To overcome the difficulties of working in geographies where different languages are spoken, it was necessary to use standard methods, even a standard language. Lingua Franca based on Latin has been used for a long time in the Mediterranean, the cradle of seamanship. Currently, the international maritime language is English.

The globalization makes the world like a small village. The shipping business is a worldwide business which requires full application of the international arrangements. In order to survive in the competitive and challenging shipping business, all respective parties should meet golden standards not contented with minimum (Oral and Demirel, 2017). To achieve that the seafarers need a specific education and training. MET is a key element to ensure the quality in shipping. The fundamentals of MET are based on international standards, namely STCW.

Traditional seafarer training has always focused on the acquisition and use of practical skills. The prevailing view is that, while this approach addresses a degree of cognitive skills, it focuses on and gives much more emphasis to the acquisition of hands-on practical skills for the performance of specific tasks. On the other hand, academic education has been seen to be much more focused on the development of in-depth analytical and critical thinking skills; cognitive skills that are less reliant on hands-on task-oriented training, but stress critical reading and discussion (Manuel, 2012).

Navigation and marine engineering programmes are based on generic engineering programmes which require delivery of mathematics, basic science, and fundamental engineering courses. The basic science courses are 'sine qua non' for engineering education. The technologic development will make engineering courses rather weighed in these programmes.

Seafaring officers needs a lifelong education system which ensure their career development and assuming positions in the shore jobs in the late phase of their life. This is a lifelong education covering both undergraduate and graduate, as well as training and certificate courses to adopt new systems under the pressure of rapidly developing technology. Two examples are introduced in the Figure 2 which explains career pattern of a seafaring officers.

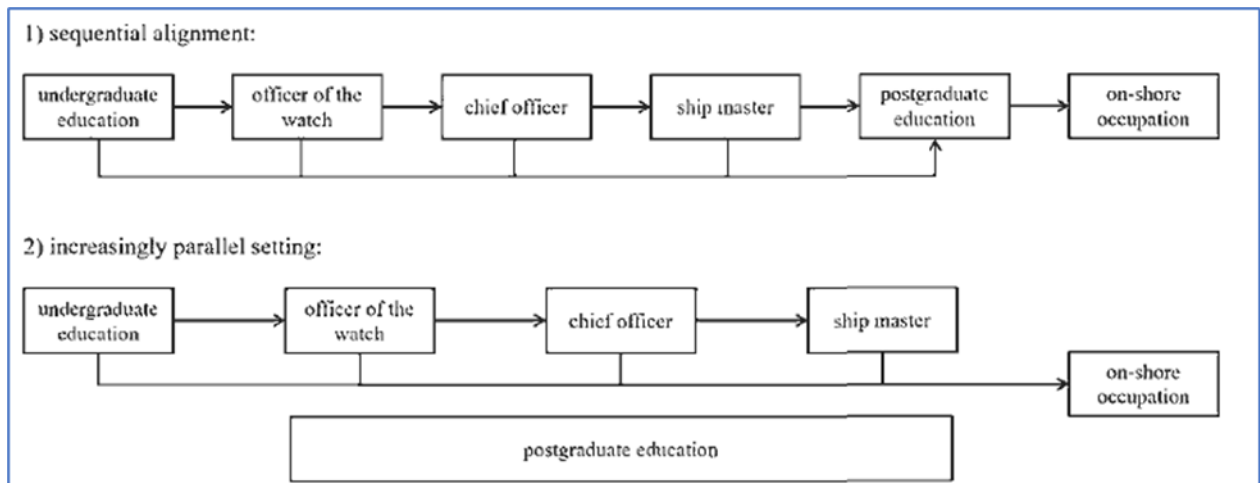


Figure 1. Compilation of widespread COVID-19 vaccination (Source: The Economist, 2021)

Main problem areas in the MET have been identified by many authors/researchers (Pourzanjani et al, 2002; Schröder et al, 2002; Yongxing, et al 2009; Zade et al, 2002; Ziarati R. &Demirel E, 2011; Ziarati et al 2020 etc.) are as follows:

- -MET should be focused in the longer term on the manning of new generation high technology ships as well manning existing more traditional fleets.
- Although the number of maritime institutes is increased, there are some gaps related to the financial support which harden acquisition of required facilities laboratories and simulators.
- To meet the training needs for modern ships, maritime colleges will need better resources, more modern facilities and improved staffing and staff development.
- Basic education (foundation courses to support engineering courses) is better in the developing countries comparing with developing countries.
- Some trainees from developing countries find, through lack of basic education and/or languages problems.

The following STCW required practical trainings which needs special facilities and drills in groups of 10-15 cadets could not be achieved; The Survival at Sea, Basic Fire Fighting, Advance Fire Fighting, Proficiency of Survival Crafts, Elementary First Aid Medical First Aid which are ultimately important for personal safety and social responsibilities for seafarers.

Basic science courses are essential to provide better understanding for engineering courses such as statics, dynamics, electricity, electronics, machinery, cargo handling etc. Unfortunately, there is no Learning Management System (LMA) to conduct laboratory studies. So, physics, chemistry, electrics, and electronics laboratory works could not be achieved.

Simulators used in support of Navigation, Navigation Watch, Cargo Handling and Operations, Communication, Maritime Electronics, Mechanical Engineering could not be used. From 20 to 60 percent of these courses should be conducted by using simulators in according to STCW and really needs practise at simulators. It is not so easy to provide interface between the software of online course systems used by the institutes and manufacturers' software due to commercial imperative. Even if an agreement reached between manufacturers and institute, this adaptation requires enhancement of hardware and software of LMA of the institute which may burden of the budget as well as a big dwell time to achieve.

