

SOEN 6841 - Software Project Management

Risk Assessment and Mitigation

Project 20 - Intelligent Tutoring System

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Risk Assessment and Mitigation

Objective: Conduct a risk assessment, identifying potential challenges and uncertainties associated with the project. Develop a risk mitigation plan.

Content:

Risk Identification:

IntelliTutor is an Intelligent Tutoring System that aims at providing educational services to students studying in classes ranged from 1st to 12th standard. It aims to revolutionize the learning experience of the students by addressing some of the issues like isolation from the real world and the language barrier. IntelliTutor has various advantages over the already existing Intelligent Tutoring System in the market like more powerful personalized training contents and giving students feedback in real-time. But it still comes with a set of risks and challenges. In this document, we will discuss the various types of risks associated with IntelliTutor, which includes technical, operational, financial, market, legal and strategic risks. It becomes important to understand these risks for successful delivery of the software. Below mentioned are some of the risks associated with IntelliTutor:

1. Technical Risks:

- a) *Technology Obsolescence:* Technology is evolving rapidly and there is a possibility that the technology we are using to develop IntelliTutor may become outdated. This could lead to compatibility issues with new devices which can affect the usability of the software among students. Since, the new devices wouldn't support the IntelliTutor, the number of user may fall by a great number which could make the software disappear slowly.
- b) *Integration Issues:* If we decide to integrate IntelliTutor to school boards, there is a probability that there may be some issues while integrating the software in the already existing school platforms. This could lead to operational disruptions.

2. Resource Risks:

Resource risks refers to the potential and vital team members leaving the project in middle of it. It may lead to delay in the delivery of the project, or it can harm the quality of the product to be delivered. It is important to have a proper backup for every resource in the team so that it does not affect the product delivery in any possible way.

3. Operational Risks:

- a) *Performance Issues:* There is a high chance that IntelliTutor would not perform as per user expectation which may lead to user dissatisfaction. There may be a case where the software is very slow or it has some glitches or inaccuracies in the content. Just imagine, if a student has searched for some topic to study and it displays of content some other topic. This is a huge mistake which can lead to losing trust of the customers.

- b) *Data Security*: IntelliTutor deals with a huge amount of data. There is a risk of data breach and privacy violation. This could damage the reputation of the company losing a huge amount of users.

4. Financial Risks:

- a) *Cost Overruns*: During the project planning, the budget decided may not be the exact amount and just an estimation based on assumptions. While doing software development, maintenance, testing and marketing, IntelliTutor may exceed the budgeted amount. This can impact the viability of the project.
- b) *Revenue Generation*: When IntelliTutor is released in the market, there is a risk that it may not generate sufficient revenue to add more features in the future or for its maintenance. This could happen because some of the users didn't find it that useful for them, or because of the other competition in the market. There may be a case students find it subscription costly.

5. Market Risks:

- a) *Competitive Pressure*: The educational technology market is highly in demand and highly competitive. There are many competitions of IntelliTutor like Khan Academy, DreamBox, Duolingo etc. which offers similar services as IntelliTutor. This can impact the number of users who will opt for IntelliTutor which in turn impacts the overall profitability of the software. When there exists similar products in the market, user compare the services provided by Intelligent Tutoring Systems, the subscription each one of them is offering and the quality of the content provided by them.
- b) *Changing market needs*: Educational trends may change with time and new methodologies and technologies may immerge. If IntelliTutor fails to swiftly adapt to these trends it can become outdated and less effective compared to the newer and more effective solutions. This could lead to decrease in the number of users, impacting the market share. Therefore, IntelliTutor must prioritize ongoing research and remain a valuable tool in the field of education.

6. Strategic Risks:

- a) *Strategic Misalignment*: If IntelliTutor's objectives does not align with educational institutions or school boards, it may lead to wastage of resources who helped in developing this software product as well as the time given to develop the product. This can lead to the delayed software delivery. Moreover, strategic misalignment leads to confusion or lack of direction while developing and deploying IntelliTutor. This will result in a product that doesn't meet user expectations making it a complete failure. This can result to wastage of resources, money and time.
- b) *Lack of Adoption*: Lack of Adoption comes from insufficient marketing efforts. The popularity of the software also depends on its marketing. If the students are not aware of any such software in the existence, how will they use it. Thus, it crucial to have top-notch marketing strategy and reach as many target audience as possible to increase the number of users.

