

CPUE - AL

Certified Professional for Usability Engineering and

User Experience Design

Advanced Level

Syllabus Version 4.1 EN

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User Experience Quality

Certification Center

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1 Introduction

1.1 REVISION HISTORY

Version	Date	Note
4.1	May 1 st 2022	Update
4.0	Nov 21 st 2021	Major Update
3.0	Jan 17 th 2021	Major Update
2.3	Jan 15 th 2019	UX Design Update
2.2	Oct 18 th 2018	UXQCC Version Release
2.1	Jun 30 th 2017	Minor Update
2.0	May 17 th 2017	Major update
1.1	Jan 31 st 2016	Update
1.0	Nov 30 th 2015	Release Version

1.2 PURPOSE OF THIS SYLLABUS

This syllabus describes the business outcomes, learning objectives, and concepts underlying the Certified Professional for Usability Engineering and User Experience Design. The learning objectives support the business outcomes and are used to create the exams. The syllabus will help candidates in their preparation for the certification examination.

The Advanced Level of the certification program for the Certified Professional for Usability Engineering and User Experience Design addresses all persons and professional areas involved in the development of software, mobile, or Internet applications. This includes software developers, GUI programmers, SCRUM masters, project managers and personnel, organizers,

supervisors, technical staff, IT auditors and quality assurance representatives, as well as management personnel in charge of software quality.

The program assumes basic experience gathered in development projects, particularly software development. The Foundation Level certificate is a pre-condition for taking the higher-level certification examination for the Certified Professional for Usability Engineering and User Experience Design Advanced Level.

1.3 SCIENTIFIC ADVISORY BOARD

The Scientific Advisory Board of UXQCC consists of renowned scientists, representatives of relevant organizations as well as organizations involved in the fields of user experience and usability-relevant topics. The Board supports the didactic and content-related further development of the syllabus. This ensures that the content is up-to-date, relevant, and applicable from a scientific and practical point of view. For the current composition of the Board, please refer to the UXQCC website (<https://www.uxqcc.com>).

1.4 LEARNING OBJECTIVES AND COGNITIVE LEVELS OF KNOWLEDGE

Each section of this syllabus has a cognitive level associated with it:

C1 Proficiency / Knowledge: Knowledge of precise details such as terms, definitions, facts, data, rules, principles, theories, characteristics, criteria, procedures; candidates are able to recall and express knowledge.

C2 Understanding: Candidates are able to explain or summarize facts in their own words, give examples, understand contexts, and interpret tasks. This includes being able to transfer the contents from one notation into another (for example, words into a diagram), to explain and summarize the contents, and finally to derive future developments from the contents.

C3 Apply: Knowledge transfer for problem solution; Candidates can apply their knowledge in new situations and use abstractions or form their own abstractions. Ability to use the acquired knowledge in new specific situations, for example, by applying certain rules, laws, or theories.

For example, an IT student should be able to program different sorting algorithms in any assembler language or a math student must be able to reason mathematically according to the valid rules.

C4 Analyze: Candidates are able to partition a problem to understand how it is structured; they are able to discover inconsistencies, recognize correlations and derive conclusions, and distinguish between facts and interpretations. This includes, for example, identification of the individual elements, determination of the relationships between the elements and recognition of the design principles. The Analysis level requires a higher knowledge level than Understanding and Apply, because it assumes that both the contents and the structure of the learning matter are well understood. For example, the learning activity of art history students discovering the elements of a painting that determine the style and assigning them to a specific epoch belongs to this level.

C5 Evaluate: Candidates are able to build a new structure or create a new meaning based on several elements; they are able to suggest new approaches, design new schemas or conceptualize substantiated assumptions.

C6 Create: Candidates are able to assess the value of ideas and materials and use them to weigh alternatives against each other, select them, make decisions, and give reasons for them, and deliberately transfer knowledge to others, for example, by providing flow charts.

1.5 EXAM

The Advanced Level Certificate examination is based on this syllabus. Answers to examination questions may require the use of material based on more than one section of this syllabus. All sections of the syllabus may be included in the examination.

The format of the examination is multiple choice. Forty questions have to be answered. The duration of the exam is 60 Minutes.

Exams may be taken as part of an accredited training course or taken independently (e.g. at an examination center). The training providers approved by UXQCC are listed on the UXQCC website (<https://www.uxqcc.com>).