Workshop activities which are a significant element of marine engineering programmes could not be achieved. Some part of workshops can be achieved at shore facilities such as shipyards. But due to reduction of capacity in shipyards related to the economic condition, hardened to find a on the job opportunity for marine engineering cadets.

The pandemic is also affected economy, subsequently shipping. In according to UNESCAP/UNCTAD (2020), the economic downturn has weighted down on maritime trade flows which are projected to fall in 2020. The decrease of production and consumption activities leads to a slowdown in maritime trade, which in turn reduces shipping demand and port traffic and turnover. Impacts of the COVID-19 on shipping is introduced in Figure 3. The reduced maritime activities make finding a ship for sea training for both navigation and marine engineering cadets. Travel restrictions, restrictions on border passes between the entry countries, also severely restricted reaching of assigned ship location.

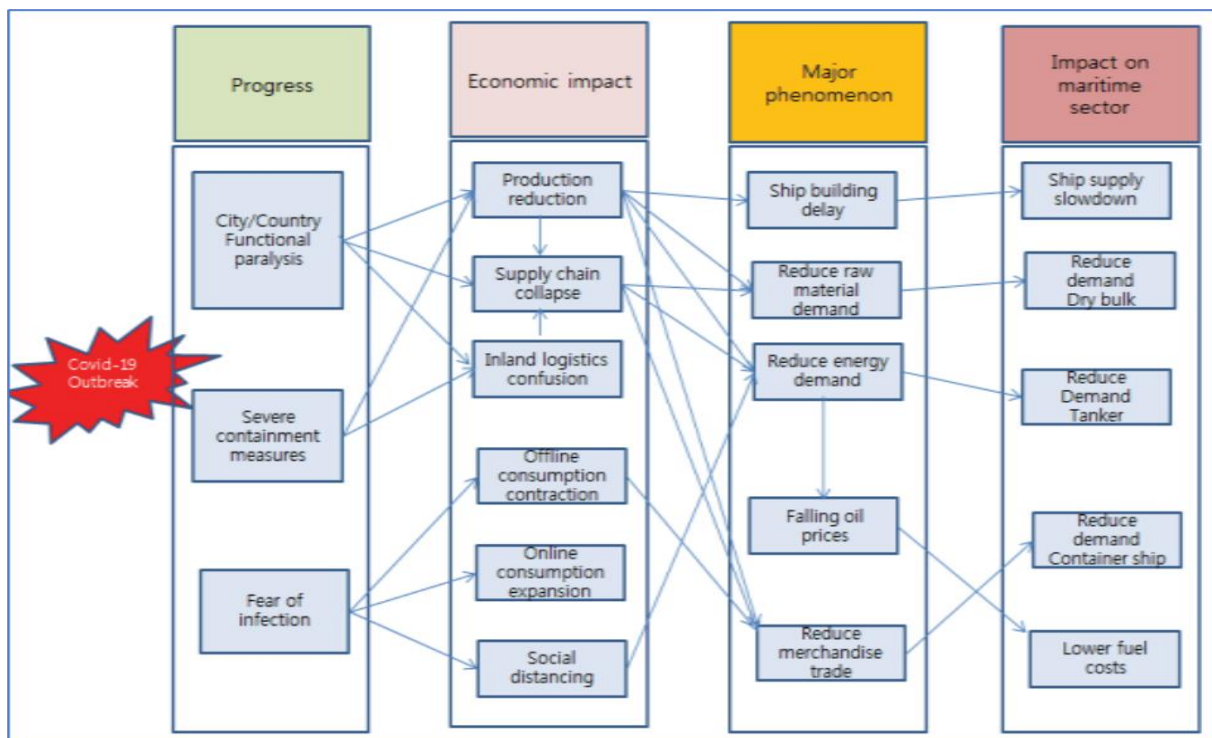


Figure 3. Impacts of the COVID-19 on shipping (Source: UNESCAP, 2020)

Sea training is mandatory for a minimum of one year for deck cadets and a minimum of six months for marine cadets. The reduced maritime activities make finding a ship for sea training for both navigation and marine engineering cadets. Travel restrictions, restrictions on border passes between the entry countries, also severely restricted reaching of assigned ship location. Currently, many cadets cannot find internship positions due to the decrease in ship activities, and those who find them are waiting for transportation restrictions.

3.2. Effects of the COVID pandemic on Education and Training

Following the emerging of Coronavirus Pandemics, the face to face classes at many schools disrupted. As a quick solution many schools passes to distance learning using their LMS (Learning Management System). As a good example 96 percent of the MET institutes applied distance learning after pandemic

starts (IAMU, 2020). In a very short period students and lecturers adopted themselves to distance learning successfully. Many schools have upgraded their LMS system to meet all aspects of distance learning education.

COVID-19 led to significant innovation and change in universities regarding the processes used for teaching and learning (Carver, 2020). Disruption presents a tremendous challenge for global higher education institutions and their leaders, particularly the disruption caused by COVID-19 (Lemoine et al, 2020). Major change was changing delivery system from face to face to online courses.

Every disaster forces the people to produce solutions to mitigate the effects of the calamity as they try to achieve that they also create new system and applications. COVID-19 pandemic created valuable opportunities for education system globally. The pandemic produced the opportunity for global higher education to embrace new delivery. The pandemics caused development of delivery system. Online education has already been used for many years, but this time online education became a replacement for face to face education under the extraordinary condition due to pandemic.

Of course, this transition was not easy. Lecturers and students were not ready to switch to this system suddenly, the digital infrastructure of the education institutes at hand were not enough for such a wide use. Houlden & Veletsianos (2020) were questioned that situation as “The key question was whether or not the institution, faculty and students were prepared for the transition. Most were not”.

