# Project risk assessment of higher education online learning project during the Covid-19 crisis

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**Submission date:** 08-Apr-2023 01:22PM (UTC+0700)
**Submission ID:** 2058896381
**File name:** risk_assessment_of_higher_education_online_learning_project.pdf (483.35K)
**Word count:** 6716
**Character count:** 38132

World Journal on Educational Technology: Current Issues

Volume 13, Issue 4, (2021) 602-616

www.wj-et.eu

# Project risk assessment of higher education online learning project during the Covid-19 crisis

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**Suggested Citation:**

Catyanadika, P.E. & Isfianadewi, D. (2021). Project risk assessment of higher education online learning project during the Covid-19 crisis. *World Journal on Educational Technology: Current Issues*. *13*(4), 602-616. https://doi.org/10.18844/wjet.v13i4.6232

Received from July 31, 2021; revised from August 15, 2021; accepted from October 05, 2021;
Selection and peer review under responsibility of Prof. Dr. Servet Bayram, Yeditepe University, Turkey.
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**Abstract**

This research aims to identify and assess the project risks of online teaching in Indonesian higher education institutions during the COVID-19 crisis. Two analyses have been conducted using the project risk management approach. First, a triangulation analysis based on interviews with 35 online teaching stakeholders was implemented in order to construct a risk breakdown structure to identify major registered risks. Second, a risk assessment calculating the severity score of each registered risk was conducted using an online survey with 125 online teaching participants. The results of these analyses concluded that there were 11 registered risks, with the highest risk exposure in the technological area. In terms of risk criticality, inadequate Internet connection and an inconducive learning environment were selected as the most critical risks with the highest severity scores. These results imply the importance of focussing on the technological risk mitigation and strategy policies to prepare for future online learning projects after the COVID-19 crisis in Indonesia.

Keywords: distance learning, online teaching, project risk management, risk breakdown, structure.

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## 1. Introduction

*Background*

The global pandemic of the novel coronavirus (COVID-19) has enormously changed people's daily lives in many sectors. Majority of the daily activities are restricted in order to stop the virus from spreading (Camba & Camba, 2020). In terms of education activities, the urgency to stop the COVID-19 virus from spreading among class participants by restricting physical contact has shifted majority of the class sessions to the virtual platform (Huang et al., 2020; The World Bank, 2020; UNESCO, 2020). While many attempts to stop the virus from spreading have been initiated, the global society also prepares to accept and adapt to the virus, simultaneously creating a new life system of a 'new normal' (Berwick, 2020).Adapting to post-COVID-19's new normal environment is surely full of challenges, as people will face many problems they have never met before. The education community, fortunately, has been majorly selected as one of the priority sectors to rapidly cope with the COVID-19 situation. While online teaching activities have become common alternative so far, they also come with several challenges and problems during the implementation process. A report by Triwibowo (2020), which identified online teaching issues in Indonesia during the COVID-19 crisis, mentioned three obstacles that appeared: the inequality of Internet access and technology infrastructures, digital capabilities of teacher and students and the uncertainty of technology adoption. While in Philippines, Cortez (2020) mentioned the necessity of teacher validation methods for students' feedback in online classes as one important concern. Other findings also reported some challenges which educational institutions faced during the pandemic, such as the adaptation of academic workforces (Cappelletti, 2020), information flows among stakeholders (Crawford et al., 2020) and unclear shutdown policies from the government (Hui, 2020).

While several challenges were identified during the crisis phase, the future of online teaching under the new normal circumstance would be full of uncertainties. Educational institutions need to learn from past experiences and adapt to complement new systems. This adaptation process will bring up many risks related to its implementation. As the first step to overcome changes, it is important to identify the risks that will potentially occur. This research is initiated in order to identify and assess the risks that will potentially occur in Indonesia's higher institution online learning projects. As project risk assessment would be important to identify the project area with higher risk exposure (Bissonette, 2016; Project Management Institute, 2017), this research would contribute to identify in which area the risk will critically occur in online learning projects after the COVID-19 crisis in Indonesia. The results from this research also contribute to help decision-makers to prepare for better risk mitigation strategies and implement appropriate policies for future online learning projects in Indonesia.