7. Legal and Compliance Risks:

- a) *Regulatory Compliance*: IntelliTutor must follow various educational regulations, data protection laws (e.g., GDPR, COPPA), and other legal obligations. These regulations govern how student data is collected, stored, and used, as well as whether accessibility and inclusivity standards are met. Failure to comply could result in significant fines, legal action, and reputational harm, as stakeholders may lose faith in the platform's adherence to legal and ethical standards.
- b) *Intellectual Property Rights*: IntelliTutor may inadvertently infringe on intellectual property rights by using unauthorized content or violating patents. This could result in costly legal disputes, financial penalties, and limitations on the use of specific technologies or materials. To mitigate this risk, IntelliTutor must conduct extensive research to ensure that all content used is legally licensed or falls under fair use provisions. It should also consider applying for patents to protect its own intellectual property.

Prioritization of risks based on severity and likelihood

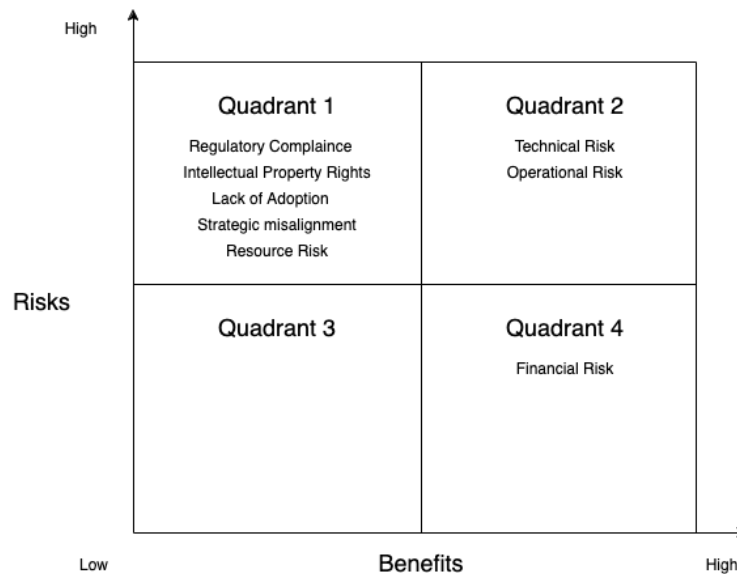
To assess the likelihood of occurrence and impact on the IntelliTutor, we use the scale of 1-4 that is, 1-Low, 2-Moderate, 3-Significant and 4-High. Below is the evaluation of risks:

1. Regulatory compliance R_1 :
 - a. Likelihood: High (4) – This is due to very strict laws in educational sector.
 - b. Impact: High (4) – You may need to change lot of things in order to comply to the existing laws which can affect the features of the product and usability.
 - c. Risk Exposure = $4*4 = 16$
2. Intellectual Property Rights R_2 :
 - a. Likelihood: Significant (3) -
 - b. Impact: Significant (3) – Legal disputes may delay the delivery of the product in the market. It can also lead to financial penalties and legal costs.
 - c. Risk Exposure = $3*3 = 9$
3. Strategic Misalignments R_3 :
 - a. Likelihood: Significant (3) – depends on the alignment with educational institutes
 - b. Impact – Significant (3) – it may require realignment in the project objectives which may affect the long-term business goal.
 - c. Risk Exposure = $4*3 = 12$
4. Lack of Adoption R_4 :
 - a. Likelihood: High(4) – The educational sector is highly resilient to changes
 - b. Impact – Significant (3) – it may need to change its requirements based on the current trend. Low adoption of the product can lead to low revenue.
 - c. Risk Exposure = $3*3 = 9$
5. Technical Risks R_5 :
 - a. Likelihood: Significant (3) – depends on the technology used to develop the product

- b. Impact: Moderate (2) – The software may require few updates but not major changes, but it can affect the reputation if not handled on time
 - c. Risk exposure = $3 \times 2 = 6$
- 6. Operational Risks R_6 :
 - a. Likelihood: Significant (3)
 - b. Impact: Moderate (2) – It may require to make some changes in the software.
 - c. Risk Exposure = $3 \times 2 = 6$
- 7. Financial Risks R_7 :
 - a. Likelihood: Moderate (2) – depends on the financial management of the company
 - b. Impact: Moderate (2) – It may affect the budgeting, pricing strategy and financial sustainability.
 - c. Risk Exposure = $2 \times 2 = 4$
- 8. Resource Risks R_8 :
 - a. Likelihood: Moderate (2) – depends on the team member leaving the project
 - b. Impact: High (4) – it can lead to late delivery of the product or it can also affect the quality of the product
 - c. Risk Exposure = $2 \times 4 = 8$

Impact -----^	High		R_8		R_1
	Significant			R_2, R_4	R_3
	Moderate		R_7	R_5, R_6	
	Low				
		Low	Moderate	Significant	High
Likelihood of occurrence ----->					

Based on above diagram, R_8 (Resource Risks), R_1 (Regulatory Compliance) and R_3 (Strategic Risks) should be given priority as this risk can have high impact on the project.