About 24.9% of college students have experienced anxiety because of this COVID-19 outbreak. Living in urban areas, living with parents, having a steady family income were protective factors for college students against experienced anxiety during the COVID-19 outbreak. However, having a relative or an acquaintance infected with COVID-19 was an independent risk factor for experienced anxiety. The COVID-19-related stressors that included economic stressors, effects on daily-life, and academic delays were positively associated with the level of anxiety symptoms. The mental health of college students is significantly affected when faced with public health emergencies, and they require attention, help, and support of the society, families, and colleges. It is suggested that the government and schools should collaborate to resolve this problem in order to provide high-quality, timely crisis-oriented psychological services to college students. (Wenjun et al, 2020b).

The pandemic started in the 2019-20 Spring semester, and in the middle of the semester, most educational institutions switched from face to face to online education. In the beginning, both students and teachers had a lack of adaptation problems. There is a tendency for some students not to participate in their online education. The decrease in participation in training can be explained by the indifference of individuals and / or by a boring against online training. Even though the problems encountered at the beginning were resolved, the unattendance problem in online education continued in the Fall Semester of 2020-2021.

The stability of family income was also a significant factor in students' experienced anxiety during the COVID-19 crisis, which could be explained by increased psychological and economic pressure (Liu, 2013). Living with parents was another favourable factor against feeling anxious. Relatives or acquaintances being infected with COVID-19 was an independent risk factor in college students' anxiety about the epidemic, which might be related to the high contagiousness of the new coronavirus pneumonia (Song et al., 2019). On the other hand, the students' anxiety may have been caused by the gradually increasing distances between people resulting from the quarantine. It is known if anxiety disorders are more likely to occur and worsen in the absence of interpersonal communication (Xiao, 2020; Kmietowicz, 2020).

3.3. Survey to Evaluate Effectiveness of Online Delivery of Courses and resilience of the Systems used.

3.2.1. Aim, content and preparation.

The aim of the survey is to investigate and evaluate the application of online teaching and learning systems and evaluate the opinions of teachers and students, then evaluating the results of the survey to reach some proposals for improvement and resilience of existing system.

The survey has planned to learn apprehension of both important elements of education, learners, and teachers. A survey composed of questionnaires is planned to evaluate the opinions of learners, and teachers who used online education since the start of COVID-19 Pandemic through interne. environment.

Before preparation of questionnaire a working group established composed of a group of lecturers all have PhD at least 10 years of teaching experiment from different science branches (economics, management, engineering, politics, language) experiment. This working group discussed on their experiments, perception, and information on distance learning as well as student claims and perception on online education. Finally, they have assumed some hypotheses to form the questionnaire. These hypotheses are as follows:

H1: Effectiveness of online delivery is not sufficient.

H2 More effort should be spent to ensure the quality of online course efficiency.

H3: The different tools used for online education such as Zoom, MSTEAMS should be embedded/interfaced to Learning Management System (LMS) of education institute to enable both connection tools and LMS system.

The questionnaires have been created and been tested with small groups. At the beginning different questionnaires have been planned for teachers and learners, but after testing it is decided to use a combined questionnaire has been developed for both. But questionnaires are sent separately to learn opinion of teachers and learners which are the target groups.

Survey is conducted in the three universities in Turkey, 32 Lecturers and 30 students have responded the questionnaires. This situation restricts the coverage of survey with only one country. But the opinions of the other researchers in the worlds have already been provided in the previous section.

3.2.2. Evaluation of the survey

While global higher education is no stranger to the turbulence brought on by major social, political, and economic change, the scale and scope of COVID-19 is unprecedented in an era when higher education is widely available on a global scale (Mayo, 2020). Nobody knows for certain when the COVID 19 pandemic will come to an end. Even if this pandemic is over, no one can guarantee that we will not encounter a similar disaster in the future. However, in this period we changed almost all our face to face delivery system to the online training system. This process taught us to understand our shortcomings and what measures to take to correct them. In the meantime, it is learned that the online education system is essential for a sustainable education and that online education is an alternative to the face to face system in the following period.

The diagrams showing the survey results and evaluation are introduced in the following paragraphs.

H1: Effectiveness of online delivery is not sufficient.

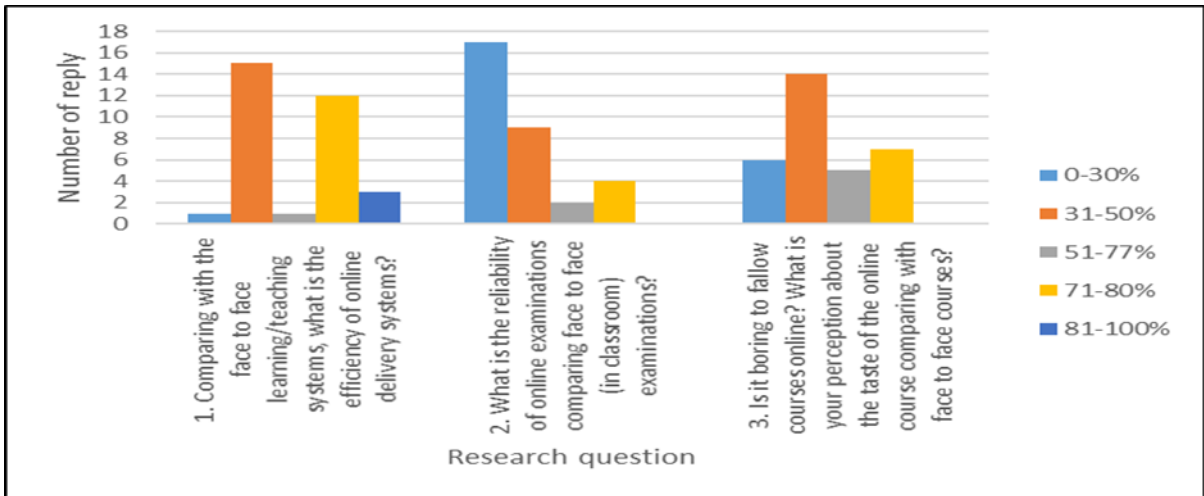


Figure 4. Comparison between online and face to face education (Lecturers)

