Friedrich-Alexander-Universität
Technische Fakultät

Machine Learning
Data Analytics

FAU

Human Computer Interaction

Discussion Session 6: Analysis

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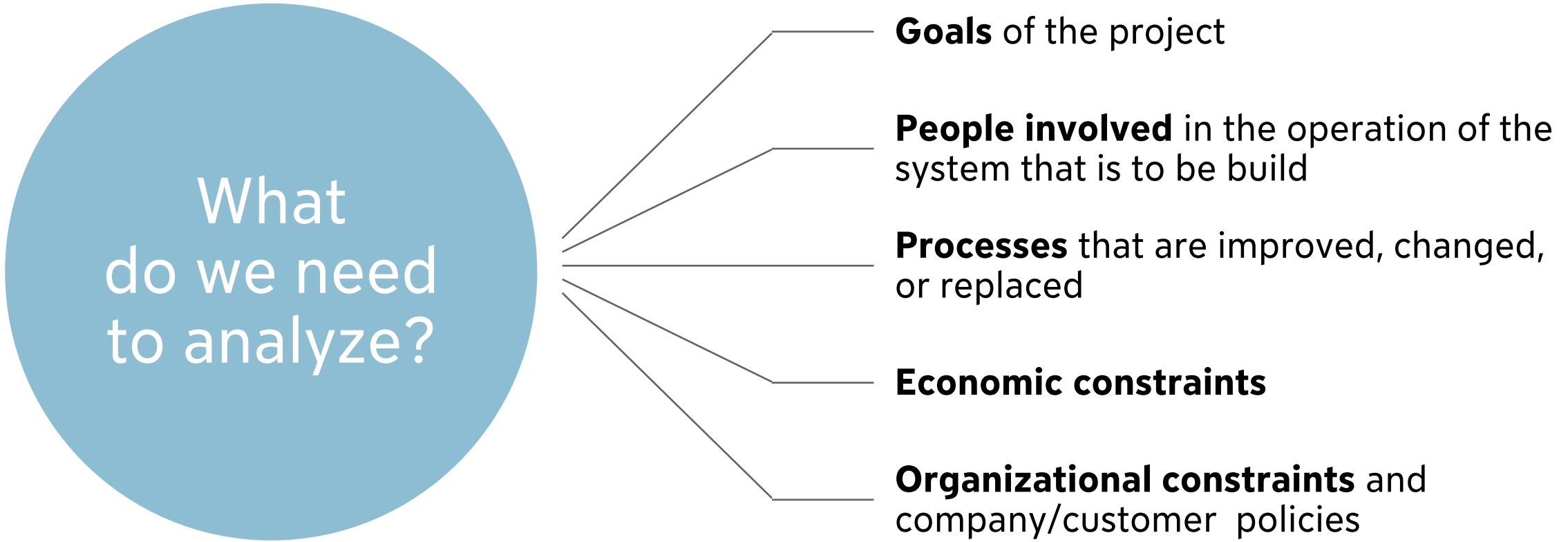
Relevant factors in the analysis



Usually there is a trade-off between different factors

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From the lecture handouts:

A Focus group is an informal group gathering with typically **6 to 12 people** that focus on a **specific topic** and have a group discussion as means of communication

During the session, you collect **qualitative data** from the group to indicate **how people think and feel**
You collect opinions, attitudes, feelings, perceptions, and ideas and you get examples and rich descriptions

The goal is to **understand why people act or react** in a certain way. That helps you to make important design choices.