*Why is this study important?*

The educational practices are expected to change, following the rapid adoption of online and blended learning in education activities (Korkmaz & Toraman, 2020). Even though several historical experiences have been reported and presented by prior researches regarding online learning during COVID-19 (Cappelletti, 2020; Cortez, 2020; Crawford et al., 2020), there are still no attempts to specifically analyse the risks of online teaching activities under the new normal environment. Risk identification would be important to build a better preparation for supporting successful educational projects' delivery in the future (Viner et al., 2021; Zou et al., 2007). Therefore, initial risk identification

and assessments are necessary to fully understand the situation and prepare for further actions. As many higher educational institutions begin to change their operational procedures and policies for adaptation, predicting the potential unknown circumstances or risks that may happen in the future would contribute to better preparation.

*Purpose of this study*

This research aims to identify and assess the potential risks of online teaching activities in higher education, specifically under the new normal circumstances after the COVID-19 pandemic. Project risk analysis would give a preferable understanding regarding the risks registered, as the analysis not only identifies causes and effects of risks, but also identifies in which area the risks will potentially occur and classifies the risks based on their probability and impact value (Project Management Institute, 2017). Considering that no risk report has been presented so far, this research proposed the report for initial identification using qualitative and quantitative risk analyses. The reports presented consist of a risk register generated from the risk breakdown structure (RBS) and the risk assessment matrix. RBS analysis was applied for the risk identification process, in order to describe the structure of risk exposure. Thus, the sources of the risk can be identified in hierarchical order (Hall & Hulett, 2002; Hillson, 2003; Holzmann & Spiegler, 2011; Project Management Institute, 2017). However, risk assessment is conducted using probability and impact calculation (P–I score). The P–I score gives the value of the risk based on the probability that it will occur and the effect of the contingency for the overall project (Dumbrava & Vladut-Severian, 2013; Hall & Hulett, 2002; Project Management Institute, 2017). The output of the analysis was presented in a risk critical ranking to visualise the risk severity value categorisation ranged from low, medium and high, indicating priority score of each registered risk.

## 2.Methods and Materials

*Research methods*

The project risk analysis of this research followed the rule of the following risk analysis steps: risk identification, risk assessment, risk management and risk evaluation (Collier & Lambert, 2019; Project Management Institute, 2017; Wangyal et al., 2020). Because this research was conducted during the initiation phase of the new normal, this research tends to focus only on two prior steps: risk identification and risk assessment, rather than using all the risk analysis steps. The latter two analyses will be explored later for future works, after education activities under the new normal are well implemented. This research also specifically analyses the risks related to online teaching in the Republic of Indonesia's higher education institutions. Different countries may generate different risks due to diversity in infrastructures, official policies, socio-economic condition or culture. Therefore, the results of this research may not be applicable to other countries. The risks in higher education may also different with risks in other levels of education.

- The risk identification process consists of the construction of the risk register and RBS steps (Collier & Lambert, 2019). This analysis proposes a list of risks which is categorised according to hierarchical risk sources. The hierarchical structure in RBS eases the process to identify the source area of the risk and risk exposure in each source area (Hillson,

2003), whereas the risk assessment process is related to how each risk will be measured. The assessment was conducted by calculating the P–I score of each registered risk and provides categorisation of the risks, which are ranked from critical to non-critical risks (Bissonette, 2016). The main steps of the methodology are explained sequentially as follows:

- *Step 1.* Risks on designated topics were determined using the research breakdown structure (RBS) approach. However, due to the lack in research findings regarding the standard RBS for online teaching, this research cannot rely on a specific RBS. Otherwise, this research used generic RBS proposed by Hall and Hulett (2002), which focuses on three risk sources: internal, external and technology. The RBS for a generic project can be applied in universal risk areas and any project sector (Hall & Hulett, 2002; Hillson, 2003); so this RBS is also suitable for educational project risks. Every element of the lowest level of RBS will be selected to construct interview questions for the risk identification process.

