

Root Cause Analysis #1

The clients requested that “The ‘Student’ group should be separated into two subtypes, ‘Club Member’ and ‘Club Leader’. The club leader(s) should be responsible for booking resources, and the club member(s) should be able to view resources currently booked.” After further discussion with the client about what was lacking from the original system that prompted this request, it was determined that the clients had expected a system where one type of user would not be able to access certain administrative features, such as booking and canceling resources, but that any user could do this with the proposed system. This started the design team’s root cause analysis of the problem with the fact that appropriate access control had not been implemented in the proposed design. The rest of the analysis was completed as a series of questions and answers seen below.

1. Question: What caused the lack of appropriate access control?
Answer: Missing permissions that would change who could access which features
2. Question: Why were we missing these permissions?
Answer: The design team did not consider these two distinct types of users
3. Question: Why were these two types of users not considered?
Answer: Assumed all club members had the same authority when it came to resources
4. Question: Why did the design team assume that there were not different levels of authority?
Answer: Requirements Engineers didn’t clarify with the clients how club structures and positions affect the current manual resource booking process
5. Question: Why didn’t wasn’t this clarified?
Answer: Management didn’t have a clear understanding of the expectations

From this line of reasoning, it was found that further elicitation for requirements engineering should have taken place.

Root Cause Analysis #2

Secondly, the clients requested that “there should be a method for students to register their position in a club within the system. Additionally, they should have the option to register with multiple clubs”. This led the design team to the question seen below.

1. Why do we not have a feature for registering for a specific position within a club? -
Because we assumed that all club members have the same authority and should have the same permissions

From here, further analysis followed the same path of questioning as the analysis for the first change request starting from question 2.

In summary, both change requests relate to a lack of distinct roles for users who are club members who do not have the authority to book resources and users who are club leaders who do have this authority. This misunderstanding of the current club structures and manual resource booking system that should be carried over to the new solution could have been avoided by asking more specific questions about the clients expectations, and by reiterating the design team's understanding of them to ensure consistency before continuing with the design.