1.6 ACCREDITATION

Training providers whose course material is organized in accordance with this syllabus must be recognized and accredited by the IBUQ.

1.7 LEVEL OF DETAIL

This syllabus is intended to allow internationally consistent training and examination. This syllabus comprises the following components to reach this goal:

- General learning objectives describing the intention of the Foundation Level
- A list of information to teach, including a description, and references to additional sources if required
- Learning objectives for each knowledge area, describing the objective cognitive learning outcome of the course and the attitude that the participant is to achieve
- A list of terms that participants must be able to recall and understand
- A description of the key concepts to be taught, including sources such as accepted technical literature, norms or standards

The syllabus content is not a description of the entire Usability and User Experience fields of knowledge. It reflects the scope and level of detail relevant for the learning objectives of the Foundation Level.

1.8 STRUCTURE OF THE SYLLABUS

There are four major chapters. The top-level heading for each chapter shows the learning objective category covered and specifies the estimated amount of time that an accredited course shall spend on the chapter. See the respective table for each chapter.

Topic 1: UX Management

UX management and UX Managers

UX Management as process - overview

UX Management as process - UX maturity level

UX Management as process - UX Vision

UX Management as process - UX Strategy

UX Management as process - UX Measurement

Topic 2: UX and Software Engineering

Software Development Overview

SDLCs and UX

Topic 3: UX Research and Evaluation

Definition UX Research and differentiation to Evaluation

Planning research activities

Structure of research and evaluation methods with users

Journey mapping (Customer journeys and User journeys)

Test methods – remote testing

Questionnaires

Topic 4: UX Psychology Insights for Design

Behavioral patterns

Memory effects

Attention and decisions

2 UX Management

2.1 UX MANAGEMENT AND UX MANAGERS

Competence level and allocated time	C3 / 35 min
Learning objectives	2.1.A. Graduates will be able to define the term UX management. 2.1.B. Graduates will be able to differentiate the roles of the tactical and strategic UX Manager and the roles in UX design.
Keywords	UX management, UX maturity level, UX vision, UX strategy, change process, commitment of (senior) management), job title, ROI, UX team roles

User experience (UX) management is the practice of managing user-centered design-related activities inside an organization to create growth and good user experience in all products, services, and processes. Typical UX management activities are to evaluate the current UX maturity level of the organization, define the UX vision and planning the UX strategy. UX management starts from the status-quo and works on a continuous change process. It involves the dimensions: people, processes and culture and needs budget, resources, and a clear commitment of the management (especially senior management). Understanding the users' needs is the main center of UX management.

UX management can be understood as a job title (e.g., UX manager) and an organizational activity. Even when UX is the responsibility of a UX manager, it is important that the entire organization also take an active interest in users and user needs. To practice effective UX management, leaders must ensure the strategic alignment of people and practices, all in the interest of the products or service's end users.

A core principle of UX management is that an organization must enable and value UX resources, researchers, designers, and design leaders. To do well at UX management, your company needs to have this level of organizational maturity to maximize its UX return on investment (ROI) and deliver consistently on it. UX ROI can be measured through metrics such as healthy conversion and drop-off rates. A solid understanding of users' needs therefore should be at the center of *all* activities. The real value of effective UX management often shows when one considers the cost of UX mismanagement from such issues as stakeholders' conflicts of interest and poor alignment between development and user needs. Naturally, a sign of good UX management is that your organization experiences growth.

UX management comprises two dimensions – tactical and strategic. These two dimensions result in two different kinds of UX managers.

The Tactical UX Manager, is responsible for a product or product area. He leads the design team and gives the direction to the UX vision of the product. The tactical UX manager needs solid coaching skills and a deep knowledge about the entire field of user-centered design, including UI design, usability testing, human factors engineering and agile project work.

The strategic UX manager, is responsible for “UX” within the entire company. He works as a change manager - planning, shaping, and measuring all activities that should lead to a better user experience. He focuses on long-term plans. He promotes UX in all dimensions, including aligning UX strategy with organizational goals. He gives the direction to the UX vision with the goal of reaching the next UX maturity level. He is involved in UX process development, project selection and establishing UX knowledge in every project, as well as a corporate mind-set. Through targeted changes in the organization, he ensures optimal conditions in which all people involved in the product or service can work smoothly towards a common goal: the best possible UX.

