

HINF1102 Medisinsk Informatikk og Logistikk

Question 1: Please explain the concept of Bootstrapping and what does it mean in the context of hospital information systems? Under what conditions is this concept applicable, using ONE (1) example.

Answer: the answers has three parts and the word limit is 1000 words:

- (i) students should explain the concept of bootstrapping. Bootstrapping is a concept (from Information Infrastructure literature) presented in the article by Hanseth and Aanestad 2003. Bootstrapping can be described as a strategy for implementing network technologies which uses the self-reinforcing mechanism of network effects, critical mass and direct usefulness to initiate the uptake of a new network technology. Students should explain the following core concepts: critical mass (one needs to reach a certain number of users), network effect (the value of using a technology increases with the number of users), direct usefulness (one has to design the system for solving actual problems so that users perceive the usefulness of the system at once as they start using it).
- (ii) Students should explain how a bootstrapping strategy can be used in a hospital context to implement hospital information systems of different types. The should mention that:
 - a. This is a gradual implementation strategy, with low risks;
 - b. It is important to start with a small group of motivated users to which the new system is directly useful;
 - c. It is a way to 'test' the system on a small scale (e.g. a department, a small user group) before rolling it out to the whole hospital;
 - d. Learning is critical and should be supported;
 - e. Applying bootstrapping in a hospital, students should also mention that in a hospital setting not all users are 'equal', which is assumed in the original bootstrapping concept;
 - f. Link bootstrapping to cultivation as a more general implementation strategy that is gradual and develops by trial and error;
 - g. Contrast bootstrapping with other types of implementation strategies such as the 'big-bang' approach (not gradual, needs much more work in the preparatory phase to train users;
- (iii) Students should provide an example from the course literature of a case of bootstrapping and explain in which conditions is this strategy applicable. Possible examples from the course literature are:
 - a. The ambulance case in Østfold in Hanseth and Aanestad 2003;
 - b. The EDI standard in Hanseth and Aanestad 2003;
 - c. The telemedicine case at Rikshospitalet in Hanseth and Aanestad 2003;
 - d. Other cases that have been discussed in class: e.g. eResept, health registers.

Question 2: This question has THREE (3) parts and the word limit is 1000 words.

Part 1: Explain the socio-technical approach as a basis to understand health information systems.

Answer: Students should explain the concept of social-technical approach. The concept (from Information Systems literature) is presented in book chapter 1, 2 in Berg, M. et al. (2004) "Health Information Management. Integrating information technology in health care work", and articles Aanestad and Olaussen (2010) and Berg, Arts, van der Lei (2003). The main points that should be mentioned are the following:

1. A sociotechnical approach considers how technical, organizational and social aspects are interrelated.
2. An information system is thoroughly intertwined with the work practices in which it functions, a change in the information system will have widespread and often unpredictable consequences for that work practice. And a work practices include networks of people, tools, organizational routines, documents etc.
3. Both social and technical take an active role.
4. The socio technical approach stands in contrast to a technical approach where the focus is primarily on the IT artefact not taking into account the socio-institutional context within which the technology is designed and used.
5. Health information systems are especially socio-technical as they deal with data about people, processes, practices, and necessarily involves inter-connections with different groups of people, departments, institutions and even countries.

Part 2: Discuss why such approach is relevant in implementation research and practice.

Answer: Students should explain the relation between people, work practices and technology, as important corner stone for systems to work. As such an approach is key to making information systems work in general and particular for health information systems. They should explain that:

1. Implementation research concerns building new concepts and understanding of how and why implementation works or not in particular settings. Implementation practice concerns the everyday work which people do in organizations around health information systems.
2. Students should discuss how a socio-technical approach can enrich both these streams of research and practice. They can also explain this citing some examples from course literature or class discussions.

Part 3: Select a paper from course literature and identify FIVE (5) elements/concepts of approach which are socio-technical in nature.

Answer: Students should select a paper from the course literature to discuss how a socio-technical approach has been highlighted in the paper. Some of the concepts relating to such an approach could be participation, mutual learning, people and technology in workplaces, adaptability, process based, human centered, organizational learning. They should be able to discuss these concepts in relation to the broader socio-technical approach.

Question 3: This question has two parts. 'Standards are fundamental building blocks for eHealth Architectures' :

Part 1: Explain what this statement means and critically discuss it.

Answer: Students should firstly explain what are standards, what is an architecture, and how are they interrelated, and relate them to the health domain. They should discuss the following aspects:

1. how standards, their different types (for example, nomenclature, semantic, technical) are fundamental to design an ehealth architecture. This is by creating a common language for systems and people to speak to each other. This is especially relevant in the health domain, for example in a hospital, where there are a multiplicity of systems operating and there is both the clinical and administrative need for these systems to speak to each other.
2. They should highlight the importance of standards to enable interoperability by encoding health data using a common, generally agreed upon "language" that multiple systems can read.

3. They should mention two main concepts to consider about standards: syntax and semantics. Syntax refers to the grammar rules for a defined "language" so that the electronic messages being exchanged can be properly deconstructed when received. Semantics ensures that message components are coded so that their meaning can be interpreted or understood (e.g., which lab tests were performed and what their values are) when the message is deconstructed. Examples of syntax standards - Health Level 7 (HL7), Digital Images and Communications in Medicine (DICOM), National Council for Prescription Drug Programs (NCPDP). Examples of semantics standards - International Classification of Diseases (ICD), Systematized Nomenclature of Medicine (SNOMED-CT)

Part 2: What are the challenges of implementing standards within health information architecture in Norwegian Health sector?

Answer: Students should be able to explain the proliferation of software systems within Norwegian health sector (even at hospital level), which exist as silo systems and building integration between these systems has been a very difficult task. They could discuss the following aspects:

1. The challenges of dealing with the legacy of pre-existing systems from both the institutional and technical perspectives. Examples should be provided of both, such as ownership, multiplicity of platforms, dealing with different kinds of data and others.
2. How on hindsight, had these systems used standards in their design and implementation, their integration would have been much easier.
3. What are the kinds of standards that could have been used.

Question 4: 'Hospitals should only have patient care functions/services at core, and all logistics and supply chain management functions should be at the periphery.' Explain and critically discuss the statement with ONE (1) example from course literature.

Answer: Firstly, students should be able to describe the multiplicity of services a hospital is responsible for ranging from medical, clinical to administrative. Secondly, they should be able to situate logistics and supply chain management within this broader landscape of hospital services. They should discuss:

1. the role and fundamental importance of logistic services at the hospital level. The type of services including hospital supply chain management of drugs, surgical and medical equipment; transportation – ambulances; patient food; waste disposal; patient laundry, sterile services.
2. Students should reflect on if these functions should be managed and run by the hospitals or should be outsourced to agencies/organizations with expertise in respective function and hospitals should then focus on their core tasks of patient care.
3. What are the pros and cons of these two different models should be highlighted, and where the student stands in this debate:

(answer: 1000 words)