STUDENT

DIT096-0001-RCC

TENTAMEN

DIT096 Summer 2025 Omtentamen 2 - J

Kurskod	--
Bedömningsform	--
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Skapad av	Lisa Lindén

Welcome to the exam for Human-Computer Interaction!

Here's some basic information about the exam:

Total Points: The examination is out of a total of 100 points.
Grading Scale: The grades will be allocated as follows:

- To pass you must achieve more than 41 points.
- A grade of 3 is awarded for achieving between 41 and 60 points.
- A grade of 4 is awarded for achieving between 61 and 80 points.
- A grade of 5 is awarded for achieving between 81 and 100 points.

Examination Aids: No external aids are permitted during the examination.

Please read all instructions carefully. Some questions require you to provide the answers in a specific format or order.

We're keeping our fingers crossed for your success in the exam :)

All the best,
The HCI Teaching Team

1 According to ISO 9241-210, the four principles of human-centered design are

- active ✓ (no, active, passive) involvement of users
- appropriate allocation of function between users and technology ✓ (between users and technology, for technology over users, for users over technology)
- iteration ✓ (iteration, succession, implementation) of design solutions
- altenative ✗ (altenative, creative, multi-disciplinary, novel) design

Which of the following statements best describes the role of Human-Computer Interaction (HCI) in the design of interactive systems?

- HCI is irrelevant in the design process, as the company knows best what its customers need.
- HCI is focused solely on visual design, such as choosing colors and fonts.
- HCI is only concerned with the technical aspects of the system, such as coding and software development.
- HCI is important for identifying user needs and ensuring the system is usable and user-friendly. ✓

Delvis rätt. 4 av 5 poäng.

2

A nice inclusive design quote is "Good design [enables] ✓ (disables, enables), bad design [disables] ✓ (disables, enables)."

Consider the following types of disabilities and situations, and chose the right one:

	Permanent	*Temporary*	*Situational*
Touch	[one arm] ✓ (arm injury, one arm, holding a bag)	[arm injury] ✓ (holding a bag, arm injury, one arm)	[holding a bag] ✓ (arm injury, holding a bag, one arm)
Sight	[blind] ✓ (blinded by the sun, blind, cataract)	[cataract] ✓ (cataract, blind, blinded by the sun)	[blinded by the sun] ✓ (blind, cataract, blinded by the sun)
Hearing	[deaf] ✓ (at a music concert, deaf, ear infection)	[ear infection] ✓ (ear infection, at a music concert, deaf)	[at a music concert] ✓ (ear infection, at a music concert, deaf)
Speaking	[mute] ✓ (mute, heavy accent, sore throat)	[sore throat] ✓ (mute, sore throat, heavy accent)	[heavy accent] ✓ (mute, heavy accent, sore throat)

Rätt. 7 av 7 poäng.

3

A horizontal ✔ (vertical, diagonal, mixed, horizontal) prototype shows all the features, but does not implement them.

A vertical ✔ (vertical, horizontal, diagonal, mixed) prototype shows only one feature, fully implemented.

The following is a type of low fidelity prototype: paper ✔ (plastic, paper, functional, metal)

A *conceptual* prototype is more appropriate at early stages of the work ✔ (at early stages of the work, never!, at any time, at later stages of work)

A *functional* prototype is more appropriate at later stages of the work ✔ (at early stages of the work, never!, at later stages of the work, at any time)

Prototypes are useful mainly because they allow us to

do a "quick and dirty" evaluation that will inform the next iterations ✔ (do a "quick and dirty" evaluation that will inform the next iterations, determine the price of the final product, do a thorough and detailed test of the system, conduct user studies and publish academic papers)

Rätt. 6 av 6 poäng.

4

A *Heuristic Evaluation* is done with typically a few ✓ (a few, many)

experts ✓ (representative users, experts) and the main goal is to

identify problems ✓ (get ideas for improvement, identify problems) of the prototype, according to

(pick one)

- [ ] their preferences
- [x] their performance ✗
- [ ] usability principles ✓

The *Severity Rating* of a Heuristic Evaluation is a combination of which three factors?

(pick three)

- [x] productivity ✗
- [x] persistence ✓
- [ ] impact ✓
- [ ] aesthetics
- [x] cost ✗
- [ ] frequency ✓

Usability Testing is done with typically many ✓ (many, a few)

representative users ✓ (representative users, experts) and the main goal is to

get ideas for improvement ✓ (identify problems, get ideas for improvement) of the prototype, according to

(pick two)

- [x] their preferences ✓
- [ ] their performance ✓
- [x] usability principles ✗

The manipulated aspects of an experiment are called Independent ✓ (Dependent, Independent) Variables, and are isolated through a control condition ✗ (randomization, a control condition) .