Besides defining experience strategies and how to deliver these, UX managers (both types) are likely to work closely with development and product managers in pursuing strategies. They need to master tools such as Agile and Lean.

In order to make UX Management work successfully, the organization has to fully recognize the value and impact of UX. The respective UX manager must have support from the management level. The entire organization has to take an interest and an active role in users and user needs. Executives need to ensure the strategic alignment of people and practices, all of which are in the best interests of the end users of the product or service.

Based on the recognition of UX, UX resources must be allocated properly, researchers, designers and UX team leads have to be supported, valued, and trained. Only then can a UX Manager ensure that the UX Return on Investment (ROI) can be maximized. UX Managers must incorporate processes in the projects and in the organization to make UX measurable, otherwise the value of UX activities will not become visible from the business perspective. The value of effective UX management is often better shown when one considers the costs of UX mismanagement!

UX Activities within an organization are covered by several roles, each requiring trained skills. The most common ones are:

UX Manager: I take a higher-level look at connections with a view to the company and the entire user journey.

UX Researcher: I am in contact with users and master interview and observation methods.

UX Designer: I handle exploration and design.

UX Team Leader: I lead a central UX team.

External UX instance: I work in an external UX instance and am the contact person for the UX manager and the UX team leader when support is needed.

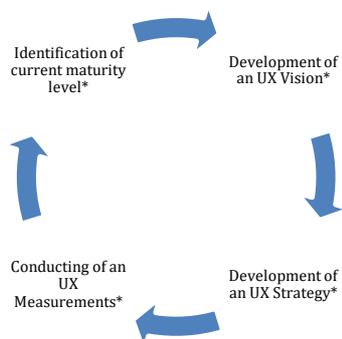
Additional roles that can be found in system design and development projects are UX Writer, Interaction Designer, UI Designer, Usability Evaluator, Information Architect, Content Designer, Requirements Engineer and Experience Designer.

The difference between internal UX and external UX is important. For internal UX the mapping of the UX roles to the company structure is highly critical, whereas for external UX, external consulting and design services are a supplement to internal UX activities.

2.2 UX MANAGEMENT AS A PROCESS - OVERVIEW

Competence level and allocated time	C 2 / 25 min
Learning Objectives	2.2.A. Graduates will be able to define and describe the steps of the UX Management Cycle.
Keywords	UX management, UX maturity level, UX vision, UX strategy

UX management is best expressed as an iterative cycle, that shows the steps taken, to increase the organizations UX maturity.



1. Identification of current maturity level*
2. Development of a UX Vision*
3. Development of a UX Strategy*
4. Conducting of UX Measurements*

*always addressing Project and Organization views

2.3 UX MANAGEMENT AS A PROCESS - UX MATURITY LEVEL

Competence level and allocated time	C 3 / 40 min
Learning Objectives	2.3.A. Graduates will be able to draw a graphic visualizing the UX maturity levels. 2.3.B. Graduates will be able to describe and approach how to identify the maturity level of an organization.

Keywords	UX maturity level, Ad hoc UX, Project UX, Business UX, Holistic UX
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A company undergoes gradual growth towards user focus as its own UX processes slowly develop and mature. This gradual development often takes place in the same sequence. A UX maturity model is a guide that helps to classify businesses and define what is necessary to reach the next level.

The UX maturity level expresses, how deep UX recognition and UX activities have been incorporated in an organization on a sheer operational up to a strategic level. Most organizations increase their UX maturity level in a similar order.

1. Lack of UX awareness - usability or UX are not there.
2. Ad hoc UX - Individual employees try to learn UX.
3. Project UX - budget and experts for UX tests in some projects.
4. Business UX - UX management works across projects and departments.
5. Strategically integrated UX culture - The development process starts with the user.
6. Holistic UX culture - UX is part of the corporate strategy.

To be able to evaluate the maturity level of the company, the following 12 guiding questions help:

1. How is user research conducted in your company?
2. In which phases of product development are user-centered design methods used?
3. How many projects have a sufficient UX budget?
4. What are the UX roles in the company?
5. In how many projects are UX methods involved?
6. How much are UX results shared and used across departments and projects?
7. To what extent are UX methods standardized?
8. What is the target of the use of UX methods?
9. How do you measure the success of UX methods?
10. How many people have UX training?
11. How strongly is UX already anchored in the corporate culture?
12. How satisfied are users with the UX of the products?

