Development of risk breakdown structure for online learning project during COVID-19 Crisis

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ARTICLE INFO

ABSTRACT

This research aims to develop risk breakdown structure specifically for virtual learning projects in higher institutions. Transition from physical face-to-face study into virtual learning practices during COVID-19 mitigation phase had been selected as the main focus to construct risks identification. Opinions and experiences from 35 stakeholders in university level had been gathered and analysed using triangulation and meta-language of risk statement methods, in order to maintain statements' validity and quality based on project management's standard. All registered risks were listed using universal risk breakdown structure format, which emphasized on three risk areas: internal, external, and technology, in order to categorize risk based on its sources and identify areas with high exposure of risk. The result proposed 11 risk statements with the highest exposure to risk in the technology area. This result indicated that virtual learning organizers need to consider strategies and mitigation processes in the technology area, specifically on the infrastructure readiness, user capabilities, and communication gap inside the virtual environment.

Introduction

Social activity restrictions implemented by various countries as an attempt to mitigate the spread of the COVID-19 virus have changed people's behavior in various daily activities. Education sector, where most activities are carried out by face-to-face interaction, is also affected by this restriction (Huang, Yang, & Chang, 2020; The World Bank, 2020). Activities that are carried out in the classroom suddenly have to be moved in online platforms and applications. Learning activities using online method are predicted to continue during the COVID-19 crisis, and it is predicted to be a new paradigm in the world of education in the future (Ogrutan & Aciu, 2020).

After COVID-19 cases began to increase in early 2020, educational institutions in various countries have massively moved physical class sessions to the online platforms during that period, the majority of the class moved simultaneously to the virtual environment in a relatively short and rushed time. Several transition problems have identified from several sources such as technology adaptation difficulties (Cappelletti, 2020), and miscommunication among educational stakeholders (Crawford et al., 2020), In Indonesia, three major problems of online teaching during COVID-19 have been identified, which related to internet and infrastructure inequality, limitations of digital capabilities among students and teachers, and uncertainty of technology adoption (Triwibowo, 2020).

An organization can learn from past experiences to overcome environmental changes (Bissonette, 2016). In the scope of project or product development planning, managing risks that may occur in the future is one important aspect that needs to be considered (Oehmen, Olechowski, Robert Kenley, & Ben-Daya, 2014). The application of online learning during the COVID-19 pandemic in Indonesia can bring experience and lessons for the education sector to develop curricula and effective online learning methods in the future. By learning from experiences and findings of online classes transformation during COVID-19 pandemic, educational institutions can actually predict risks that might occur in online classroom practice in the future, and also prepare strategic acts to mitigate these risks. Unfortunately, even though COVID-19 pandemic situation is an opportune time to identify potential risks in online classroom activities, there has not been much research that specifically identifies this issue, especially in Indonesia.

This research was conducted to identify and develop risk structure to conduct online learning in Indonesia using a project risk management approach. Risk identifications were carried out using qualitative approaches with interviews and focus group discussions on four categories of stakeholders in the online class project at a private university in Indonesia. Retrieved data in the form of a risk statements are carried out using a meta-language approach of risk statement, which focuses on identifying risk agents and risk statements (Project Management Institute, 2017).

The results of interviews between stakeholders were then compared using the data source triangulation method to obtain valid risk statements from various participant sources (Carter, Bryant-Lukosius, Dicenso, Blythe, & Neville, 2014). The output of the analysis is presented in a table that contains a detailed risk breakdown structure and categorized using the universal risk breakdown structure approach which is divided into internal, external and technological risk categories (Hall & Hulett, 2002).

The results of this research are expected to map the risks of implementing online courses in Indonesia in the future that are able to help decision makers in the education sector to design appropriate mitigation strategies. This research can also be a reference source for the development of further risk analysis, such as risk assessment and risk mitigation in the online learning management field.

Methodology

Data of this research was gathered using interviews and focus group discussions with stakeholders in the online class project at the university level. The selected stakeholders to be a participant must involve directly with the project concerned or have a decision-making role in the running of the project (Bissonette, 2016; Project Management Institute, 2017). Four categories of participants have been selected in this research, namely consist of 20 college students, 7 lecturers, 4 parents, and 4 university management.