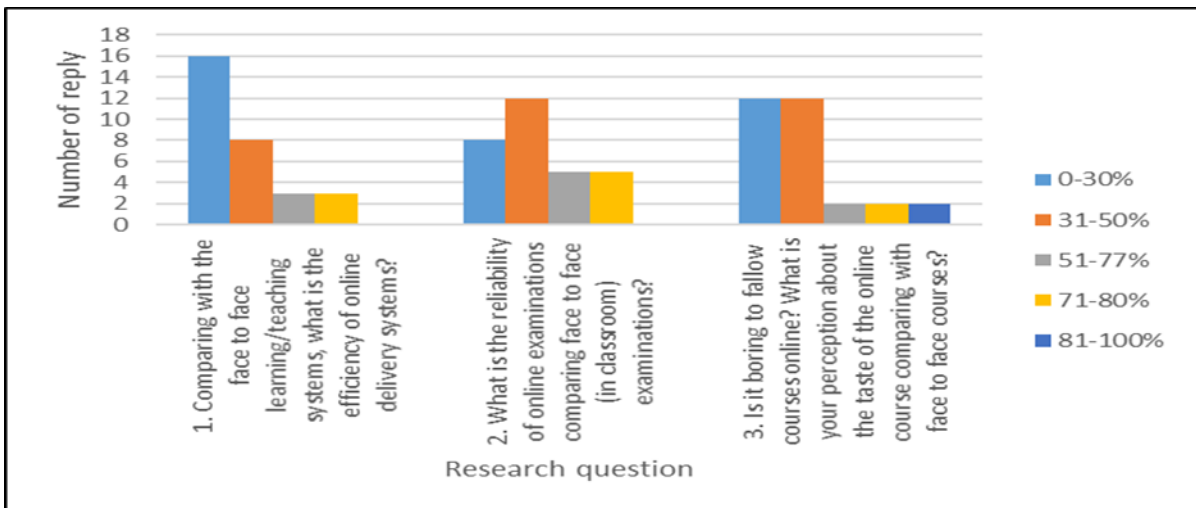


Figure 5. Comparison between online and face to face education (Students)

Values

1. Comparing with the face to face learning/teaching systems, what is the efficiency of online delivery systems?

3 percent of the lecturers evaluated the effectiveness of online education as 0-30%, 47 percent as 31-50%, 3 percent as 51-70%, 38 percent as 71-80% and 9 percent as 81-100%.

53 percent of the students evaluated the effectiveness of online education as 0-30%, 27 percent as 31-50%, 10 percent as 51-70% and 10 percent as 71-80%.

2. What is the reliability of online examinations comparing face to face (in classroom) examinations?

53 percent of the lecturers evaluated the reliability of online examinations as 0-30%, 29 percent as 31-50%, 6 percent as 51-70% and 12 percent as 71-80%.

27 percent of the students evaluated the reliability of online examinations as 0-30%, 40 percent as 31-50%, 6 percent as 51-70% and 12 percent as 71-80%.

3. Is it boring to follow courses online? What is your perception about the taste of the online course comparing with face to face courses?

19 percent of the lecturers evaluated the taste of online courses comparing with face to face as 0-30%, 44 percent as 31-50%, 15 percent as 51-70% and 22 percent as 71-80%.

40 percent of the students evaluated the taste of online courses comparing with face to face as 0-30%, 40 percent as 31-50%, 7 percent as 51-70% and 7 percent as 71-80% and 6 percent as 81-100%

Evaluation:

Evaluation of these outcomes is as follows.

- Efficiency of online delivery systems:

While 47 percent of the lecturers evaluated it as 31-50%, 38 percent as 50-70%. This shows that approximately half of lecturers evaluates the efficiency of system is between 31-50%, and two thirds evaluate as 50-70%. Even lecturers are not satisfied with the effectiveness of online delivery.

While 53 percent of the students rated it as 00-30%, 29 percent as 31-50%. This shows that approximately half of the student evaluates the efficiency of system is between 00-30%, and one thirds evaluate as 50-70%. The students are not satisfied with the effectiveness of online delivery.

Here, the evaluation of the students who benefit from the courses is considered important. The efficiency of online courses is evaluated in the range of 31-50%. The students are not satisfied with the effectiveness of online delivery.

- Reliability of online examinations:

While 53 percent of the lecturers evaluated it as 00-30%, 44 percent as 31-50%. This shows that approximately half of the lecturers evaluates reliability of online examinations is between 00-30%, and another half evaluate as 50-70%. The lecturers do not rely on the online examinations which is not fully under control although many procedures are applied against cheating.

While 27 percent of the students rated it as 00-30%, and 40 percent as 31-50%. This shows that approximately half of the students evaluates reliability of online examinations is between 31-50%, and one third evaluate as 31-50%. The students are also not satisfied with reliability of online exams.

Here, the evaluation of the lecturers who assess the courses is considered important. The reliability of online courses is evaluated in the range of 31-50%. The lecturers do not rely on the online examinations which is not fully under control although many procedures are applied against cheating.

- Boring to follow courses online (comparing with face to face):

While 19 percent of the lecturers evaluated it as 00-30%, 29 percent as 31-50%. This means that students are not happy with online classes. They do not taste the online classes.

While 40 percent of the students rated it as 00-30%, and 40 percent as 31-50%. This means that students are not happy with online classes.

Here, the evaluation of the students who benefit the courses is considered important. The boring level of online courses is evaluated in the range of 00-30% and 31-50%. If a delivery method is troublesome, it is necessary to either change that method or make it more attractive.