The maturity level expressed itself in phases:

<p>Phase 1: Low UX maturity level 1-2</p>	<p>The foundation stone for UX in the company is laid, for example, with the appointment of a UX person who begins with internal evangelization.</p>
<p>Phase 2: Medium UX maturity level 3-4</p>	<p>A central UX team initially works independently on tasks from various product areas and project constellations. From maturity level 4 at the latest, a UX manager takes on non-operational tasks in this phase, such as controlling the maturity level, developing the UX vision, exchanging experiences and results across teams and linking business and UX goals.</p>
<p>Phase 3: High UX maturity level 5-6</p>	<p>Operational UX tasks of understanding, researching, designing, and testing are shifted to the product and project</p>

	<p>teams. Ideally, more UX administration tasks can be taken over by the central UX team.</p> <p>Consideration of the UX maturity level of your organization.</p>
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2.4 UX MANAGEMENT AS A PROCESS - UX VISION

Competence level and allocated time	C 4 / 40 min
Learning Objectives	<p>2.4.A. Graduates will be able to explain UX management.</p> <p>2.4.B. Graduates will be able to explain the requirements for efficient UX management.</p>
Keywords	UX Product Vision, UX Company Vision

Once the current maturity level of the company has been determined, the desired positive state in the future can be defined - the UX vision. The vision is about the products as well as the whole company's perspective on UX.

The UX vision should be brought in a living form to all who have influence on the successful implementation. Methods such as future-journey-mapping, code of conduct, empathy map, design the package, a prototype, and so on are suitable for this. Develop a UX vision with the company in mind, describing how the work on user experience will ideally look and feel at some point in the future. As many employees as possible should be enthusiastic about the proposed imaginations and enjoy working on them.

UX Vision - Company

- Defines the positioning and role of UX in the company!
- Is the basis for strategic UX decisions
- Answers the question “How should our company look like in the area of user experience in the next X years?”

UX Vision - Product

- Is used to define the direction and the scope for decision-making for product design.
- Harmonizes goals and customer goals
- Focuses the user-centered product development
- Pathways the UX methods applied to reach the vision
- Supports the overall products vision in your company

Visions shall be developed by stakeholders and designers in “Vision workshops” aligning with business visions and strategies. They must not be developed by a single person; however senior this person might be.

2.5 UX MANAGEMENT AS A PROCESS - UX STRATEGY

Competence level and allocated time	C 4 / 40 min
Learning Objectives	2.5.A. Graduates will be able to describe an approach to set up a UX Strategy of an organization
Keywords	UX strategy

“It’s the vision of a solution that needs to be validated with real potential customers to prove that it’s desired in the marketplace. Although UX Design encompasses numerous details such as visual design, content messaging, and how easy it is for a user to accomplish a task, **UX strategy is the “Big Picture”**. It is the high-level plan to achieve one or more business goals under conditions of uncertainty.” Jaime Levy, Author “UX Strategy”

A strategy is an interlocking series of decisions you make to overcome adversity and achieve a desired position. It is based on facts, analysis, and planning, and collects “if statements” that should be regularly evaluated and adapted. Six interlocking aspects shape the strategy.

1. **Uncover challenges that are preventing you from getting from point A to B.** Define which problems you want to solve. Focus on customers and users, but also consider internal challenges.
2. **Inspire your teammates with aspirational goals.** What experience do you ultimately want to deliver? How do you want to differentiate your service? Go beyond generic goals like “be consistent.” Think about how you will influence your customers’ work and daily lives.
3. Indicate and concentrate on your focus areas:
 - **Users:** Who will use your products or services? Your personas
 - **Regions:** What countries, languages and cultures are involved?
 - **Services:** Which products, services, platforms, and technologies are included in the strategy?
 - **Use cases:** What are the key scenarios of use?
 - **Areas of UX:** What areas of UX will make the most difference? Highlight aspects such as information architecture, interaction design, visual design, content strategy, or branding, as well as usability attributes such as control, learnability, or findability.
4. **Design and formulate your guiding principles.** How will you win against competitors? How will you overcome the challenges and how will you solve the problems you are facing? What mantras would you give design teams to consistently work toward the same goal?
5. **Define your activities.** What types of UX activities are needed to implement the strategy and achieve your aspirations? This includes things like user research, concept development, sketching, screen design, prototyping and testing, and creating patterns or guidelines. Team development and skill development also belongs here.