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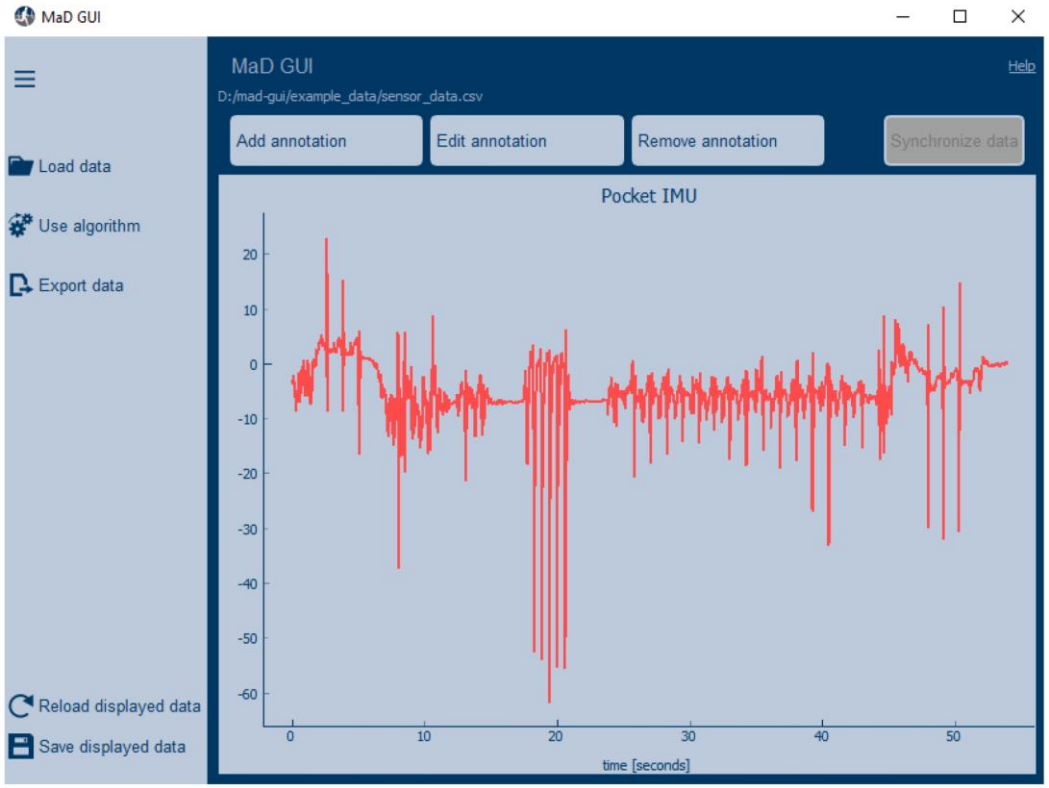
Real world scenario:

- GUI for analyzing time series data (from gait) Doctors and developers can use it.
- Open-source so that developers can adapt existing GUI.
- Two focus groups before designing GUI
  - 6 Developers (2 PhDs, 4 PhD candidates)
  - 10 Doctors (2 Professors, 6 PhDs, 2 Assistants)



Analysis

Discussion on Focus Group

Imagine you have the following project to do...

- Football championship web page for mobile device access (textual live reporting)
- Micro-payment service on a website

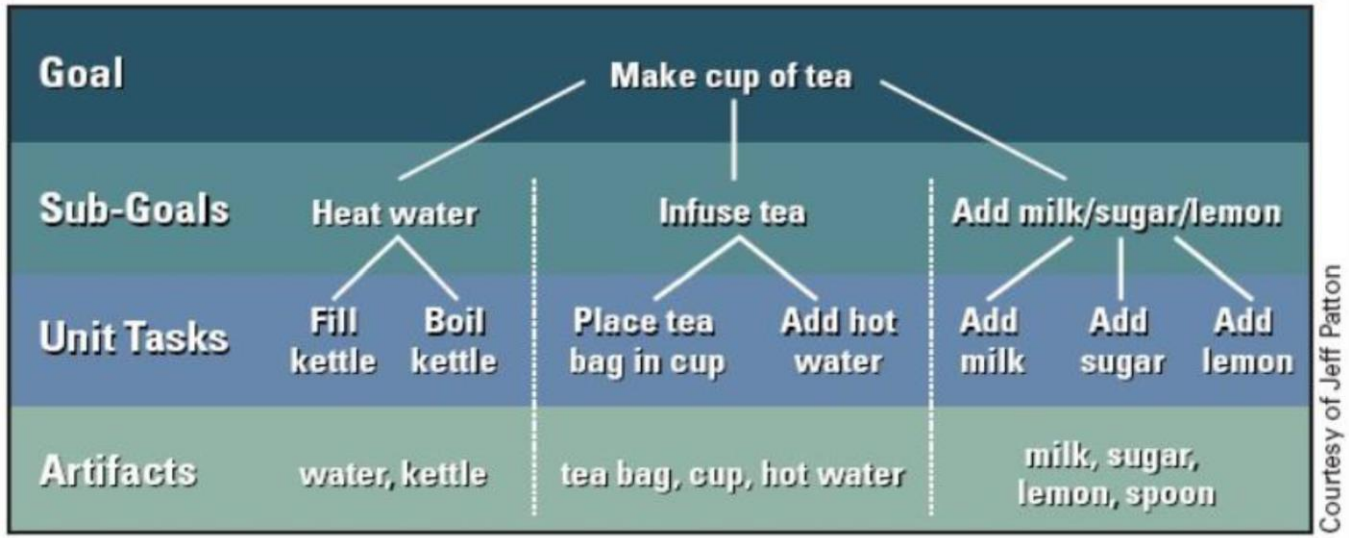
Should focus groups be used?
What focus groups would be appropriate?
What are the requirements for the moderator?