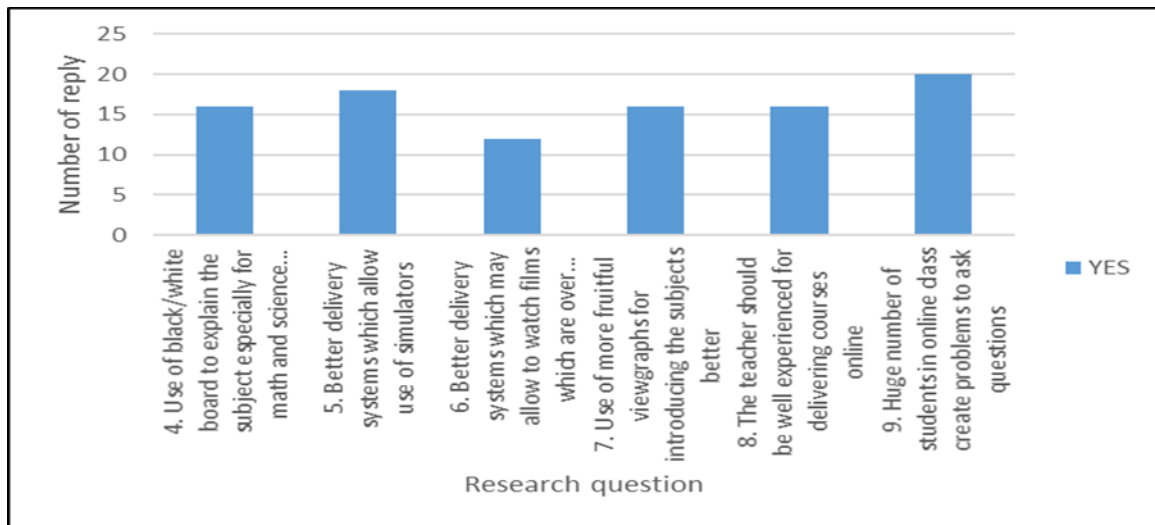


Figure 6. Measures to enhance the effectiveness of the online education (Lecturers)

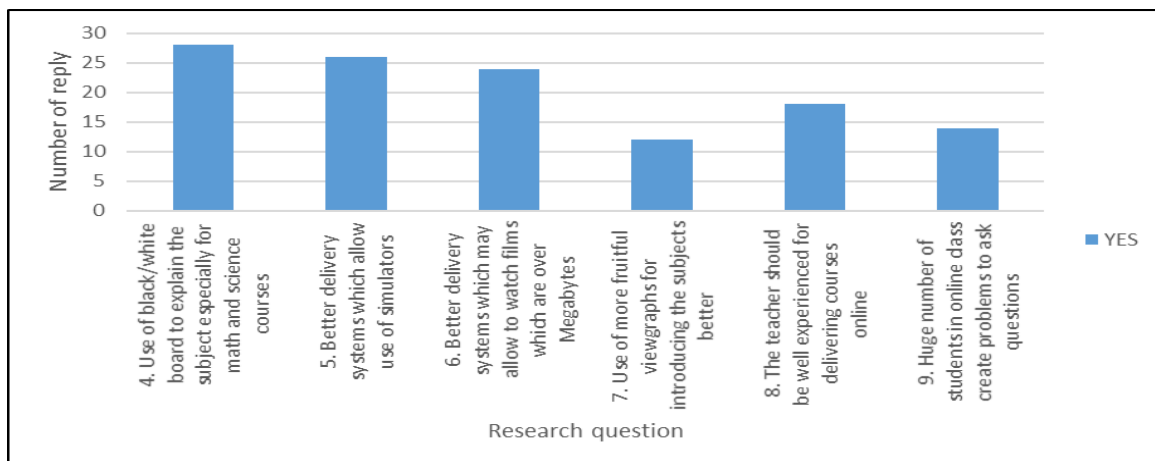


Figure 7. Measures to enhance the effectiveness of the online education (Students)

4. Which are following measures would be suitable to enhance the effectiveness of the online courses?

- Use of black/white board to explain the subject especially for math and science courses. Highly supported by the students. Students want the lecturer to explain the subject as in the face to face delivery
- Better delivery systems which allow use of simulators. Highly supported by the students. The simulators are essential to support most of the vocational courses.
- Better delivery systems which may allow to watch films which are over Megabytes. Highly supported by the students and lecturers. Existing systems are insufficient high megabyte navigation, loading and communication programmes as well as movies to reflect real world applications.
- Use of more fruitful viewgraphs for introducing the subjects better. Only 30 to 35 percent of students and 50 percent of lecturers are supported. There is a need to improve viewgraphs.
- The teacher should be well experienced for delivering courses online. Over half of the students and lecturers are supported. There is a need to improve the lecturer experience to deliver courses online.

- Huge number of students in online class create problems to ask questions. Highly supported by lecturers but not by the students. That means there is a need to limit the numbers of participating students for better delivery of online courses. The optimum student number should be defined for each type of courses.