- *Step 2.* Among the many methods used to conduct qualitative risk identification analysis, interviews can be implemented to generate suitable risk statements for a specific project (Bissonette, 2016). This research gathered risk statements from stakeholders in the higher education sector, such as lecturers, senior lecturers, deans, vice deans, directors of academic programmes and undergraduate students. Direct and online interviews were initiated to generate risk statements for each RBS element. In order to ensure the quality of the research statement, every statement issued must meet the meta-languages of risk statement. First, the meta-language rules stated as 'if–then' or 'condition–consequence risk statement' (Bissonette, 2016; Hall & Hulett, 2002) will be adopted to avoid misperception between cause and risk. Any statement that does not meet these criteria will be eliminated. Second, the meta-language should be related to the differences between risk and assumption. The assumption statement is bound to known constraints, while future risks and constraints are unknown (Bissonette, 2016). Thus, statements with definite future consequences will also be eliminated. In order to ensure validity of each statement, all registered risks from participants were compared using the data sources triangulation method (Carter et al., 2014).

- *Step 3.* The risk statements identified in step 2 will be registered and measured using the severity score of each risk. The severity score of each risk is determined based on the probability of risk occurrence and impacts on the online teaching output (Bissonette, 2016; Hall & Hulett, 2002; Project Management Institute, 2017). The severity risk score was calculated using the index formula proposed by Al-Hammad (2000) as follows:

$$\text{Severity Index } (I) = \frac{\sum_{i=0}^{4} a_i X_i}{4 \sum X_i} \text{ x } 100\%$$

Where:

$a_i$ = The constant expressing the weight given to *i*

$X_i$ = The variable expressing the frequency of *i,* the response for *i* = 0, 1, 2, 3, 4

$X_0$ = Frequency of a very high response corresponding to $a_0 = 4$

$X_1$ = Frequency of a high response corresponding to $a_0 = 3$

$X_2$ = Frequency of a medium response corresponding to $a_0 = 2$

$X_3$ = Frequency of a low response corresponding to $a_0 = 1$

$X_4$ = Frequency of a very low response corresponding to $a_0 = 0$

An online survey to determine both the probability and impact score was distributed to the project stakeholders, mainly consisting of lecturers and students. Both probability and impact scale were measured using a 5-point Likert scale ranging from very high to very low. Table 1 shows the reference used for respondents to fill in the questionnaire.

Table 1. *P–I* score references

| | Very high | High | Medium | Low | Very low |
|---|---|---|---|---|---|
| Probability | Risk will occur for more than 80% | Risk will occur for about 80%–60% | Risk will occur for about 59.99%–40% | Risk will occur for about 39.99%–20% | Risk will occur for less than 20% |
| Impact | Risk will be affected by scope, time, cost and quality of online classes for more than 80% | Risk will be affected by scope, time, cost and quality of online classes about 80%–60% | Risk will be affected by scope, time, cost and quality of online classes about 59.99%–40% | Risk will be affected by scope, time, cost and quality of online classes about 39.99%–20% | Risk will be affected by scope, time, cost and quality of online classes for less than 20% |

After both the probability and impact value scores are determined, the severity score to calculate the criticality of each risk can be calculated. The calculation formula of the severity score based on the Project Management Institute (2017) is as follows:

$$R = P \times I$$

where:

$R$ = Severity score of a risk statement

$P$ = Probability value

$I$ = Impact value

- *Step 4.* After the severity score of each registered risk is determined, the final step of this research is to categorise each risk based on its severity level. Three severity levels were

determined: low risk, medium risk and high risk. The severity value scores were calculated by converting the index score using following scales:

1 = ≤20%

2 = 20%–39.9%

3 = 40%–59.9%

4 = 60%–80%

5 = ≥80%

Both probability and impact value were plotted on the *P–I* matrix in order to categorise the severity ratings of all risks registered (Bissonette, 2016; Dumbrava & Vladut-Severian, 2013). The matrix and categorisation are shown in Figure 1.