The above diagram shows the tradeoff between risks and benefits.

- Quadrant 1 contains risks which are high and gives low benefit
They are considered high risk because they can significantly affect IntelliTutor's operations and reputation. Mitigating this risk does not benefit IntelliTutor much because it will not substantially lead to increase in their revenue or users.
- Quadrant 2 we have high risk and high benefit,
They are considered a high risk as they can disrupt the whole software infrastructure. The benefit of mitigating this is high as it leads to improved performance of the IntelliTutor and user experience.
- Quadrant 3 we have low risks and low benefit
- Quadrant 4 we have low risk and high benefit.
Financial Risks have a low probability but managing this risk could improve the profitability of IntelliTutor.

Strategies to minimize the impact of identified risks:

To minimize the impact of the identified risks for IntelliTutor, several strategies can be implemented. Below mentioned are some strategies to mitigate the risks mentioned above:

1. Regulatory Compliance:

To mitigate this risk, you can regularly review and update policies to ensure compliance with school boards. You should also be informed about the changes in the educational laws that may impact with IntelliTutor's compliance. Also, we should be ready for the worst-case scenario where this risk could happen. So, for this develop an emergency team to handle the situation. Have a legal counsel in this situation who can help you. Train all the resources with the educational laws and data protection laws. Conduct regular audits to ensure compliance with educational regulations and document all the audits for reference in case of issue.

2. Intellectual Property Rights:

Maintain the record of all IP assets owned by the company and regularly audit the usage of IP to ensure compliance with licensing and detect any potential threat.

3. Lack of Adoption:

Take feedbacks from the students using IntelliTutor to understand their concerns. Develop strong marketing plan to raise the awareness among the students describing the benefits of IntelliTutor and how it can help then enhance their knowledge. Also try to answer question to reduce the misconception about the software. Adopt to some marketing strategies like giving free trails or discounts. Adjust the marketing based on the feedback given by the students and market research team.

4. Strategic Misalignment:

To minimize this risk, engage closely with the stakeholders to understand their goal and ensure the alignment of the software with IntelliTutor's objective. The team should be ready for any change in the objective based on the feedback given by the students. Ensure that there a clear communication with the stakeholders regarding the objectives to avoid delay in software delivery. To handle this, add risk buffers so that the team can utilize this buffer time in case of change in objectives.

5. Technical Risks:

Technical risks can be mitigated in several ways. First, we can have a team of technical experts who can address the problem quickly if they arise. Keep a close track of the performance of IntelliTutor so that you can detect any threat beforehand. A temporary workaround should be in place to minimize the downtime for the users. Maintenance of the software should be regularly. The team should be trained to troubleshoot technical issues effectively.

6. Operational Risks:

Implement a process to ensure the efficiency and consistency in the services provided by IntelliTutor. Implement data security measures to protect IntelliTutor's data. Conduct regular reviews to mitigate potential operational risk.

7. Financial Risk:

Ensure to adhere to financial plans to prevent overspending. To reduce the impact of budget risks, the budget allowance should include reserve funds. So, when such risks occur, allowances can be taken up from the reserves to avoid the project from failing. Regularly review financial statements to identify potential financial risks.

8. Resource Risk:

Project team members leaving in the middle of the project is one of the biggest risks any project may face. This risk can be mitigated by implementing knowledge management system. It will store the information gained team members during the project. So, when a

team member leaves work done by them stays in the system. The team in this way will never lose the work done by them. Prioritize the tasks based on resource availability to ensure the important tasks are done first.

Contingency plans for addressing unforeseen challenges

Contingency planning is an important aspect of risk assessment that helps for the preparation when unexpected issues. By identifying potential risks, impact it can have on a project and developing strategies IntelliTutor can handle unexpected events without losing its functionality and user satisfaction. Below are mentioned some steps to address unforeseen challenges.

1. **Identifying Potential risks:** Start by identifying potential risks that IntelliTutor may face like technical risks, time risks, resource risks, quality risks.
2. **Assess Impact:** After identifying different risks, evaluate the impact of these risks on IntelliTutor's operations. Calculate the probability of occurrence for each risk and their impact.
3. **Monitor and review:** Continuously monitor the software for signs of emerging risks and regularly review the effectiveness of the contingency plans.
4. **Testing:** Conduct regular testing and exercise to stimulate potential risks and identify areas for improvement and make changes as needed.
5. **Maintain flexibility:** Maintain flexibility to accommodate changing circumstances and emerging risks. Be prepared to adjust strategies and resources as needed to meet new challenges.