Advantages provided by online courses

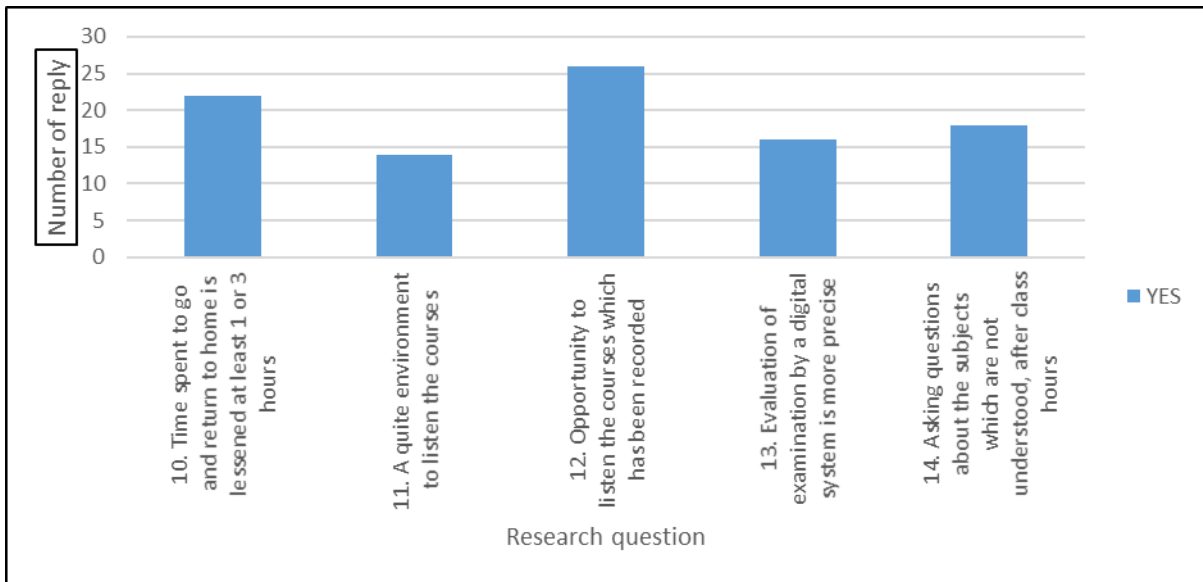


Figure 8. Advantages provided by online courses (Lecturers)

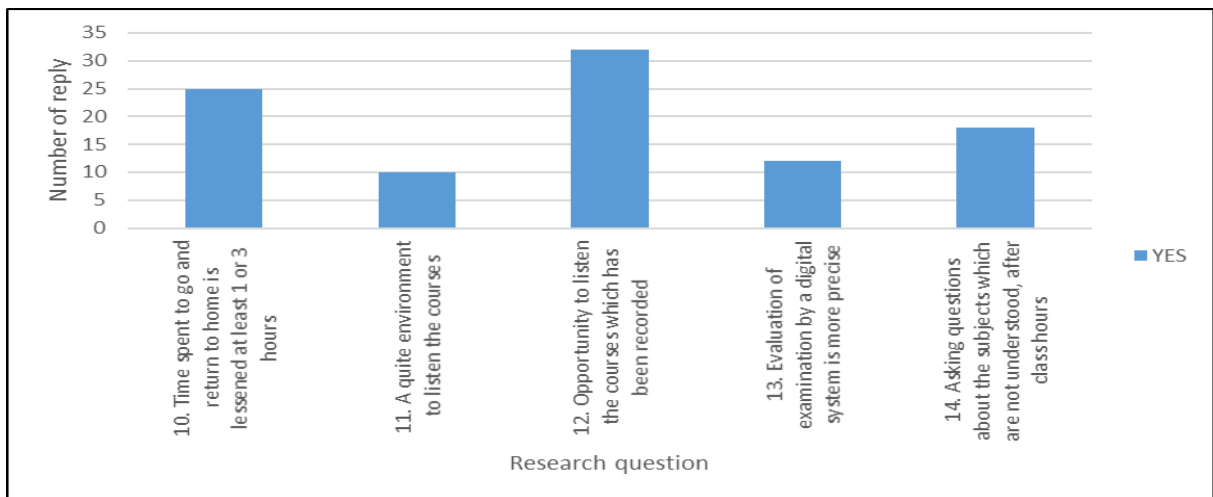


Figure 9. Advantages provided by online courses (Students)

Evaluation:

- Time spent to go and return to home is lessened at least 1 or 3 hours. While 78 % of the lecturers, 69% of students assumed that there is a significant time gained between 1 to 3 hours daily. It is a support that idea. It is very important for the metropolises which has condense traffic.
- A quite environment to listen the courses.

While 31 % of the lecturers, 44% of students assumed that there is not a significant problem having a silent environment.

- Opportunity to listen the courses which has been recorded.

While 100 % of the lecturers, 78% of students stated that the recording the live courses are important.

- Evaluation of examination by a digital system is more precise.

While 38% of the lecturers, 50% of students stated that the examination by a digital system is unlikely precise.

- Asking questions about the subjects which are not understood, after class hours.

While 53% of the lecturers, 56% of students stated that availability of asking question is not possible during online class section. This may be occurred in the classes followed large number of students.

H2 More effort should be spent to ensure the quality of online course efficiency.

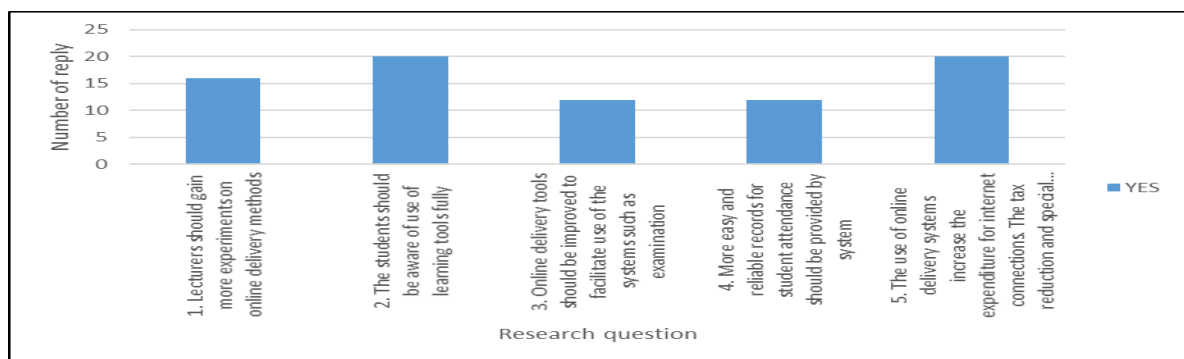


Figure 10. Effort to ensure the quality of online course efficiency (Lecturers)