Analysis

(Hierarchical) Task analysis

From the lecture handouts:

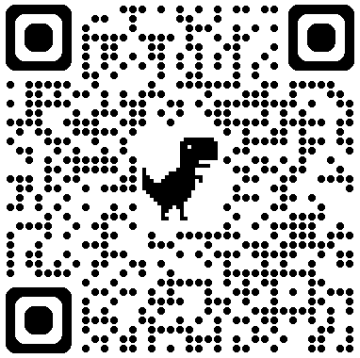
In task analysis you want to analyze all action that are performed by a user. It is about what you can observe and not really about the mental model.



Easy to understand the principle but in real world???

Real world scenario:

Surgical Endoscopy (2022) 36:5167–5182
https://doi.org/10.1007/s00464-021-08893-1



Hierarchical task analysis of endoscopic sleeve gastroplasty

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Abstract

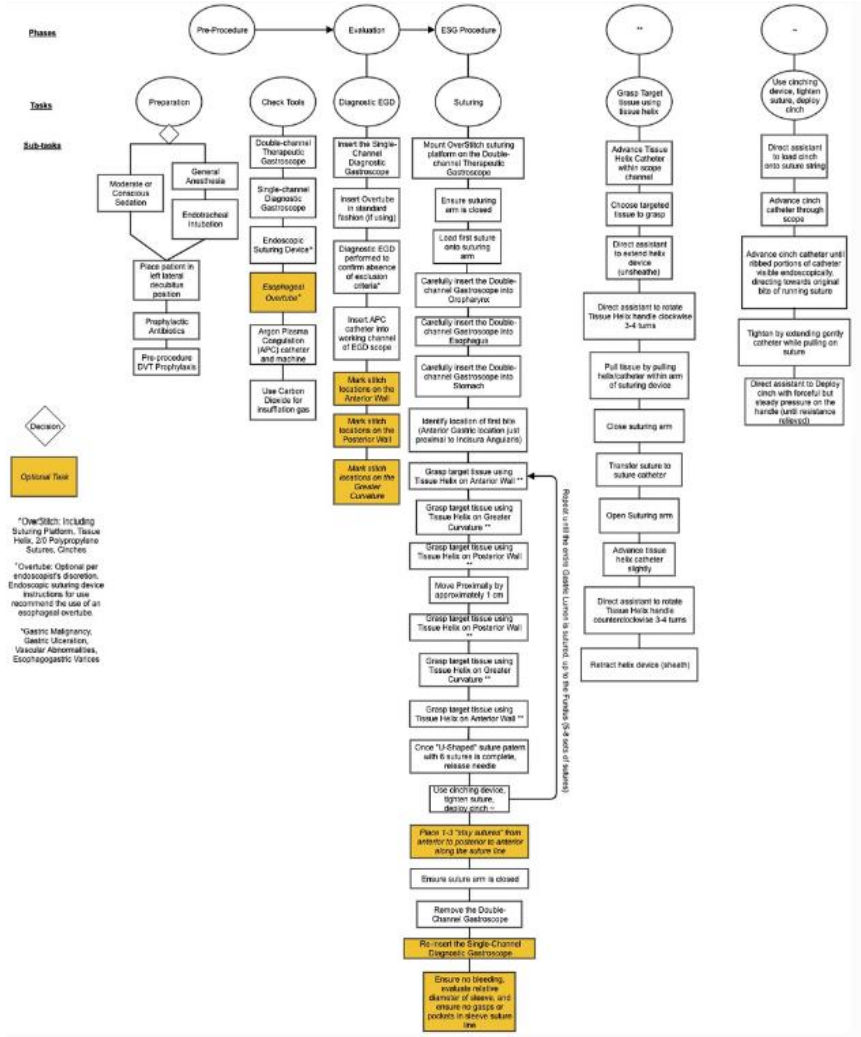
Background Endoscopic sleeve gastroplasty (ESG) is a minimally invasive endoscopic weight loss procedure used to treat obesity. The long-term goal of this project is to develop a Virtual Bariatric Endoscopy (ViBE) simulator for training and assessment of the ESG procedure. The objectives of this current work are to: (a) perform a task analysis of ESG and (b) create metrics to be validated in the created simulator.