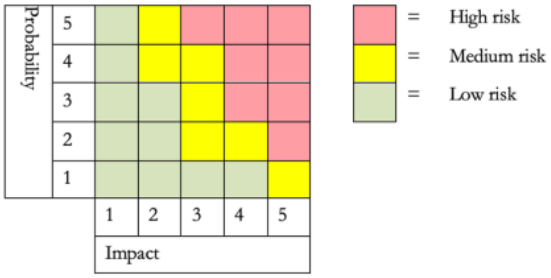


Figure 1. *P–I* matrix

*Participants and respondents*

In order to conduct the triangulation analysis, 35 online teaching project stakeholders were selected. The selected stakeholders were students, university lecturers, university heads of departments and students' parents. The snowball technique was implemented to select the participants. The heads of departments recommended lecturers from their departments to become participants. Lecturer then recommended their students and parents of their students to become participants. This technique was implemented in order to select the participants who experienced similar situations (same departments, same classes and same learning activities) but argue different perspectives regarding the online teaching project implementation.

On the other hand, the risk assessment analysis was conducted using quantitative analysis. A total of 125 research respondents are selected using the convenience sampling technique. The respondents were parties who directly experienced the online learning class, grouped into student respondents and lecturer respondents. A total of 37 lecturer respondents and 88 student respondents participated in this study.

*Data collection methods and analysis*

Data for the triangulation analysis were gathered through direct and online interviews with every participant group, consisting of management group, lecturer group, student group and students' parent group. Researchers asked every participant for any potential risk that happened during online learning activities. The risks mentioned have to fulfil the meta-language of the risk statement, which included the risk statement and the risk agent for each registered risk statement (Bissonette, 2016). The recorded interviews from every participant group were then transcribed and triangulated. The triangulation process was conducted by cross-checking the risk statements registered by one group and comparing it to the other groups' risk statements. Statements mentioned by more than 50% of the total participants or at least two of four participant groups were selected.

The results from the triangulation analysis was then assessed using the severity score analysis (Bissonette, 2016; Hall & Hulett, 2002). An online survey using Google Forms was distributed to 125 selected respondents. The respondents were asked to calculate the probability and impact of each registered risk using the 5-point scale which ranged from very low to very high. The assessment results were then calculated and ranked in order to identify which risks were categorised as critical

## *3.Findings*

*Risk Identification Results*

Based on the interviews and triangulation analysis with 35 online teaching project stakeholders, consisting of students, lecturers, parents of students and university management, 11 risk statements were obtained and categorised in a universal RBS. These risk statements were mentioned by more than 50% of the total participants or at least two of four participant groups. Each statement was carefully selected using the meta-language of risk analysis to assure the quality of risk statement and to separate the cause of risks and the risk statement itself. Therefore, all selected risks were presented with risk agents. The RBS is listed in Table 2.

Table 2. Risk breakdown structure

| Risk code | Risk category | Risk agent | Risk statement |
|---|---|---|---|
| I1 | Internal risks | Limited direct communication | Misinformation among online class stakeholders |
| I2 | | Changes in learning tools and media | Tuition fee adjustment |
| I3 | | Changes in student's expectation | Student's decreasing trust in teaching quality |
| E1 | External risks | Time zone and location differences | Limited access and geographical barriers to access online class |
| E2 | | Distraction from the surrounding environment | Learning environment is not conducive |
| E3 | | Limitations of lecturers or supervisors to observe students | Behaviour that leads to violations of academic ethics, such as cheating or plagiarism |
| T1 | Technological risks | Inadequate Internet infrastructure | Internet connection instability |

| | | |
|---|---|---|
| T2 | Online application low security level | Intruders, data lost, manipulated and stolen in online applications |
| T3 | Limited online platform features | Non-optimal interactions in online classes |
| T4 | Limited online platform features | Changes in teaching methods |
| T5 | Lack of online platform user capabilities | Online platform is not used effectively |

Source: Primary data processed.

*Discussion of the Risk Identification Analysis*

From the analysis results, technological risks dominated the RBS for online teaching projects. Majority of the participant felt that the limitation of the platform's features confined learning participants to interact and communicate with others during class sessions. This issue is also potentially caused by miscommunication among the parties involved; as interaction among parties are indirect, there would be huge probability that the information transfer process will not be effective. User-limited capabilities to use and adopt online platforms may also become barriers to communicate on online platforms.

