CSP 587 - Software Quality Management

Homework #3

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1. **Make sure no one / nothing bad gets onto a commercial flight**
   a. **How will flow be impeded to support adequate inspection?**
      The security checkpoints which contain the screening systems like X-rays, metal detectors and other screening systems they are purposely designed to slow down the movement of passengers so that they get sufficient time for thorough screening. These checkpoints slow down the movement to inspect each and every passenger for potential threats which makes it difficult for any dangerous person or anything dangerous to board the flight.
   b. **What automated tools can be used to facilitate achieving adequate inspection while maximizing flow?**
      Automated tools like Advanced Scanners, facial recognition and the explosive detectors can basically identify the potential threats quickly. Automation reduces the need for manual inspection which helps the security work more efficiently. It saves the time by identifying the risks more accurately and also minimizes the delays.
   c. **What metrics can be collected/analyzed for ensuring that progress is impeded by just the right amount?, and how can they be collected/analyzed automatically?**
      With the help of average screening times and keeping the track of items flagged during the screenings and the detection rates we can find the efficiency and thoroughness of the screenings. This data helps the security authorities make certain adjustments which can help improve the flow without compromising on safety.
   d. **What are the drivers of cost?**
      The drivers of cost include various factors like purchasing, maintaining and updating the security screening equipment. Also, the costs required to train the security staff to make use of the equipment properly and efficiently. The delays caused in the screening process also adds to passenger time and require more staff which incurs more cost so we need to make sure the equipment is used efficiently.
   e. **How can the inspectors prove that the checkpoint is worth it (i.e., benefit > cost)?**

The inspectors can show that the checkpoint is worth when they can show a reduction in the number of incidents or an increase in threats avoided at checkpoints. Then they can prove the value of checkpoints. When it is proved that the checkpoint has prevented significant number of potential risks it justifies the costs incurred in the security measures and it helps us build the trust of passenger.

2. Make sure only authorized users gain access to an application

a. How will flow be impeded to support adequate inspection?

With the help of authentication tools, we can develop an access control system like passwords, Two-factor authentication etc,. The process of authentication might delay the access slightly but they are very important in order to make sure that only the authorized users get the access to the application. These small delays help the app protect its sensitive information.

b. What automated tools can be used to facilitate achieving adequate inspection while maximizing flow?

Automated tools like SSO, MFA and other tools can help the application keep the security tight without compromising on safety of the users. These automated tools which are intelligent make adjustments based on the user's context which makes access smoother for frequent and trusted users.

c. What metrics can be collected/analyzed for ensuring that progress is impeded by just the right amount?, and how can they be collected/analyzed automatically?

We can collect metrics like keeping track of successful and failed login attempts and times. With this data we can make adjustments that keep the flow smooth for users while maintaining tight security.

d. What are the drivers of cost?

Here, the drivers of cost would be the development of authentication tools and maintaining them with regular updates. Also, costs would incur in solving the issues faced in managing the security.

e. How can the inspectors prove that the checkpoint is worth it (i.e., benefit > cost)?

Inspectors can prove that checkpoint is worth it in this case by blocking unauthorized attempts and reduced security breaches to the application which can demonstrate that secure access control mechanisms can help the application protect itself from security breaches and gain the trust of the users.

3. Make sure the software development organization is improving

a. How will flow be impeded to support adequate inspection?

Having regular code reviews, retrospectives and proper testing make the process slow but these things make sure that the software is of high quality and detect the

bugs at an early stage. Slowing down to make sure that the software is working as it is intended to so is always a step towards success.

b. What automated tools can be used to facilitate achieving adequate inspection while maximizing flow?

In this situation, automated systems like Continuous Integration and tools which review the code automatically set the quality checks without the need to manually set them which helps us reduce the time consumed. These tools help the teams to address the problems quickly and efficiently without consuming more time.

c. What metrics can be collected/analyzed for ensuring that progress is impeded by just the right amount?, and how can they be collected/analyzed automatically?

Calculating defect rates, velocity of the team and the scores of code quality help us track the team's skills and how productivity are evolving. With the review of these metrics constantly we can ensure that the team benefits from inspections without unnecessary delays by improving speed and the quality of the code.

d. What are the drivers of cost?

In this situation, costs include investing in CI systems and code review tools and training for the code developers to enhance their skills. Also, here the time spent on quality reviews and resolving the issues can incur the costs especially in case of bigger projects.

e. How can the inspectors prove that the checkpoint is worth it (i.e., benefit > cost)?