The observed aspects of an experiment are called Dependent ✓ (Independent, Dependent) Variables, and are isolated through randomization ✗ (randomization, a control condition).

When participants are assigned to *one condition only*, this is called within ✗ (within, between) subjects, or independent ✓ (independent, repeated) measures.

When participants are assigned to *all conditions*, this is called between ✗ (within, between) subjects, or repeated ✓ (repeated, independent) measures.

Delvis rätt. 12 av 20 poäng.

5 When considering the difference between two conditions, the *alternative hypothesis* would be that

there is NO difference ✗ (there is NO difference, there IS a difference).

If we conduct a statistical test and the calculated *p-value* is more than our predefined *significance level*, then we must reject ✗ (accept, ignore, reject) our *null hypothesis*.

Some typical measures of central tendency are (pick two)

- [ ] frequency
- [ ] mean ✓
- [x] confidence interval ✗
- [ ] sample size
- [x] interquartile range ✗
- [ ] rank
- [ ] standard deviation
- [ ] standard error
- [ ] median ✓

Some typical measures of variability are (pick three)

- [x] standard deviation ✓
- [x] sample size ✗
- [ ] interquartile range ✓
- [x] standard error ✗
- [ ] frequency
- [ ] mean
- [ ] rank
- [ ] median
- [ ] confidence interval ✓

Delvis rätt. 1 av 7 poäng.

6 A researcher named Astrid wants to investigate how people use a "checklist" app, on a desktop computer (using the mouse), a handheld tablet (tapping on the screen), or a physical printout of the checklist (marking with a pen).

A task will consist of participants having to select specific items on a checklist, based on instructions given to them by Astrid each time.
She will time how long it takes them to perform such a task, and ask for their impression of the input method(s) they used (computer/tablet/paper).
Each participant's impression will be measured on a *Likert scale* from 1 (would not use) to 5 (would use), after they completed all the tasks they were asked to do using an input method.

There are 16 participants that can be recruited for the study.

Help Astrid to design a user study that *optimally and effectively* evaluates the speed and user preference.

She should use a within-subjects ✓ (within-subjects, between-subjects, mixed) experimental design.

The control condition should be the users marking on the physical printout ✓ (marking on the physical printout, using the mouse on the desktop, tapping on the tablet).

Each participant should perform a task using an input method once ✗ (multiple times, once), for multiple different cases ✓ (for one same case, for multiple different cases).

What should be the ONE independent variable for this study?

- [ ] task completion time
- [ ] error rate
- [ ] participants' impression
- [x] input method (mouse, tap gestures, writing) ✓

What should be the TWO dependent variables for this study?

- [ ] input method (mouse, tap gestures, writing)
- [ ] participants' impression ✔
- [x] task completion time ✔
- [x] error rate ✖

Select the statistical test which should be used to analyze the (continuous) TIMING MEASUREMENTS; you can consult the provided PDF diagram on the side.

- ○ Mann-Whitney
- ○ repeated measures ANOVA ✔
- ○ Wilcoxon signed-rank
- ○ paired t-test
- ◉ ANOVA ✖
- ○ Kruskal-Wallis
- ○ t-test
- ○ Friedman

Select the statistical test which should be used to analyze the (ordinal) LIKERT SCALE MEASUREMENTS; you can consult the provided PDF diagram on the side.

- ◉ Friedman ✔
- ○ paired t-test
- ○ Wilcoxon signed-rank
- ○ ANOVA
- ○ t-test
- ○ Kruskal-Wallis
- ○ repeated measures ANOVA
- ○ Mann-Whitney

Delvis rätt. 6 av 9 poäng.

7 Plan your data gathering for the following task:

Some people have reservations about using robotic vacuums (e.g. Roomba etc) for cleaning their homes. They are either uncertain about their efficiency, or may have security / privacy concerns. You are hired as a consultant hired by Aether Corp. and your objective is to investigate how robotic cleaners are currently used to address these customer issues. Your aim is to deliver a comprehensive report outlining potential ways to enhance the company's products accordingly, to make them more acceptable to customers.

You have been allocated 10 hours for data gathering and analysis, with an additional 2 hours designated for report writing. *(i.e. propose something doable within that time frame, that does not require more time from you; justify and argue for your choices carefully otherwise)*

In your plan, you should address the following five important points:

- Research Focus
- Context of use
- Participants
- Research Questions *(the questions that drive your research, not the questions you might ask the participants)*
- Research Plan

Ensure that you complete the task thoroughly. Be concrete, provide practical answers and bear in mind how many resources you have.

Consult the rubric below to know how we will score your answer and how you can get the most points. Your text answer should be between at least 400 and up to 800 words.