Another risk mentioned by majority of the participants is Internet connection instability. Indonesia's Internet speed and infrastructure are still far from ideal for online learning (Triwibowo, 2020). Participants who live in rural area argue that they are sometimes not able to join class sessions due to poor Internet connection. Sometimes, unstable Internet also causes the class session to not run smoothly, especially in classes that use a web conferencing platform. Some of the participants also experienced a condition when they would suddenly exit the session because of power outage.

*Risk Assessment Results*

The researchers tried to get wider perspective related to the risk statements listed in the RBS. A questionnaire measuring the value for each risk had been distributed to the 125 respondents, consisting of 37 lecturers and 88 college students, using Google Forms in order to determine the probability and impact score of each risk. Each respondent was asked to measure the probability and impact of all registered risks based on their own experience and perception from attending online classes. Both the probability and impact score were calculated using the severity index formulation in order to measure the critical value of the risks in the overall project. The results of probability and index scores, severity score percentage and categorisation of risk level are presented in Table 3.

Table 3. Risk assessment result

| **Probability** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Risk code** | **Risk statement** | **1** | **2** | **3** | **4** | **5** | **Tot.** | **SI** | **Cat.** |
| | | **VL** | **L** | **M** | **H** | **VH** | | | |
| **I1** | Misinformation among online class stakeholders | 2 | 16 | 50 | 44 | 13 | 125 | 60.0% | 4 |
| **I2** | Tuition fee adjustment | 4 | 15 | 48 | 41 | 17 | 125 | 60.4% | 4 |
| **I3** | Students' decreasing trust in | 1 | 16 | 48 | 56 | 4 | 125 | 59.2% | 3 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | teaching quality | | | | | | | | |
| **E1** | Limited access and geographical barriers to access online class | 6 | 12 | 43 | 51 | 13 | 125 | 60.6% | 4 |
| **E2** | Learning environment is not conducive | 6 | 18 | 36 | 41 | 24 | 125 | 61.8% | 4 |
| **E3** | Behaviour that leads to violations of academic ethics, such as cheating or plagiarism | 4 | 25 | 50 | 33 | 13 | 125 | 55.2% | 3 |
| **T1** | Internet connection instability | 3 | 6 | 38 | 40 | 38 | 125 | 70.8% | 4 |
| **T2** | Intruders, data lost, manipulated and stolen in online applications | 10 | 36 | 42 | 25 | 12 | 125 | 48.6% | 3 |
| **T3** | Non-optimal interactions in online classes | 4 | 23 | 47 | 36 | 15 | 125 | 57.0% | 3 |
| **T4** | Changes in teaching methods | 2 | 14 | 51 | 44 | 14 | 125 | 60.8% | 4 |
| **T5** | Online platform is not used effectively | 8 | 30 | 55 | 24 | 8 | 125 | 48.8% | 3 |
| **Impacts** | | | | | | | | | |
| **Risk code** | **Risk statement** | **1 VL** | **2 L** | **3 M** | **4 H** | **5 VH** | **Tot.** | **SI** | **Cat.** |
| **I1** | Misinformation among online class stakeholders | 3 | 13 | 45 | 46 | 18 | 125 | 62.6% | 4 |
| **I2** | Tuition fee adjustment | 0 | 16 | 40 | 43 | 26 | 125 | 65.8% | 4 |
| **I3** | Students' decreasing trust in teaching quality | 1 | 20 | 44 | 51 | 9 | 125 | 59.4% | 3 |
| **E1** | Limited access and geographical barriers to access online class | 7 | 9 | 38 | 48 | 23 | 125 | 64.2% | 4 |
| **E2** | Learning environment is not conducive | 3 | 14 | 36 | 42 | 30 | 125 | 66.4% | 4 |
| **E3** | Behaviour that leads to violations of academic ethics, such as cheating or plagiarism | 4 | 24 | 49 | 34 | 14 | 125 | 56.0% | 3 |
| **T1** | Internet connection instability | 1 | 8 | 28 | 38 | 50 | 125 | 75.6% | 4 |
| **T2** | Intruders, data lost, manipulated and stolen in online applications | 12 | 34 | 34 | 29 | 16 | 125 | 50.6% | 3 |
| **T3** | Non-optimal interactions in online classes | 2 | 20 | 46 | 39 | 18 | 125 | 60.2% | 4 |
| **T4** | Changes in teaching methods | 2 | 18 | 47 | 36 | 22 | 125 | 61.6% | 4 |
| **T5** | Online platform is not used effectively | 5 | 28 | 53 | 27 | 12 | 125 | 52.6% | 3 |

Source: Primary data processed.