6. **Measure.** How can you check the progress and success of your strategy? You need to measure aspects of the user experience (e.g., satisfaction) that should support business goals before and after you begin.

2.6 UX MANAGEMENT AS A PROCESS - UX MEASUREMENT

Competence level and allocated time	C 4 / 100 min
Learning Objectives	<p>2.6.A. Graduates will be able to argue the importance of UX measurement for UX strategies.</p> <p>2.6.B. Graduates will be able to name measures to collect data for UX measurement.</p> <p>2.6.C. Graduates will be able to differentiate Usability metrics, UX KPIs and KEIs.</p>
Keywords	UX Measurements, ROI, KPI, KEI, Usability Metrics

To verify that the UX strategy is working, measurement is needed. The metrics must fit the company, the goal, and the task. Tools such as usability testing, AB testing, multivariate testing, and surveys provide data for Usability and UX metrics such as task success rate, time-on-task, search versus navigation, or user error rate. However, to measure the success of the UX strategy, business data must be collected and contextualized in addition to user data. This data is provided by other departments like Marketing, Sales, Customer Support or Business Analysis. Metrics can be top line growth & cancellation, churn, or average revenue per user (ARPU).

The overall questions that measurements address

- the Usability and UX quality >> Is the UX good?
- the Return of Investment (ROI) >> Does it pay to invest in UX?

Therefore, it is essential to understand the meaning, measurement methods and tools and differentiation of:

- Usability Metrics
- Key performance indicators (KPIs)
- Key experience indicators (KEI)

A good user experience is clearly good for business. Studies show that companies that invest in UX lower customer acquisition costs, lower support costs, increase customer retention and increase market share. On average, every dollar invested in UX yields \$100 in return. (Source Forester Research)

Key ROI areas from UX that save money and time:

- Overall revenue / conversion boost (loyalty)
- Lower support calls (cost)
- Customer retention / increase customer satisfaction (also B2B) (revenue)
- Development time / Team productivity (efficiency)
- Development costs / reduced development waste (quality)
- Reduces the risk of building the wrong thing!

3 UX Software Development

3.1 SOFTWARE DEVELOPMENT OVERVIEW

Competence level and allocated time	K4 / 90 min
Learning Objectives	<p>3.1.A. Graduates are able to name classical software development life cycle (SDLC) models</p> <p>3.1.B. Graduates are able to explain the advantages and disadvantages of classical software development life cycle (SDLC) models</p> <p>3.1.C. Graduates are able to name agile software development life cycle (SDLC) models</p> <p>3.1.D. Graduates are able to explain the advantages and disadvantages of agile software development life cycle (SDLC) models</p>
Keywords	Software engineering, Software development processes, Software development life cycle (SDLC) models

Software engineering basics are not part of this syllabus. Intermediate knowledge of software engineering methodologies like the waterfall model and agile frameworks are prerequisites for this level.

Software development life cycle (SDLC) is a planned process that consists of a series of activities to develop or modify software systems. In recent decades companies have implemented different types of SDLCs. These SDLC all aim to produce a high-quality software.

High quality software: Software that meets or exceeds customer expectations and reaches completion within times and cost estimates.

SDLCs are also called “software development processes” and are frameworks defining tasks performed at each step in the software development process.

The international standard for the software life-cycle processes is the ISO/IEC 12207 that defines tasks required for developing and maintaining software.

