



Pilot Course Curriculum and Intervention Plan for Human-computer Interaction (SU)

**“Improving the quality and sustainability of
learning using early intervention methods based
on learning analytics”**

Project No. 2023-1-FI01-KA220-HED-000159757



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Author(s)	Prof. Krassen Stefanov
With contributions by:	Oleg Konstantinov Dafinka Miteva
Revised by:	Sonsoles López-Pernas, UEF

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1 General course information

Course name	Human-computer interaction (HCI)
Institution	Sofia University
Course level	Undergraduate
Teaching model	In-person
Course learning objectives	<p>Human-Computer Interaction (HCI) course focuses on understanding, designing, and improving the interaction between humans and computer systems. Learning objectives:</p> <ol style="list-style-type: none"> 1. Understand the Fundamentals of HCI <ul style="list-style-type: none"> - Grasp the principles of user-centered design (UCD). - Understand human cognitive and physical capabilities and limitations in interacting with technology. - Explore the evolution and scope of HCI as a discipline. 2. Design and Prototype Interactive Systems <ul style="list-style-type: none"> - Learn the methods for creating user-friendly and aesthetically pleasing interfaces. - Use prototyping tools and techniques to create mockups of digital interfaces. - Understand design principles like consistency, feedback, and affordances. 3. Conduct User Research and Analysis <ul style="list-style-type: none"> - Perform user research to identify user needs, behaviours, and preferences. - Develop personas, scenarios, and storyboards based on research findings. - Apply ethnographic and contextual inquiry techniques. 4. Evaluate Usability and User Experience (UX) <ul style="list-style-type: none"> - Understand usability principles and heuristics (e.g., Nielsen’s heuristics). - Learn to design and conduct usability testing with real users. - Analyse and interpret test results to improve system design. 5. Apply Interaction Design Processes

	<ul style="list-style-type: none"> - Understand the stages of interaction design: discovery, ideation, prototyping, and evaluation. - Use iterative design and development methodologies. - Explore task analysis and workflow modelling. <p>6. Familiarize with Tools and Technologies</p> <ul style="list-style-type: none"> - Gain hands-on experience with software and tools for prototyping, wireframing, and usability testing (e.g., Figma, Axure, Proto.io). - Overview of programming basics for creating interactive systems. <p>7. Explore Emerging Trends and Technologies</p> <ul style="list-style-type: none"> - Discuss and analyse new HCI challenges related to emerging technologies like augmented reality (AR), virtual reality (VR), AI, and IoT. - Understand accessibility standards and inclusive design practices. - Examine ethical considerations in designing technology (e.g., privacy and data security). <p>8. Collaborate in Interdisciplinary Teams</p> <ul style="list-style-type: none"> - Work in teams to tackle design problems and develop solutions collaboratively. - Communicate design decisions effectively through presentations and documentation. <p>9. Develop Critical Thinking and Problem-Solving Skills</p> <ul style="list-style-type: none"> - Critically analyse existing systems for usability and user experience. - Solve real-world interaction challenges by applying design and evaluation principles.
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2 Motivation and purpose (Why)

Goal of the inquiry

What do you want to learn about the teaching and learning process?	Getting insights into students’ engagement with online learning resources. Improving student engagement with learning activities How engaged are students with online activities? How engaged are students in their assignment work? How engaged are students in their group collaboration? How are students progressing on course activities? How much do students engage in class preparation activities?
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3 Defining more precisely what to explore (What)

Specific questions of interest	
Key inquiry questions	Which activities do students find engaging? Is regular engagement associated with better learning results? How much do students engage in class preparation activities?
Data sources	Engagement logs, quiz attempts, assignment submissions

4 Data collection strategy (How)

Data sources		Learning management system (LMS) Moodle, quizzes.	
Data aggregation		Data will be collected in xAPI format and integrated into Learning Locker either directly from the LMS plugin or through the csv2xAPI tool developed within the ISILA project	
Detailed methods for data collection			
Week#	Topic	Learning activities and materials	Data source(s) and collection method(s)
1	Course outline and structure. Understanding the process of project-based learning (PBL).	- Course structure slides	- Interaction with slides, logged in to the course LMS.
2	Models and theories of the psychological basis of human perception	- Slides on the topic - Discussions and feedback in the course forum	- Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
3	Methods and stages in the interface design process, the “Persona” technique & use cases	- Slides on the topic Each team submits a work file in the course forum with a “Persona” profile and user case ideas related to the development of their project. - Homework assignment 1: Project description	- Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS. - Assignment grades and submission logs from LMS.
4	Visual interface design	- Visual interface design slides - Each team submits in the course forum progress report.	- Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
5	Concept of Golden rules of design	- Golden rules of design slides	- Interaction with slides, logged in the course LMS,

		<ul style="list-style-type: none"> - Each member of the team submits individual sample designs - Homework assignment 2: First visual prototype 	<ul style="list-style-type: none"> - Forum posts and submission logs from LMS. - Assignment grades and submission logs from LMS.
6	Requirements analysis – user and environment analysis	<ul style="list-style-type: none"> - Requirements analysis slides - Each member of the team submits in course forum individual report focusing on personal contribution to the project and possible obstacles at this stage 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
7	Basic methods for evaluating interfaces	<ul style="list-style-type: none"> - Evaluating interfaces slides - Each team is randomly assigned another team's project to evaluate and works on testing report. - Homework assignment 3: Results of testing the first prototype 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS, - Assignment grades and submission logs from LMS.
8	Basics of graphic design	<ul style="list-style-type: none"> - Graphic design slides - Each team review and discuss the reports of the first prototypes in course forum. 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
9	Designing interactive interfaces	<ul style="list-style-type: none"> - Designing interactive interfaces slides - Each team submits progress report in course forum. 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
10	Concepts of human-machine interface systems	<ul style="list-style-type: none"> - Human-machine interface systems slides - Each member of the team submits individual report focusing on personal contribution to the project and possible obstacles at this stage. - Homework assignment 4: Needs analysis 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS, - Assignment grades and submission logs from LMS.

11	Interactive models	<ul style="list-style-type: none"> - Interactive models slides - “Applying Interactive models” lecture video. 	<ul style="list-style-type: none"> - Interaction with slides and videos, logged in the course LMS.
12	Rules and standards for availability of information	<ul style="list-style-type: none"> - Slides on the topic - Each team submits progress report in course forum. 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
13	Virtual and augmented reality	<ul style="list-style-type: none"> - Virtual and augmented reality slides - Example videos of Virtual and augmented reality. 	<ul style="list-style-type: none"> - Interaction with slides and videos, logged in the course LMS.
14	Concepts of project presenting	<ul style="list-style-type: none"> - Project presenting slides - Each team presents their project by uploading a presentation to the course forum. 	<ul style="list-style-type: none"> - Interaction with slides, logged in the course LMS, - Forum posts and submission logs from LMS.
15	Final test and evaluation	<ul style="list-style-type: none"> - Each student takes a test for a certain amount of time in LMS. 	<ul style="list-style-type: none"> Test grades and submission logs from LMS.

5 Data analysis and interpretation (So What)

Sense-making and interpretation context	Use dashboards to visualize engagement levels. Analyze correlations between activities and outcomes. Compare results with course goals and prior expectations.
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6 Intervention plan (Now What)

Potential interventions	E-mail reminders & recommendations; Face-to-face interventions (devote more time to the assignment).
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