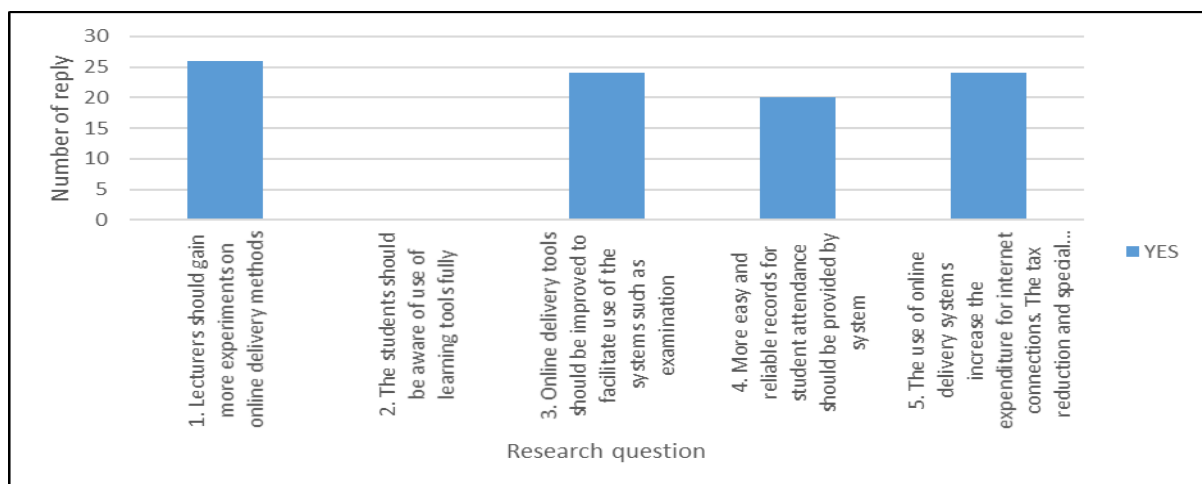


Figure 11. Effort to ensure the quality of online course efficiency (Students)

Evaluation:

- Lecturers should gain more experiments on online delivery methods.

While 78% of the lecturers, 83% of students stated that lecturers should gain more experiment on online delivery methods which requires a new issue should be added in the lecturer's development plans.

- The students should be aware of use of learning tools fully.

While 31% of the lecturers, 0% of students believed that students should learn how to use learning tools fully. The students have no concerns on this issue. But lecturers some queries on student's ability to use learning tools fully.

- Online delivery tools should be improved to facilitate use of the systems such as examination. While 100% of the lecturers, 80% of students believed that online delivery tools should be improved to facilitate use of the systems such as examination.

- More easy and reliable records for student attendance should be provided by system. While 38% of the lecturers, 67% of students believes that easy and reliable records for student attendance should be provided.

- The use of online delivery systems increases the expenditure for internet connections. The tax reduction and special discounts should be made for students taking online courses.

While 56% of the lecturers, 80% of students believes that the tax reduction and special discounts should be made for students taking online courses to reduce additional expenses.

H3: The different tools used for online education such as Zoom, MSTEAMS should be embedded/interfaced to Learning Management System (LMS) of education institute to enable both connection tools and LMS system.

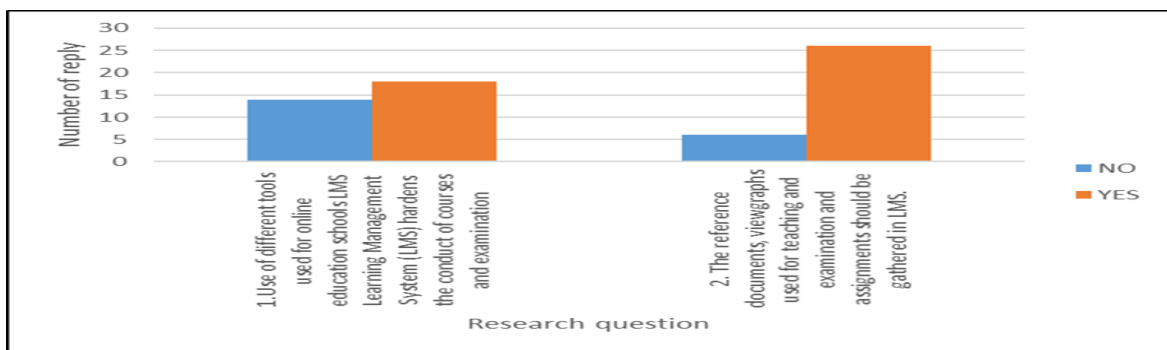


Figure 12. Use of different tools for LMS and adds for LMS (Lecturers)