VL = Number of respondents who perceived the risk as very low

L = Number of respondents who perceived the risk as low

M = Number of respondents who perceived the risk as medium

H = Number of respondents who perceived the risk as high

VH = Number of respondents who perceived the risk as very high

Tot. = Summary of respondents' answers

SI = Severity index calculation results

Cat. = Categorisation of the risk critical scale

*Discussion of the risk assessment analysis*

Based on the risk evaluation analysis presented in Table 3, all of the registered risk statements have a severity index percentage of more than 40% in both probability and impact score. This indicates that no registered risks were considered as low risk by the respondents. The three highest probability severity indexes were from T1 (70.8%), E2 (62.8%), and T4 (60.8%), while the highest severity indexes for impact were from T1 (75.6%), E2 (66.4%), and I2 (65.8%). These results indicate that the highest risk originated from the instability of Internet connection (T1), for both probability and impact, whereas the second highest risk came from external sources, which is an inconducive learning environment (E2). The average severity index score for probability is 58.8%, while the average severity for impact is 61.1%. These numbers show that the respondents feel that the chances for the registered risks occurring are more than 50%, and if the risks really occurred, then it highly affected the project's output and quality. This assessment result confirms that all of the risks registered are accepted by majority of the respondents.

The registered risks also were evaluated in terms of their criticality. By addressing the critical rates of each risk, decision-makers were able to identify the areas with higher risk exposure in order to make priority mitigation strategies. Each of the registered risks were converted into a 1–5 critical scale and mapped to the *P–I* matrix with three levels of risk, namely high risk (red), medium risk (yellow) and low risk (green). In order to compare the critical levels of each risk, the *P–I* score was calculated using the average severity index. The rank of each risk's criticality is presented in Table 4.

Table 4. Risk's rankings based on the *P–I* matrix and severity score

| Rank | Risk code | Risk statement | Severity score | *P* scale | *I* scale |
|---|---|---|---|---|---|
| **1** | T1 | Internet connection instability | 73.2% | 4 | 4 |
| **2** | E2 | Learning environment is not conducive | 64.1% | 4 | 4 |
| **3** | I2 | Tuition fee adjustment | 63.1% | 4 | 4 |
| **4** | E1 | Limited access and geographical barriers to access online class | 62.4% | 4 | 4 |
| **5** | I1 | Misinformation among online class stakeholders | 61.3% | 4 | 4 |
| **6** | T4 | Changes in teaching methods | 61.2% | 4 | 4 |
| **7** | I3 | Students' decreasing trust in teaching quality | 59.3% | 3 | 3 |
| **8** | T3 | Non-optimal interactions in online classes | 58.6% | 3 | 4 |
| **9** | E3 | Behaviour that leads to violations of academic ethics, such as cheating or plagiarism | 55.6% | 3 | 3 |
| **10** | T5 | Online platform is not used effectively | 50.7% | 3 | 3 |
| **11** | T2 | Intruders, data lost, manipulated and stolen in | 49.6% | 3 | 3 |

| | |
|---|---|
| | online applications |

Source: Primary data processed.

The results in Table 4 show that there are seven registered risks categorised as high risk (highlighted in red colour) and four risks categorised as medium risk (highlighted in yellow colour). The highest critical risk based on severity score was the Internet connection instability (T1), which obtained a severity score of 73.2%. This result indicates that this risk needs to be mitigated immediately or set as a priority risk due to its high probability and impact (70.8% and 75.6%, respectively). This finding also supported Triwibowo's (2020) finding regarding the lack of Internet speed and infrastructure for online learning activities in Indonesia. Another research also mentioned a similar result, that with more than 150,000 schools in Indonesia located in rural area, it would be difficult to provide adequate internet infrastructures for online learning (Churiyah et al., 2020).

