Week 8: Monitoring System Performance

Overview

Week 8 is the last week where there are materials for you to go through. It covers the last step in the system development life cycle, with a focus on using **key performance indicators** for monitoring system performance.

Learning outcomes

Going through the materials for week 8 will contribute to your achieving the following learning outcomes:

- LO5: **Understand the purpose of and approaches to measuring system performance**
- LO10: **Define and operationalise indicators of system performance**

Materials and activities

8.1 Key Performance Indicators (KPIs)
Once a system has been deployed and is in use, you need to monitor whether it is meeting its objectives. This activity introduces you to **key performance indicators (KPIs)** as a way to help you **define your system's objectives** and **measure the progress towards achieving them**.

8.2 Formulating KPIs - exercise
Complete this exercise to start thinking about the type of KPIs you could include in the implementation plan for your assignment. Ask for feedback from your colleagues and the tutors by posting your suggestions on the forum.

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KPI domains

KPIs are **quantifiable expressions** of what you want to achieve with the system and by when. For **IT systems in general**, you can roughly distinguish the following KPI domains:

- **Technology** – includes aspects of the **IT infrastructure and equipment**. KPIs in this domain often focus on **IT utilisation**, and are easy to measure objectively. E.g. average network response time, or % of central storage capacity used.
- **Processes** – relates to the **functioning of (critical) IT processes**. KPIs in this domain can

be either **objective** (e.g. average time required to handle a user query or complaint) or **subjective** (e.g. user satisfaction with help desk support).

- **Service** – covers an **end-to-end view on system performance** (e.g. overall user satisfaction with the system). KPIs in this domain are often more difficult to measure, mainly because they tend to (at least partly) depend on organisational processes and/or the behaviour of users, such as the average time required to complete a task supported by the system.

Operationalising a KPI

In order for a KPI to be a useful tool to measure progress towards achieving a system's objective, you need to operationalise it. This entails the following steps:

- **Step 1: verbally express the KPI in a SMART way**
  Verbally express what you are measuring (i.e. the measure), while including a target that can serve as a benchmark for deciding whether the system has achieved its objective. Make sure this verbal expression is **SMART**: **Specific, Measurable, Actionable, Realistic and Time-bound**. In addition, you may consider to extend the KPI by including a statement on its purpose to explain why the KPI is important. Examples of SMART KPIs are:

  1. Decrease [A] the maximum total annual system down-time (planned and unplanned) [S] to 120 minutes [M] in 2019 [T] to increase system reliability [purpose].
  2. Increase [A] the percentage of user complaints satisfactorily addressed within 48 hours after reporting [S] by 25% [M] in the next 6 months [T] to improve overall user satisfaction [purpose].

  In both cases, the statement as a whole should be realistic [R] and feasible, which is primarily determined by a combination of the:

  - **Baseline**; this was the total annual down-time in 2018 for the above example 1, and the percentage of user complaints satisfactorily addressed within 48 hours in the previous 6 months for example 2;
  - **Target**; decrease to 120 minutes for example 1 and an increase by 25% for example 2;
  - **Time frame**; in 2019 and in the next 6 months for examples 1 and 2, respectively.

- **Step 2: specify the owner**
  Specify the owner of the KPI: who is **responsible for monitoring progress and achieving the objective/target**? For example 1 above, this may be the lead of the system management team, while for example 2 this could be the IT help desk manager.

- **Step 3: identify the data source** Identify the source that will provide you with the data for measuring your KPI. The source can be **data collected routinely** (such as system logs for

  example 1, or the help desk's ticket management system for example 2) or **data collected purposely** (e.g. a user satisfaction survey).

- **Step 4: determine the frequency of measurement**
  Determine the **frequency of measuring the KPI**. The key is to do this as frequently as is required to monitor progress towards the objectives, while making sure to leave ample opportunity to take action if progress is insufficient. For example 1, it would make sense to measure and update the KPI each time the system has been down. For example 2, this could be monthly or quarterly, depending on how quickly you expect to see an increase.

KPIs for health information systems

To give you an idea about what KPIs for a health information system may look like, read the 2009 paper by Hübner-Bloder and Ammenwerth (see reading list below). They consulted a group of experts about what would be useful and not so useful indicators to benchmark performance of hospital information systems. When reading, you can focus on the Introduction, sections 3.1 to 3.3 of the Results, and sections 4.1.1 and 4.1.2 of the Discussion. Figure 2 in the paper shows a rank list of the most useful KPIs.

Also have a look at the APFT dossier (under 'Further resources') , where we added some worked examples of KPIs to monitor the performance of the wound care management systems once it has been implemented.

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8.2 Formulating KPIs - exercise

Complete this exercise to start thinking about the type of KPIs you could include in the implementation plan for your assignment. Ask for feedback from your colleagues and the tutors by posting your suggestions on the forum.

Formulate a **maximum of three KPIs** (e.g. **one per KPI domain**) for monitoring the performance of the health information system you are proposing for your assignment.

Post your suggestions on the general forum, including how you would operationalise each KPI. Use some of the recommended time for this activity to give feedback on KPIs that others posted to help them further improve their KPIs for inclusion in their assignment.

If you would like some feedback from the tutors, just ask.

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