Data collection process for management participants was carried out by face-to-face interviews. Meanwhile, data collection for students, lecturers, and parents' participants were carried out in a focus group discussion using the Zoom teleconferencing application due to limited physical contact due to the pandemic that took place during data collection period. Questions and the direction of the group discussion were constructed using universal risk breakdown structure by classifying risks into three risk categories, namely internal, external, and technological. This risk breakdown structure can be used in projects whose risks have never been identified, so that the structure created can be a reference for mapping the risk exposure level of each risk category. The universal structure can also be applied to various types of projects, so that it still meets the criteria for online college project risk identification (Hall & Hulett, 2002; Hillson, 2003).

Data were collected separately for each participant category. Participants are directed to provide opinions regarding risks that may occur in accordance with the perceptions and personal experiences of each participant. Then each risk is recorded and grouped according to its suitability in the risk breakdown structure categories.

Each risk proposed by the participant must meet the requirements of the meta-language risk statement by including the agent or cause of the risk in each risk statement. This rule applied so that the quality of the risk statement meets the requirements of the project risk criteria, namely (1) it is not a statement of the causes of risk, and (2) it is not an assumption (Bissonette, 2016). Each of the risk breakdown structures of the four participant categories then further selected using the triangulation method of data sources, by comparing each recorded risk (Carter et al., 2014).

This method was implemented in order to determine which statements are recognized as risks by the majority of participants. Risk statements that are not popular, or mentioned by less than 50% of participants will be eliminated from the risk breakdown structure. The triangulation results were then recapitulated into a detailed risk structure table that became the outcome of this study.

Risk Agent and Risk Statement from Triangulation Analysis

The triangulation analysis from participant opinions generated 11 risk statements during online class implementation. These risk statements were obtained from the major recommendation of the four groups of participants, it is proposed by at least 50%, or two of the four groups of participants.

Each recorded risk statement has met the meta-language of risk statement where the agent and risk statement must be identified. The 11 risk statements obtained from data collection and triangulation analysis along with the agent causing the risk are described in table 1 below.

Table 1: Risk Agent and Risk Statement from Triangulation Analysis

Risk Code	Risk Category	Risk Agent	Risk Statement
I1	Internal Risk	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 Risk	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	Behavior that leads to violations of academic ethics such as cheating or plagiarism
T1	Technological Risk	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

The proposed risks then grouped into three main categories of the universal risk breakdown structure, namely internal or management risks, external risks, and technology risks (Hall & Hulett, 2002; Hillson, 2003). This risk categorization is useful for identifying the sources of risk in a structured manner, making it easier for decision makers to plan risk mitigation strategies. In addition, this categorization also shows areas of the organization that have a greater level of risk exposure than other areas, so it becomes a priority to be mitigated (Hillson, 2003; Holzmann & Spiegler, 2011). The results of risk identification in each category are described in more detail below.

Internal Risks

The list of risks categorized as internal risk includes risks that come from internal factors of the company, consumers, and stakeholders. The sub-categories of internal risk include risks originating from corporate culture, management, human resources, operational processes, corporate finance, and interactions with consumers.

Misinformation among online class stakeholders

The limitation of online lecture applications as communication media will hamper the flow of information between students, lecturers, management, and student parents. This risk is consistent with the finding which identified communication problems in the implementation of online lectures during the COVID-19 pandemic (Crawford et al., 2020). Interview results indicated that the majority of students mention miscommunication as a risk, with some student participants shared experiences related to wrong schedules, not doing assignments, or being late taking exams because information from lecturers was not conveyed properly. Some of the parent participants also felt that the material presented to students was unclear, especially on the subjects that required calculation. However, lecturer and management participants did not consider this issue as future risk, because they believed that gradually human would adapt to communicate online and the risk would decrease by itself. Management added that only a few people were affected by the miscommunication and most of the affected people were the same person. This means that the problem arises not from the system, but tends to the perception of the person receiving the information.

Tuition fee adjustment

Limited physical facilities used in online lectures led some participants to argued that tuition fees should be readjusted. Majority of student's parents complained about the economic conditions during the COVID-19 pandemic which made it difficult to cover tuition fees. Management participants also recognized the demand for lower tuition fees as a risk of transitioning physical to online learning methods. However, they also stated that this risk can be mitigated by subsidies and the allocation of tuition fees to expenses that support online classes. Student participants take another point of view regarding the transparency of fee spent by university. So that consumers are able to understand what for and how much money they will spend.

Student's decreasing trust in teaching quality

Majority of student and parent participants think that the quality of learning outcomes has decreased since moving to online class. Some of the participants argued that the method used by the lecturer for online class was ineffective, because it only moved the physical class method to the online platform. Lack of communication and feedback from lecturers to students also triggers the perception of decreasing learning quality. Lecturer participants also admitted that there was a decrease in the quality of the material presented, especially in materials that required calculation. This problem occurs because of the feature limitations of the online platform used to explain the subject and the ability of lecturers to adopt the platform's features. Management also considers that

reduced consumer confidence is a major risk. If this is not immediately mitigated, there is a concern that consumers will move to other universities that are already well-prepared to conduct online courses.