Methods We performed a hierarchical task analysis (HTA) by identifying the significant tasks of the ESG procedure. We created the HTA to show the breakdown and connection of the tasks of the procedure. Utilizing the HTA and input from ESG experts, performance metrics were derived for objective measurement of the ESG procedure. Three blinded video raters analyzed seven recorded ESG procedures according to the proposed performance metrics.

Analysis

(Hierarchical) Task analysis

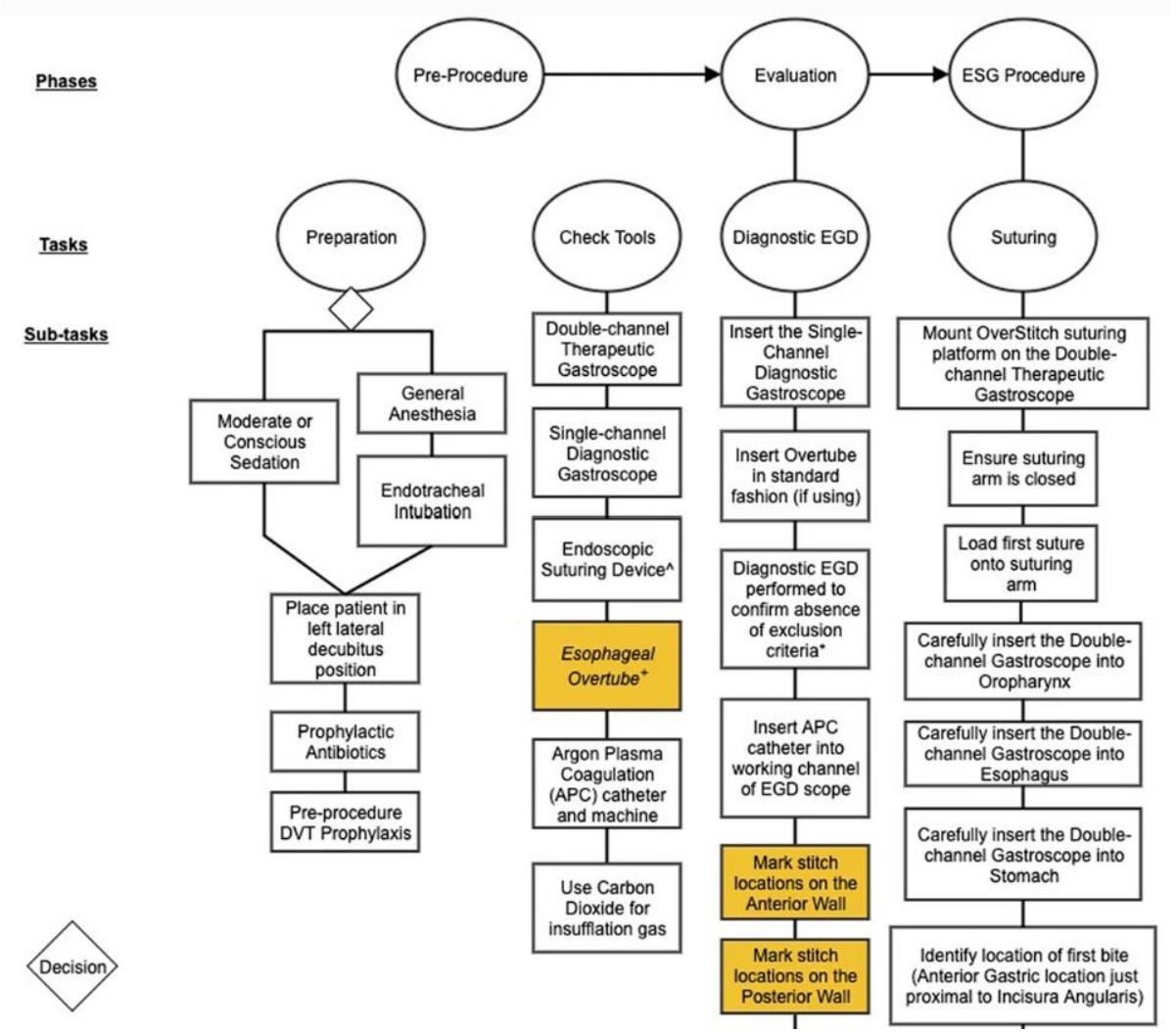
Real world scenario:



Analysis

(Hierarchical) Task analysis

Real world scenario:



Analysis

(Hierarchical) Task analysis

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Real world scenario:

Table 1 Operative errors and complications

Phase	Errors and mistakes	Occurrence and complications
Diagnostic EGD	• Oropharyngeal trauma • Perforation [35]	• Free flow air • Fluid leakage • Infection
Suturing [36]	• Perforation • Bent suturing needles • Loose suture (incorrect cinch) • Not enough suture bites •Non-full thickness endoscopic sutures • Prematurely released suture • Bleeding/ Oozing blood • Esophageal Oropharyngeal tear/trauma • Incorrect suture location • Damage to adjacent organs	• Bleeding [37] • Excessive tension • Blood clot forming • Incomplete or incorrect gastric plication • Abcess formation • Extragastric bleeding or organ damage • Tear or perforation
Overall procedure/general surgical risks	• Prolonged anesthesia (due to long completion time) [38]	• Thromboembolism • Post-operative infection • Hypothermia • Fever with no procedure-related collection • Perigastric collection with bilateral pleural effusion • Perigastric collection with left-sided pleural effusion • Severe abdominal pain/nausea •Readmissions + conservation management • Readmission + reversal of ESG [39]

Analysis

(Hierarchical) Task analysis

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Real world scenario:

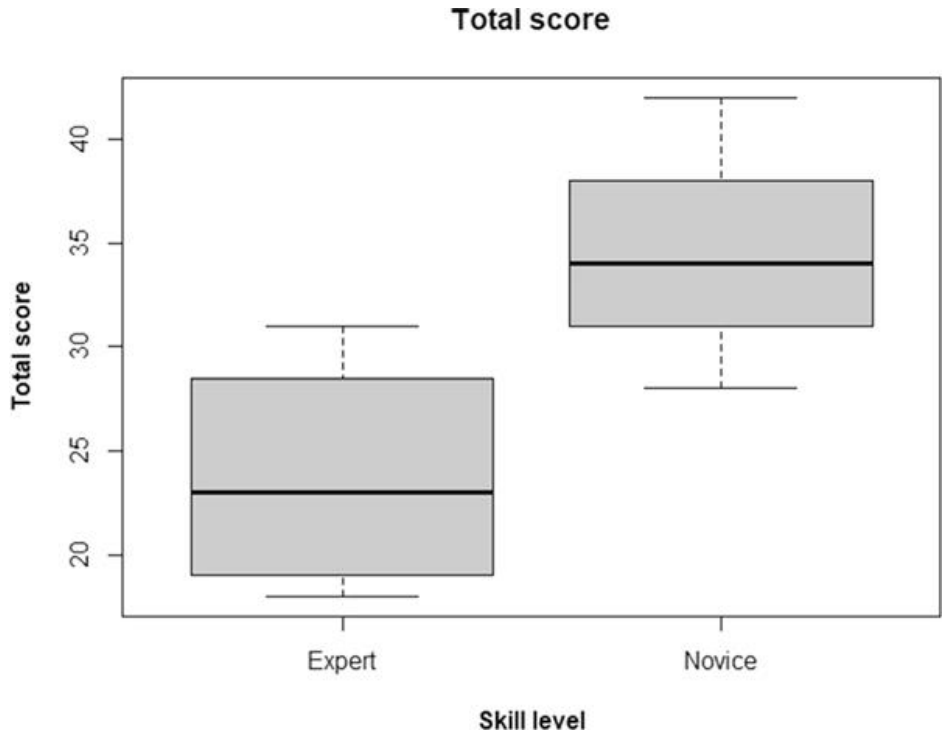
No	Metrics	Score
	Insertion and Diagnostic Upper Endoscopy	
1.	**Insert Over tube in standard fashion (Optional)**	
	No perforation	0
	Perforation	5
2.	**Endoscope inserted into posterior pharynx**	
	No perforation	0
	Perforation	5
3.	**Advance endoscope into esophagus**	
	No perforation	0
	Perforation	5
4.	**Diagnostic Evaluation of Esophagus**	
	Diagnostic Evaluation performed	0
	Not performed	5
5.	**Advance endoscope into stomach**	
	No perforation	0
	Perforation	5
6.	**Advance endoscope into duodenum**	
	No perforation	0
	Perforation	5
7.	**Diagnostic Evaluation of duodenum**	
	Diagnostic Evaluation performed	0
	Not performed	5
8.	**Diagnostic Evaluation of Stomach**	
	Diagnostic Evaluation performed	0
	Not performed	5

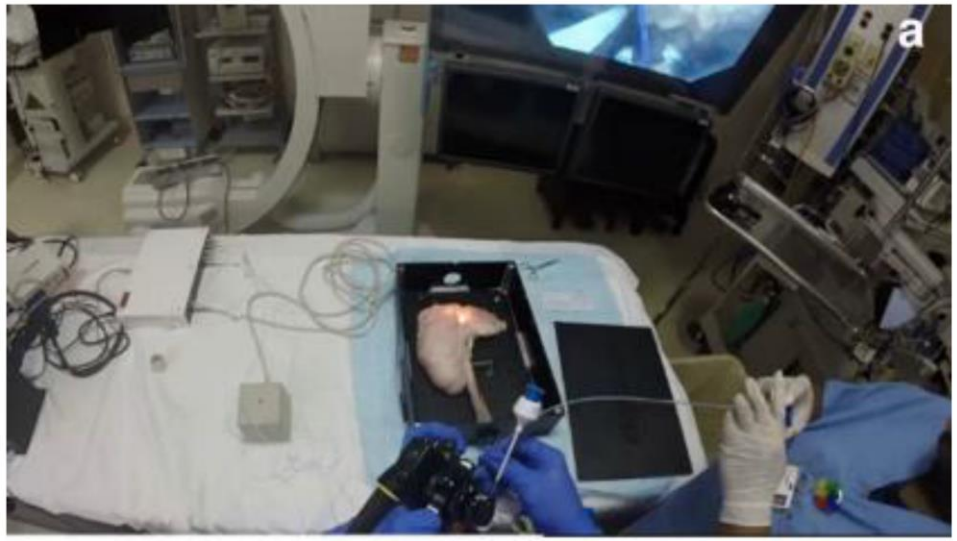
Analysis

(Hierarchical) Task analysis

Real world scenario:

Study novices vs experts to see if HTA found all steps and identify variations between endoscopists





Discussion on Task Analysis

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Real world scenario:

- A Task Analysis can help to identify the key tasks of a procedure
- BUT: Based on a good TA you can generate more important information like
  - Task specific complications
  - Procedure specific performance metrics
- Requirement for a good training with progress monitoring

Thank you for your attention!

Are there questions