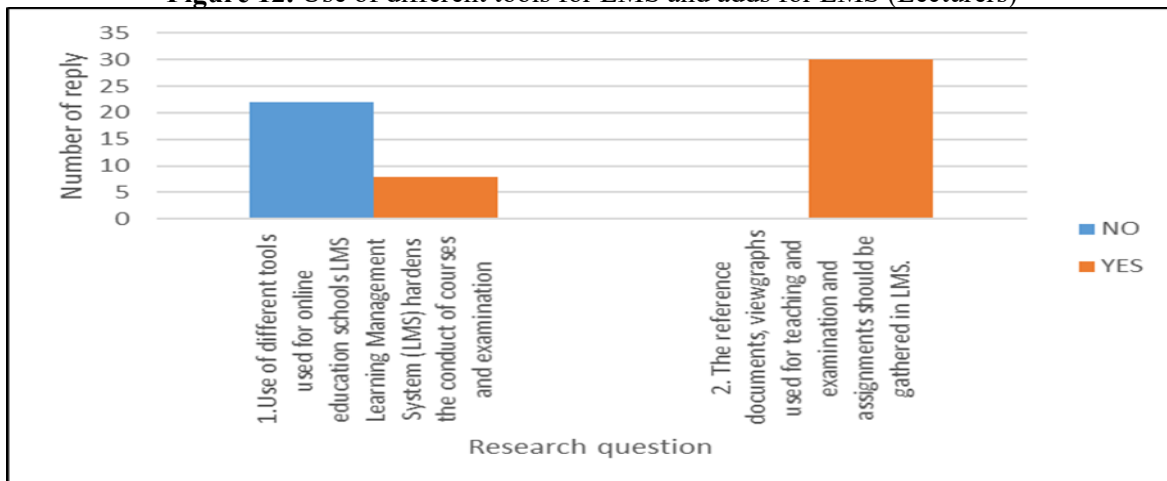


Figure 13. Use of different tools for LMS and adds for LMS (Students)

Evaluation:

- Use of different tools used for online education schools LMS Learning Management System (LMS) hardens the conduct of courses and examination.

69% of the lecturers and 73% of the students states that use of different tools used for online education schools hardens the conduct of courses and examination.

- The reference documents, viewgraphs used for teaching and examination and assignments should be gathered in LMS.

44% of the lecturers and 100% of the students states that all learning tools should be gathered in LMS.

Other comments from the participants

The students' families are also suffering with financial problems. A financial support to procure suitable online equipment should be provided.

Some students are waiting the last minute to respond the questions until to get help from the others. The time to reply the multiple choice questions should be minimized.

Students should be provided with interactive opportunities such as asking questions and making comments. It is not possible to conduct the lesson effectively with over 30 students.

Practical trainings are also possible through distance education. These technologies must be used. Vocational courses require additional course material such as charts, diagrams, catalogues as well as variety of simulators. Simulators are indispensable training aids of vocational courses.

Additional measures to avoid cheating for online examination should be taken.

Continuing the delivery of some courses with online method should be considered even after the pandemic.

5. Conclusion

Humanity has faced various natural disasters and epidemics so far and this catastrophic situation will continue. These disasters cause serious problems on social and economic structures and most importantly, negatively affect the mental health of the society. It is inevitable that daily life will be interrupted and restricted due to disasters.

Educational activity is necessary for our children and young people to be perfectly prepared for life. Natural disasters and epidemics also interrupt educational activities. Nations have to establish and operate a sustainable education system under all conditions for young generations that affect their future.

The sudden emerging COVID-19 Pandemic has disrupted education all over the world. In order to continue education, nations have rapidly introduced alternative education methods and prevented the interruption of education. In this process, distance education (online education) has been widely used.

The development of online education methods and tools during this painful period has enabled both teachers and students to gain experience in this method of delivering education. The experience gained in the last year will ensure the uninterrupted continuation of the education system in case of a disaster. Of course, the most important factor in providing that availability was advanced IT support.

Thanks to both field studies and surveys, the current situation of online training was determined and improving suggestions were made. The findings and suggestions on this subject are presented in the following paragraphs.

The epidemic has also created economic difficulties, and many families' income levels have decreased. In addition, the restrictions imposed have had a negative impact on people's lifestyle. Psychological studies conducted during the epidemic period also show that the society suffers from serious

psychological problems. The survey conducted shows that the students are also in psychological distress. This situation both decreases the efficiency of online courses and decreases the interest in following the courses.

It is observed that the efficiency of online courses decreases when the efficiency of online courses is compared with the face to face courses, and the interest of students in the courses decreases. In this regard, it is necessary to develop technical and psychological methods that will increase students' interest in the course.

Both teachers and students do not find online exam very reliable, as there is still the opportunity to get support from others during online exams. Exam grades are a factor affecting the future of students. More reliable systems should be created and both verification and validation should be made in order to create the trust of both students and teachers and who make evaluations in this type of exams.

At the beginning of online education, both students and teachers encountered some problems, and they were tried to be eliminated gradually. For the success of online education, blended education methods should be developed to ensure the adaptation of both teachers and students to this system. It should be ensured that online education is supported by suitable course material will facilitate for students to understand the subject. This can be solved by equipping educational institutions with LMS, which has broader capabilities, and teachers having the ability to fully use online education tools.

During the pandemic period, applied lessons, workshops, laboratory and simulator studies were largely interrupted. These applications are essential and complementary to theoretical courses especially in sciences such as engineering, science, and health. Current delivery systems do not allow these applications to be carried out. There is a need for high capacity LMS systems that allow these applications to be made.

Online training requires high capacity data transfer. This has led many users to replace their computers with higher capacity ones. Internet usage is expensive on some policies. Internet connection fees paid due to high data transfer have also increased considerably. To this end, it requires countries to provide support such as tax breaks for at least students' IT devices and connections.

In some schools, the number of students participating in online education has reached 100-200. This issue limits the student's ability to ask questions during the lesson and leads to a loss of interest. Therefore, optimum numbers that will limit the number of participants for online courses should be determined.

In this period, by recording the lessons, the students were able to better understand the lesson after the lesson, listen again and make up for the missed lessons. It is considered beneficial to continue this practice, which does not bring any extra cost, in face-to-face training.

The online education implemented during the pandemic period has also had some gains. First of all, teachers and students have become familiar with the system. This will enable an easy transition to online education in a future disaster. In addition, it has been found that it is possible to give many theoretical courses online. Especially in a metropolitan area with heavy traffic problems, it will be possible to save students' time on the road, and the number of facilities such as classrooms and lecture halls can be reduced.

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