External Risks

External risk is a type of risk that occurs due to factors beyond the management's control (Bissonette, 2016; Hall & Hulett, 2002; Hillson, 2003). The sub-categories of external risk include geographic, demographic, cultural, and economic factors. The following is a list of external risks identified from participants:

Limited access and geographical barriers to access online class

Geographical differences between participants in online courses can cause several risks. The most commonly reported risk is unstable internet connections in areas with minimal internet infrastructure. The inequality of internet accessibility is also mentioned in another finding regarding online learning problems during COVID -19 crisis in Indonesia (Triwibowo, 2020). Majority of the lecturer participants considered this risk as understandable due to Indonesia's geographic situation and there should be relief policies published from class administrators until infrastructures and internet connections are evenly distributed in Indonesia. Some participants also mentioned the difference in time zones which sometimes make it difficult for students who live in different time zones to attend classes, especially in classes held at night. Even though in this study, time zone-related risks were not the majority opinion. Management and lecturers have also prepared mitigation strategies for this risk, one of which is by conducting classes asynchronously.

Learning environment is not conducive

Learning activities requires a conducive place. Classrooms able to accommodate this requirement because it is purposely designed for the benefit of the teaching and learning process. Online classes, which can be implemented anywhere, sometimes encounter obstacles from an unfavorable environment. Lecturer and student participants addressed risks such as being disturbed by family activities, neighbors, and the sound of passing vehicles that potentially interfere with online learning activities at home. One student participant revealed that she encountered family cultural values that interfere with online class activities, such as the duty for Indonesian girls to do household activities which sometimes has to be done during class session.

Behavior that leads to violations of academic ethics such as cheating or plagiarism

Limitation of lecturers or supervisors to observe student behavior has a potential to create a bigger gap for students to commit academic unethical actions in an online classroom environment. This is reinforced by the opportunity for students to access the internet and paste the answers from internet sources when examinations are conducted online. The lecturer participant argued that this could be a big risk of online lectures if we do not consider solutions to overcome it. Management participants and lecturers understand that there are behavioral and cultural changes to source and share information in virtual environments rather than face-to-face classes. Therefore, the style of discussion questions, assignments, and examinations in online classes should also change by allowing students to search for sources on the internet. However, students also must be triggered to make knowledge constructs from sources that have been accessed.

Technological Risks

Risks in the technology category are related to the use of both infrastructure and equipment technology in the project completion process. This risk can be influenced by various things, including the complexity of the use of technology and the suitability of the technology used with the project scope. Included in the technology risk sub-category are technology requirements, technology performance, and technology applications (Hall & Hulett, 2002; Hillson, 2003).

Internet connection instability

The lack of internet infrastructure in Indonesia potentially disrupts the process of online courses. Lecturers and management participants agreed that this would put online learning activities at risk, which would be very difficult to avoid unless the internet infrastructure in Indonesia has been improved. Several participants, both lecturers and students, also mentioned that the risk of blackouts that often occur in several regions also has the potential to disrupt the course of the online lecture process in the future. The risks related to infrastructure unpreparedness are also in line with the prior research which stated that similar problems have occurred in the implementation of online education in Indonesia (Triwibowo, 2020).

Intruders, data lost, manipulated, and stolen in online applications

The large amount of data uploaded to online platforms made the majority of participants feel that there would be a probability that the uploaded data could be accessed by external parties. Some lecturer participants felt that data storages in applications were less secure because they could be accessed or manipulated by other parties. Meanwhile, management participants addressed that security risks must exist but can be minimized, among others by using a more protected premium account. The majority of participants felt that the selected platform so far was quite safe because there were not many reports of security problems. However, the majority of participants still agreed that data security remains a risk for future online classes.

Non-optimal interactions in online classes

The limited features of online platforms make interactions in the online classroom environment may not run smoothly. It is predicted that this will create the risk of miscommunication or misperception between lecturers and students. Student participants also considered that the lecturers' presentations in online classes were more difficult to understand than through face-to-face classes. This risk is referred to as transactional distance, where there is miscommunication that occurs between teachers, students, and the content being taught because of the limited communication media used (Yilmaz, 2017). Majority of student participants and student parents expressed this issue as a risk for future online studies. However, some lecturer participants did not consider this a risk because gradually online class participants would adapt to interact using existing features.