Fill in your answer here

I will focus on the users of robotic cleaners, ask them about their concern of the efficiency, security and privacy of using robotic vacuums and also how users feel on each aspect when using them. Because I only have 10 hours to gather data and analysis, it is very hard record specific data to compare using robotic cleaners and using tranditional tools,so I will make an online questionair and try to find participants to fill it. Because we need to know how robotic cleaners are currently used, so the participant group should be the users who own a robotic cleaner or who have experience using them such as students who have to borrow them, and who have use them before but do not use them now,

There can be 3 research questions, the RQ1 can be 'Are robotic cleaners more efficient than tranditional tool", the RQ2 can be' Do users feel safe when using robotic cleaners", the RQ3 can be 'what can be the improvement of current robotic cleaners'

Firstly I will make an online questionaire to let users fill it out. The questionaire can have questions like' from 1 to 5 rank the efficiency of robotic cleaners compare to tranditional tools' or 'how often do you use robotic cleaners' to try to find the answer of RQ1 and RQ2. Then I offer a open questions to let participants talk about the pros and cons when they using robotic cleaners and how they feel about it. There can also be a last qeustion to let participants describe a situation when they using robotic cleaners(it can be either a good situation or a bad situation).

After I upload the questionaire and let people fill it, then during the time I can walk into places such as hotels, restaurants and supermarkets and try to interview the manager about whether they use robotic cleaners to do the cleaning or they hire someone to do it, or they can have both the methods. Then I can ask them about the reason of their choices and also how their choices contribute to the efficency and security. I can spend 6-8 hours doing interviews so I probably can do 3-4 interviews, then I can spend more than 2 hours on data analysis and another 2 hours to finish my report, In this way I dont need additional resources and I can have

both type of data: questionaire and interview.

Ord: 404

Choice of research focus

4pt - clear focus with logical motivation

2pt - clear focus

0pt - no focus or vague

Choice of context of use

4pt - defined with clear motivation

2pt - defined but lacks motivation

0pt - not defined or generic

Participant group

6pt - clearly identified and explained

3pt - identified but without a logical explanation

0pt - too broad or no indication

Choice of RQs

6pt - explicitly stated, contributing to the design process

3pt - stated but with limited impact on the design process

0pt - vague or generic, not actionable

Research plan

10pt - clear plan, motivated choice of methods, feasible using the available resources

5pt - lacks detailed description, vague motivation of methods, requires additional or not using available resources

0pt - multiple flaws, or hard to understand

Total points: 30

Besvarad.

8 You have probably (and hopefully!) spent a significant amount of time in this course working on your group project.

We would like you now to *reflect* (as an individual member of the group) on the overall experience from this activity, and write a few sentences below on:

- the **user-centered design** approach in general (*not what you specifically did in your project*; maybe compare it with any of your previous projects or work experiences)
- something that you **did not expect** at all when you started working on the project, or something that **turned out differently** to what you hoped
- what you would **do differently** if you were to do it again (either a different direction, approach, or something that might have improved your results)
- what do you think you could **bring forth and apply to your future projects or work**

Each of the above will be scored up to 4 points giving overall 4x4=16 points (less points for not discussing something, more points for fully elaborating; some parts might be overlapping but try to be clear, formal, and precise)

Do not describe or present the your project in detail, focus on the **lessons learned**.

(Suggested text length around 400 to 500 words or so)

Fill in your answer here

1. I study Game Design in University of Gothenburg. I feel the user-centered design is a bit different compare to my projects in games. When design an application, at the early stage designer can ask questions to users and users can describe what they want and need. But when design a game, the game designer can not ask players at early stage because players have no idea what this game is about, it can be everything. Game designer firstly have to transfer their idea to a prototype, then let players play it, after that the designer can get the first feedback from player.

2. Our group project is to develop a health application to record and track the disease history of people and remind them about their doctor appointment or to do bodycheck. At the beginning we think this is a very cool idea cause we were trying to concern about people's health and we think it is very useful. After we start working on the project we meet some problems. For example we find it very hard to find enough medical staff to fill our survey because there isn't many medical staff and they usually very busy, and our application also face big problem when it comes to ethic issue because we need not only personal data but also disease record. I still remember when we do the 'evil developer' part, we realize that we can do many evil things if we have these data, so it is very hard to let user trust us, we might need to work with the government.

3. If I can do it again, I think I would prefer a different direction, a less sensitive direction, because we find we have many difficulties about the ethic issue, we need many authorization to have access to the data we want, so we will have risk doing that application. We also find it hard to make profit in our project, we do not sell any kind of products, and we also do not want to put many advertisement in a medical applications. If we choose another direction it would be less risks and we can make more profits.

4.I think in future work as a game design students, I will try to bring my game to player at early stage, for example I can make a paper prototype of the game and let people play test it, and also try to develop a software prototype and get some feedback at early stage.

Ord: 417

Besvarad.