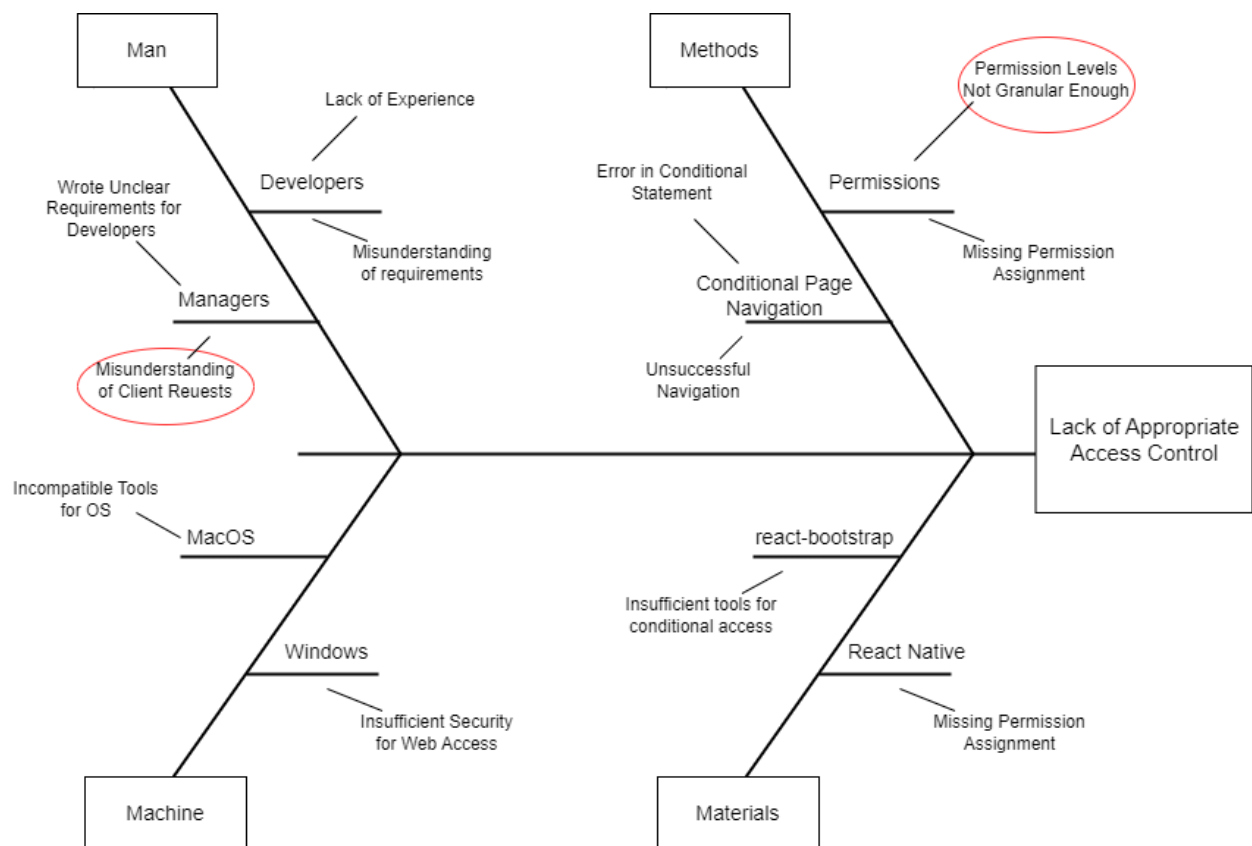


Figure 1 - Lack of Appropriate Access Control Diagram

GQM #1

Conceptual Level

Goal: To provide appropriate access control to the web application.

Operational Level

The following questions were the cause and effect questions identified in the Root Cause analysis.

1. **Question:** What caused the lack of appropriate access control?
2. **Question:** Why were we missing these permissions?
3. **Question:** Why were these two types of users not considered?
4. **Question:** Why did the design team assume that there were not different levels of authority?
5. **Question:** Why didn't wasn't this clarified?

Quantitative Level

The following are the corresponding metrics that quantify the questions above.

1. Netlink ID
2. Netlink ID associated User roles
3. User roles (ie Club leader, club member)
4. User roles (ie Club leader, club member)
5. User roles (ie Club leader, club member)

GQM #2

Conceptual Level

Goal: To provide appropriate registration for access control to the web application.

Operational Level

The following questions were the cause and effect questions identified in the Root Cause analysis.

1. **Question:** What caused the lack of appropriate registration for access control?
2. **Question:** Why were we missing this registration process?
3. **Question:** Why were these different types of users not considered?
4. **Question:** Why did the design team assume that there were not different levels of authority?
5. **Question:** Why didn't wasn't this clarified?

Quantitative Level

The following are the corresponding metrics that quantify the questions above.

1. Netlink ID
2. Netlink ID associated User roles
3. User roles (ie Club leader, club member)
4. User roles (ie Club leader, club member)
5. User roles (ie Club leader, club member)

Root Cause Analysis #3

The following is the root cause analysis to discuss the clients request to determine who can be a club representative. In answering this question, there are a number of factors that must be considered before implementing a solution.

6. **Question:** Why do we need to determine club representatives?
Answer: To create accountability for the resources reserved on the site.
7. **Question:** Why were we missing this requirement?
Answer: The design team did not consider the assigning of these user roles.
8. **Question:** Why was assigning these roles not considered?
Answer: Assumed all club members would be verified before they gained access to our system.

9. Question: Why did the design team assume that these members would be previously verified?

Answer: Requirements Engineers didn't clarify with the clients how club members would be verified to access the system.

10. Question: Why didn't wasn't this clarified?

Answer: Management didn't have a clear understanding of the expectations

As a result, our initial design did not include any form of verification. A new understanding of how to solve this verification issue should be addressed in the new development of this web application. The following image is a diagram referencing this analysis.