Changes in teaching methods

The transition from traditional face-to-face to online classes requires lecturers to adapt to the online applications used. This may potentially change the teaching methods commonly used in face-to-face classes due to the limitations of online applications, especially in terms of interactions within the classroom community. On the other hand, the use of online methods also raises opportunities for students to access information sources more quickly and easily with the help of computers and the internet. So that there is the potential for assignments and discussions to be faster in online lectures. In asynchronous classes, the teaching method will be more one-way and flexible, where the material is prepared to be accessed by students in different time periods. The online classroom method is predicted to be shorter, inductive in nature, and more manifested in discussion for cases or related topics on the internet.

Online platform is not used effectively

Lack of proficiency for lecturers and students to use the features available in online learning applications can potentially pose a risk of ineffective use of online applications. Majority of participants agreed that the use of learning applications was still limited for transferring face-to-face lectures to online applications, but other features that could actually be used to support the effectiveness of online lectures were still minimally used by class facilitators. Majority of lecturer participants do not consider this as a long-term risk, as both lecturers and students will gradually adapt to the features in the application. Management participants also expressed similar opinions, because this risk has been previously identified and can be mitigated by management by providing training or personal guidance for lecturers regarding the use of online application features. Based on the generated risk breakdown structure, it can be seen that risk exposure from the technological aspect dominates the risk list for conducting online learning during COVID-19 crisis. It cannot be denied that technology support, both infrastructure readiness, application capabilities, and application user capabilities greatly affect the success or failure of implementing online lectures. The technology risk that most participants mentioned comes from the application of technology in the project (T3, T4, T5). However, most of the participants, especially those from the lecturers and management categories, argued that this risk could be minimized if the adaptation process to the features and environment of the online classroom improved. Meanwhile, risks related to technology requirements, such as limited infrastructure and internet connections (T1), was a crucial issue mentioned by the majority of participants. If the internet infrastructure in Indonesia is not ready enough to support the implementation of online learning properly and evenly, the risk of online learning process disruption will be very large and critical. This finding is in line with several previous studies which also mentioned technological aspects as an important factor for the success of online learning (Dohaney, de Róiste, Salmon, & Sutherland, 2020; Herliandry, Nurhasanah, Suban, & Heru, 2020).

The risk of conducting online class can also potentially come from poor communication and interaction between the stakeholders involved. Based on the detailed risk structure in Table 1, two potential risks related to communication can be seen, namely misinformation between stakeholders (I1) and class interactions that are not running optimally (T3). These two findings may be caused by the limited features of the application to communicate or the ability of the application's users to communicate using an online platform. These findings support the importance of handling the transactional distance factor or communication gap that occurs in virtual or online environments (Yilmaz, 2017). The communication gap was also mentioned as one of the problems in the application of online lectures during a pandemic by several prior researches (Cortez, 2020; Crawford et al., 2020). As a mitigation strategy, it is important for educational institutions stakeholders to understand the communication features in the application, as well as mastering appropriate virtual communication techniques. This process needs time to adapt because it is indeed not easy for participants to transform verbal communication activities into written media or to speak in front of screens and cameras, while previously used to speaking in front of the class.

Conclusions

The output of this research has contributed to identify the risks of online learning projects based on the experiences of participants who conducted online classes during the COVID-19 pandemic. The proposed risk breakdown structure may become a basis for stakeholders to map potential risk areas as well as a basis for formulating more appropriate mitigation strategies. Based on the analysis conducted, the biggest risks come from the technology area, where the availability of infrastructure, the ability of online application features, and the capabilities of online application users are considered as important factors. However, it should be noted that the risk breakdown structure proposed in this study has several limitations.

The first limitation is that participants in this study come from only one higher education institution. Other institutions may have different problems and experiences with studying online, so the risks also can be different. The second limitation is that the risk structure format used for this study still adopted a universal risk breakdown structure that focuses only on three areas, namely internal, external and technological factors. This format was selected because of the absence of a risk breakdown structure specifically designed for online class projects. While a universal risk breakdown structure can be used for any type of project, the results are not as accurate as a more project-specific risk breakdown structure.

Given several limitations of this study, the results of this study have a great opportunity to be further developed in further research, such as analyzing a wider and more diverse range of participants. Other developments can also be done with risk assessment and mitigation analysis from the detailed risk structure that has been proposed in this study. The risk breakdown structure developed in this study can also serve as the basis for creating a specific risk structure that can be used to analyze online classroom projects and virtual lessons for future researches.

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