By reducing the number of bugs after the production and reducing the time needed for rework of the code, increasing the customer satisfaction by delivering high quality and reliable application then the cost is worth it.

4. Make sure a prototype application is acceptable to the users

a. How will flow be impeded to support adequate inspection?

With the help of usability testing and conducting frequent user feedback sessions will make the process delayed during the prototyping but it will help us ensure that the prototype aligns with the requirements of the customer. These delays can help us avoid reworks which can cost more at a later stage.

b. What automated tools can be used to facilitate achieving adequate inspection while maximizing flow?

Automated tools like behaviour tracking, usability testing and tools like heatmaps help us gather the user information quickly which will speed the feedback. Identifying the areas where users struggle more automatically can help designers make the changes.

c. **What metrics can be collected/analyzed for ensuring that progress is impeded by just the right amount?, and how can they be collected/analyzed automatically?**

   Here, we can collect statistics like task completion rates, user satisfaction scores and error rates which will show whether the prototype is useful or changes are needed in particular areas. By tracking these metrics, the development can assess whether the design meets the users needs and refine accordingly.

d. **What are the drivers of cost?**

   Drivers of cost include investing in tools for usability tools, user interviews and collecting feedback from the users and making the adjustments based on the feedback. Making adjustments based on feedback is time consuming but it is necessary to meet the users needs.

e. **How can the inspectors prove that the checkpoint is worth it (i.e., benefit > cost)?**

   Here, inspectors can prove that the checkpoint is worth by providing high user satisfaction and fewer post production launch fixes, which will prove that the value of these early usability checks. When the product performs well right from the beginning the investment in feedback pays off by reducing future rework and support.

5. Make sure an application meets requirements

a. **How will flow be impeded to support adequate inspection?**

   Stopping the development for a certain time to conduct tests might delay the progress but it helps us ensure that the application meets the specifications before moving forward to the next step. By reviewing the requirements at an early stage, it will avoid the rework in future

b. **What automated tools can be used to facilitate achieving adequate inspection while maximizing flow?**

   Tools like Requirements management tools, automated testing frameworks and traceability matrices help reduce the manual efforts which are needed to check whether the requirements are met. These automation tools make easier to ensure that requirements are consistently applied across the project.

c. **What metrics can be collected/analyzed for ensuring that progress is impeded by just the right amount?, and how can they be collected/analyzed automatically?**

   The metrics which we can collect here are defect rates, test coverage and alignment with requirements helps us by showing whether the application is on track. These metrics will allow the teams to catch the gaps at an early stage and ensure thorough coverage without large delays.

d. **What are the drivers of cost?**

In this situation, purchasing and maintaining the testing tools and conducting requirement reviews and doing rework if requirements change. These are the drivers of the cost which will help us prevent costly fixes at a later stage.

e. How can the inspectors prove that the checkpoint is worth it (i.e., benefit > cost)?

Better alignment and lesser code bugs with the user needs help us prove that the requirements checks save money by avoiding rework. When inspection leads to a smooth launch the initial investment is more than justified.

6. Make sure infected persons are prevented from entering a lecture hall

a. How will flow be impeded to support adequate inspection?

Placing temperature checks and taking frequent surveys in an infected areas for symptoms which might slow down the entry but it will help us keep the shared spaces safe. These health checks reduce the risk of spreading infections within close-contact setting.

b. What automated tools can be used to facilitate achieving adequate inspection while maximizing flow?

Automated tools like health tracking apps and contactless thermometers can speed up the screening process which allows faster entry while still identifying potential risks. These tools make it easier to flag and track cases without causing longer delays.

c. What metrics can be collected/analyzed for ensuring that progress is impeded by just the right amount?, and how can they be collected/analyzed automatically?

Metrics like post-screening, screening times and flagged cases show how efficient and effective the screening process is. Reviewing regularly these metrics can ensure that safety measures are effective without making and entry inconvenient.

d. What are the drivers of cost?

In this situation, the cost drivers are screening equipment, personnel for health checks, and delays caused by screening. Balancing quick entry with the help of thorough screening is key to managing these expenses.

e. How can the inspectors prove that the checkpoint is worth it (i.e., benefit > cost)?

Inspectors can prove that screening prevents outbreaks and keeps people healthy and also it shows that the benefits far outweigh the screening costs. Infections reduced means safer campuses which makes health measures an essential investment.