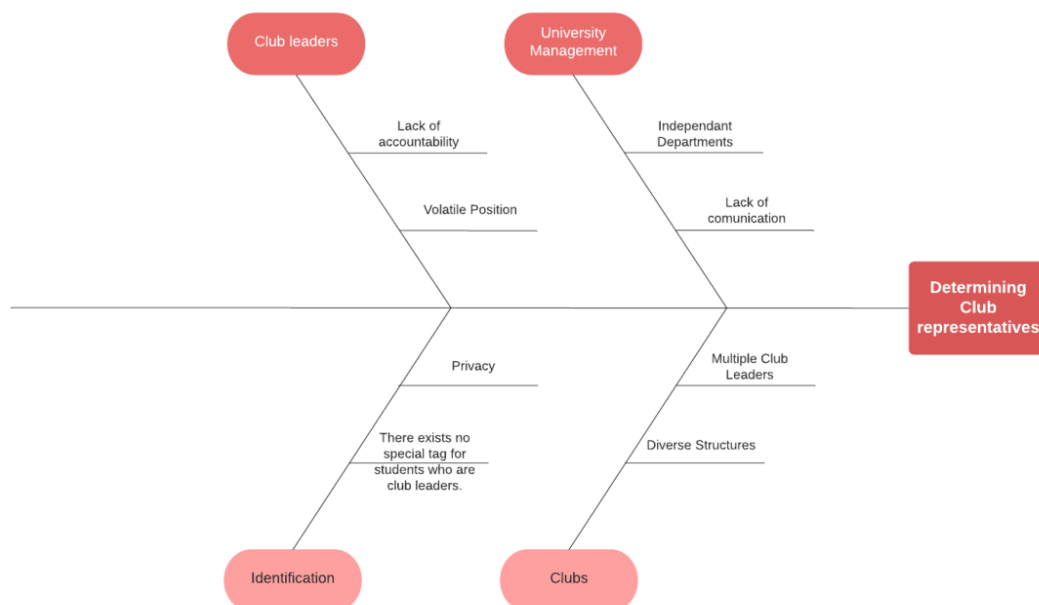


Figure 2 - Determining Club Representatives Diagram

GQM #3

The following section will discuss the GQM analysis for addressing how club representatives can be verified on our system.

Conceptual Level

Goal: To determine how and when users can be club representatives on our web application.

Operational Level

The following questions were the cause and effect questions identified in the Root Cause analysis.

1. **Question:** Why do we need to determine club representatives?
2. **Question:** Why were we missing this requirement?
3. **Question:** Why was assigning these roles not considered.
4. **Question:** Why did the design team assume that these members would be previously verified?
5. **Question:** Why didn't wasn't this clarified?

Quantitative Level

The following are the corresponding metrics that quantify the questions above.

1. User and resource security
2. Improper communication
3. Improper communication
4. Netlink id roles
5. Netlink id roles

Root Cause Analysis #4

The following is the root cause analysis to discuss the clients request to determine club membership to individual students at UVIC.

1. Question: Why do we need to determine club membership for students at UVIC?
Answer: To create accountability for the resources reserved on the site and to assign proper user roles to students.
2. Question: Why were we missing this requirement?
Answer: The design team did not consider the assigning of these user roles.
3. Question: Why was assigning these roles not considered?
Answer: The design team assumed that users would only have one user role, so assigning a club membership role was not considered.

4. Question: Why did the design team assume that a club membership role was not necessary?
Answer: Requirements Engineers didn't clarify with the clients if users required different roles to access different resources on the site.
5. Question: Why didn't wasn't this clarified?
Answer: Management didn't have a clear understanding of the expectations

As a result, our initial design did not include a user role of 'club member' as we assumed all users would have the same role. As a result, the new design of our application should include 'club member' as a different user role. The following image is a diagram referencing this analysis.

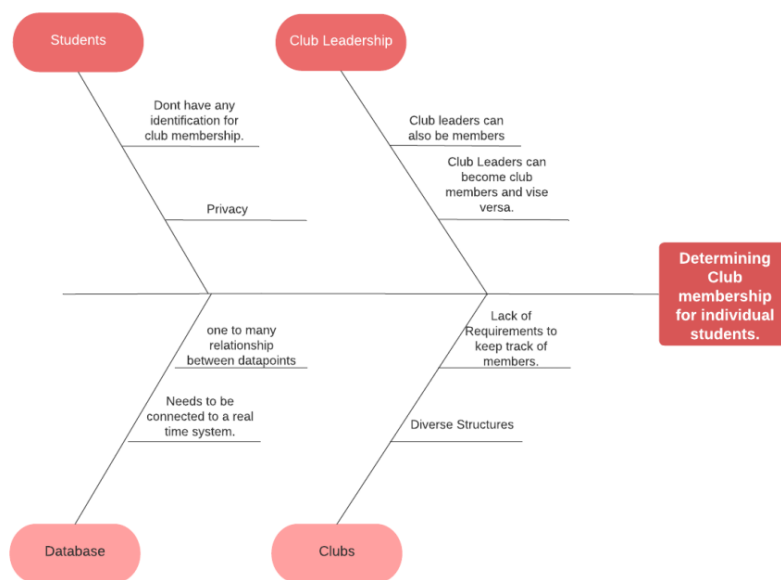


Figure 3 - Determining Club Membership for Individual Students Diagram

GQM #4

The following section will discuss the GQM analysis for addressing how club representatives can be verified on our system.

Conceptual Level

Goal: To determine club membership for individual students on our web application.

Operational Level

The following questions were the cause and effect questions identified in the Root Cause analysis.

1. **Question:** Why were we missing this requirement?
2. **Question:** Why was assigning these roles not considered?
3. **Question:** Why was a role hierarchy not considered?
4. **Question:** Why did the design team assume that a club membership role was not necessary?
5. **Question:** Why didn't wasn't this clarified?

Quantitative Level

The following are the corresponding metrics that quantify the questions above.

1. User and resource security
2. Improper communication
3. Netlink id roles (ie club member, club leader)
4. Netlink id roles
5. Refine requirement

Root Cause Analysis #5

The clients requested that the application needs to support students that are part of multiple clubs. There are many clubs at the university of Victoria, and it is very possible that a student may be part of more than one.