The digital literacy of online learning participants was also considered as another problem that may pose other risks, such as miscommunication and misinformation among class stakeholders (I1), non-optimal interaction during class sessions (T3) and ineffective use of online platform (T5). However, among the three possible risks, only I1 and T3 are grouped in the high-risk category, while T5 is considered as medium risk. Based on the interviews with several participants, challenges regarding digital literacy would potentially cause many barriers for online learning adoption process. However, since the online classes are consistently implemented, participants will gradually adapt to the online learning environment and learning platforms' features. Moreover, because majority of the class participants are from the digital native generation, adapting to online platform features would not be a big problem (Acquah & Katz, 2020). On the other hand, a bigger technological problem may come from the communication process between class participants. Interaction in online class is usually more difficult rather than in the physical class, as the communication media inside the platform is limited. Several participants also potentially experienced the lack of social presence and the feeling of others' existence in the online environment. When participants feel no social presence, it would be ungainly to talk with the other parties using the screen and microphone (Yilmaz, 2017). This problem may cause participants to be less active in discussions.

The second critical risk is related to the inconducive learning environment (E2). Even though that learning platform and class participants may able to adapt to the online learning process, the external environment to access the platform may cause disturbances for participants. Physical class sessions held in a conducive place may able to accommodate the effectiveness of the learning process. However, online class sessions that can be accessed everywhere would potentially bring challenges for learning participants due to disturbances from the external environment. Several participants experienced circumstances such as noisy environment, sound of passing vehicles, disturbances from family members and local cultural issues that potentially disturb learning activities. This finding is also stated by Rasmitadila et al. (2020), who found potential disturbances from family members and fellow online learning participants who tend to talk about unrelated topics during class.

The third risk was the tuition fee adjustment. Even though online education policies regarding tuition fees would be varied among higher education institutions, majority of the education institutions in Indonesia face similar problems regarding tuition adjustment. During the first phase of the social distancing policy applied in Indonesian education sectors, several students protested against the university to lower the tuition fees (CNN Indonesia, 2020; Iswara, 2020; Yamin, 2020). This problem led the Minister of Education of the Republic of Indonesia to issue fee reduction policies and

provide financial support to students during the pandemic (Kementrian Pendidikan dan Kebudayaan, 2020). However, several participants also addressed the transparency of educational fees they had spent. Due to the transformation process of learning activities to the online platform, tuition fees should also be spent for other infrastructures that support online learning activities, such as platform costs, Internet costs and other online peripheral costs.

### *4.Conclusion*

The output of this risk assessment provided three highly critical risk factors that had potentially occurred during the online teaching project implementation in Indonesia. The COVID-19 crisis had been selected as the period to identify and assess the potential risk factors. The risk identification process using triangulation analysis and RBS analysis from 35 participants stated 11 major registered risks, with the highest risk exposure area recorded in the technological area, whereas based on the risk assessment analysis, three critical risks had been found, namely Internet connection instability, inconducive learning environment and tuition fee adjustment. These three selected risks are perceived by respondents as the highest risks due to the highest probability and impact severity score from the *P–I* analysis conducted. These results indicate that the risk mitigation process should focus on these three aspects as a priority.

### *5.Recommendation*

Even though this research may able to support decision-makers in constructing better mitigation strategies, this research still has several limitations for consideration. The first limitation is that this research only focused on Indonesian higher education institutions. Other countries may have different risks related to online teaching applications. Secondly, the RBS implemented in this research applied a universal RBS due to lack of a specific RBS for online teaching projects. Although the universal RBS may able to identify various kinds of projects, the result generated from the universal RBS is less accurate rather than specific.

Considering the limitations above, researchers are highly requested to continue this analysis for further development. These risk assessment results can be a basis to develop RBS, specifically for online teaching projects. Based on the risk identification process, technological risks related to misinformation and inadequate infrastructures are considered the highest areas of risk exposure. This finding can act as an initial identification for online teaching specific RBS construction that focuses primarily on technological risks. The development of an RBS should also be assessed in different environments, such as conducting assessments in different countries in order to get wider perspective and variety of registered risks. Lastly, the output of this research may be implemented to conduct risk response analysis and mitigation strategies in other researches or online teaching projects in future researches to construct appropriate policies for online learning project agenda after the COVID-19 crisis.

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