The analysis was completed as a set of questions and answers as seen below.

1. **Question:** Why do we need to support students being part of multiple clubs?
Answer: There are many clubs at the University of Victoria, and it is possible that a student may be part of more than one club.
2. **Question:** Why will they need to tell which resource is for which club?
Answer: To prevent confusion and mistakes in bookings.

3. **Question:** Why did the design team not anticipate students being in more than one club?

Answer: Because they assumed that most students are incredibly busy and do not have time to be a part of multiple clubs.

4. **Question:** Why did the design team assume this?

Answer: The requirement documents did not include this requirement specifically. Also, our design team is made up of primarily engineering students, and we forgot that less time intensive programs exist that would allow for multiple extracurriculars.

5. **Question:** Why was the team not aware of other the needs of students in other faculties?

Answer: The team was formed in a classroom setting, in a class specifically for SENG students, and the client did not include this requirement specifically.

As a result, our initial design did not include functionality or UI to support student users that belong to more than one club. As a result, the new design of our application should include a UI that specifies which club the resource is booked for, and allow users to choose what club they are booking a resource for in the process. The following image is a diagram referencing this analysis.

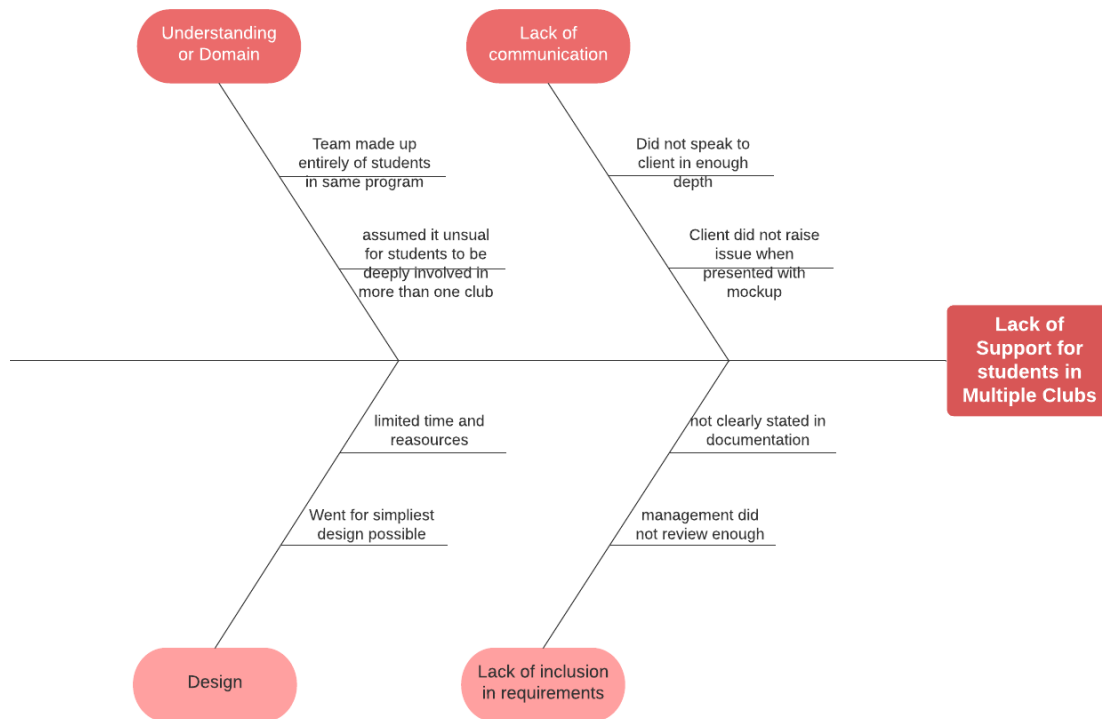


Figure 4 - Determining Cause for lack of Support for Students in Multiple Clubs Diagram

GQM #5

The following section will discuss the GQM analysis for why the system lacks support for students in multiple clubs.

Conceptual Level

Goal: To allow students to manage resources for multiple clubs on our web application with a single account).

Operational Level

The following questions were the cause and effect questions identified in the Root Cause analysis.

1. **Question:** Why were we missing this requirement?

2. **Question:** Why was support for students multiple clubs not considered?
3. **Question:** Why was assigning these roles not considered?
4. **Question:** Why did the design team assume that support for multiple clubs was not necessary?
5. **Question:** Why didn't wasn't this clarified?

Quantitative Level

The following are the corresponding metrics that quantify the questions above.

1. Improper communication: notes should be taken during meetings
2. Improper communication/lack of requirements
3. Improper communication/lack of requirements
4. Lack of domain knowledge
5. Refine requirement