3.1.1 OVERVIEW “CLASSICAL” SDLCs

Commonly used classical SDLCs include:

Waterfall model	<ul style="list-style-type: none"> • linear sequential flow • the earliest SDLC approach for software • the following phase starts only after completion of the previous phase • easy to learn • difficult to use
V-model	<ul style="list-style-type: none"> • execution of processes happens in a sequential manner • Verification and validation model • extension of the waterfall model • for every single phase in the development cycle, there is a directly associated testing phase • the following phase starts only after completion of the previous phase
Iterative model	<ul style="list-style-type: none"> • starts with the implementation of a small set of software requirements • iteratively enhances the evolving versions • does not attempt to start with a full specification of requirements • the development begins with specifying and implementing a small part of the software • it is reviewed to identify further requirements • the process is repeated • a new version of the software at the end of each iteration of the model is produced
Spiral model	<ul style="list-style-type: none"> • combines iterative development with aspects of the waterfall model • high emphasis on risk analysis

	<ul style="list-style-type: none"> • incremental releases or refinements through each iteration around a spiral
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3.1.2 OVERVIEW “AGILE” SDLCs

Agile SDLCs have become very popular recently. Agile ideas (“lightweight methods”) started early in software development due to its flexibility and adaptability.

History of agile methods:

- 1991: Rapid Application Development (RAD)
- 1994: Rational Unified Process (UP)
- 1994: Dynamic Systems Development Method (DSDM)
- 1995: Scrum
- 1996: Extreme Programming
- 1997: Feature-Driven Development (FDD)
- 2001: Agile Manifesto

Commonly used agile SDLCs include:

Lean software development	<ul style="list-style-type: none"> • Eliminate waste • Amplify learning • Decide as late as possible • Deliver as fast as possible • Empower the team • Build integrity in • Optimize
Kanban	<p>Uses specific metrics to measure team capacity and estimate project length</p> <ul style="list-style-type: none"> • Team velocity defines how many tasks a team can deliver in a given period of time

	<ul style="list-style-type: none"> • Lead time is used to understand how long a client has to wait for their product • Cycle time is used to understand how fast the team produces a product • Actionable Agile metrics use cycle time to better predict when each project item is going to be finished <p>Manages workflow directly on the Kanban Board</p> <ul style="list-style-type: none"> • visualizes the work of the development team (the features and user stories). • captures WIP limits for development steps: the circled values below the column headings that limit the number of work items under that step. • documents policies, also known as done rules <p>Shows performance of individual team members</p>
Scrum	<ul style="list-style-type: none"> • Scrum is an agile framework for developing, delivering, and sustaining complex products with an initial emphasis on software development • Scrum is used in other fields like research, sales, marketing and advanced technologies • Scrum is designed for teams of ten or fewer members. • Work is scheduled in goals that can be completed within time-boxed iterations, called sprints • Sprints length is between one month and one week • The Scrum Team track progress in short (15 minutes) time-boxed daily meetings, called daily scrums. • At the end of the sprint, the team holds <ul style="list-style-type: none"> ○ sprint review, to demonstrate the work done ○ sprint retrospective to improve continuously.

<p>Large-Scale Scrum (LeSS)</p>	<ul style="list-style-type: none"> • multiple teams who work together on a single product. • apply the principles and ideals of scrum in a large-scale enterprise • 10 principles of LeSS <ul style="list-style-type: none"> ○ Large-Scale Scrum is Scrum <ul style="list-style-type: none"> ▪ Empirical process control ▪ Transparency ▪ More with less • Whole product focus • Customer-centric • Continuous improvement towards perfection • Systems thinking • Lean thinking • Queuing theory
<p>SAFe (scaled Agile Framework®)</p>	<ul style="list-style-type: none"> • The Scaled Agile Framework® (SAFe®) is a system for implementing Agile, Lean, and DevOps practices at scale. • The Scaled Agile Framework is one of the most popular frameworks for leading enterprises. • 10 Principles of SAFe <ul style="list-style-type: none"> ○ 1 – Take an economic view ○ 2 – Apply systems thinking ○ 3 – Assume variability; preserve options ○ 4 – Build incrementally with fast, integrated learning cycles ○ 5 – Base milestones on an objective evaluation of working systems ○ 6 – Visualize and limit WIP, reduce batch sizes, and manage queue lengths

	<ul style="list-style-type: none"> ○ 7 – Apply cadence, synchronize with cross-domain planning ○ 8 – Unlock the intrinsic motivation of knowledge workers ○ 9 – Decentralize decision-making ○ 10 – Organize around value
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3.1.3 OTHER SDLCs

Other commonly used SDLCs include:

Big Bang model	<ul style="list-style-type: none"> • No specific process • starts with the assumed required budget and efforts • the output is the produced software which may or may not meet customer requirements <ul style="list-style-type: none"> ○ allows the customer to be vague about what exactly he wants ○ requirements are implemented on the fly without much analysis ○ very commonly used ○ positive results can be expected in small projects only (one to two developers)
Rapid Application Development (RAD)	<ul style="list-style-type: none"> • prototyping and iterative development • no specific planning • customer requirements assess in workshops and/or focus groups • testing of the prototypes by the customer • continuous integration and rapid delivery • use in projects in which clear modularization is possible • reuse of the existing prototypes and components

3.2 SDLCs AND UX

Competence level and allocated time	K3 / 150 min
Learning Objectives	<p>3.2.A. Graduates can explain the need for cross-functional teams</p> <p>3.2.B. Graduates can explain how “Agile” and “UX” can be integrated</p> <p>3.2.C. Graduates can explain the “Agile Ceremonies”</p> <p>3.2.D. Graduates can explain how Dual Track Agile works</p>
Keywords	Cross-functional Teams, Agile, Agile Ceremonies, Dual Track Agile

Software Development Processes and User Experience Design are difficult to combine. The main causes for this often-observed fact can be found among the following.

- UX Teams do not understand the needs of software engineers
- Software Engineers do not understand the needs of UX Teams
- Software Engineering Processes do not include UX Design Processes nor User Research
- User Research and UX Design Processes are stand-alone Processes and poorly integrate with SDLCs
- Efficient Teams are more than a group of people

3.2.1 U OR T SHAPED SKILL PROFILES

U or T shaped skill profiles solve many of these problems. Cross-functional teams need to have basic skills in all disciplines involved. Make sure all UX people have basic knowledge of Software Engineering; all Software Engineers have basic skills in UX design.

3.2.2 AGILE SOFTWARE DEVELOPMENT & UX

Today the most used agile methodology in software engineering is SCRUM. SCRUM comes in different flavors and is adapted to the specific needs of teams. The exact way how SCRUM is implemented is not fully defined. Therefore, SCRUM might differ a lot, depending on the team.

In the concept of SCRUM, there was no role defined for UX/UI. Developers are the ones responsible for the UX/UI. Without user research, creating the UI of an application often results in an inferior user experience.

Many teams experience challenges when combining SCRUM and UX design. Agile methodologies are focused on developers. The main objective of SCRUM is to get software engineering done, usability and UX are not part of SCRUM. The UX design process is more similar to the waterfall method.

Guidelines for integrating UX into SCRUM

- UX people need to be included from the onset of the project.
- Only if the value of UX is fully understood, UXers can become part of a decentralized team supporting
- When requirements are defined and the roadmap is created UX has to work in close cooperation with the product team and the stakeholders
- The ideation or discovery phase will help define the problem and bring together different teams' perspectives into a vision
- Don't try to answer all user research questions at the beginning. This leads to SCRUM waterfall and has to be avoided.
- UXers need to learn to focus on the right amount of research that will support their assumption for a concept or a feature.
- At least one dedicated UX person needs to be part of the team
- Customer exposure hours for the whole team
- Cross-functional participation in learning activities
- Changing and evolving requirements
- Incremental and iterative development
- Products have to be available quickly
- Products are developed with the customer as a stakeholder
- UX roles in the process
- UX researchers & designers need to be involved from the beginning of the project.

- The idea or research phase helps to define the problem and bring the perspectives of different teams together into one vision
- When defining requirements, UX must work in close collaboration with the developing product team and stakeholders.
- Understanding and acceptance: Only when the value of UX is fully understood, UX specialists can become part of a decentralized team that supports them.

Jeff Godhelf (Author of “Lean UX”) says:

- A) The product backlog contains the pieces of the broader vision that are not going to be worked on in the current sprint. High-level items, vision, and many assumptions live here. To inform the product backlog, activities like Design Sprints, Research (qualitative, all types) and hypothesis writing help inject both reality and a customer-centric focus to these items.
- B) Sprint planning is the day-to-day level planning effort for the team. Questions like “What will it look like?”, “How will the product flow from screen to screen?”, “What are the exceptions we’ll need to deal with?” can be answered with design tools like Collaborative Sketching (aka “Design studios”, “charettes” etc) and other group brainstorming activities that UX designers are particularly good at facilitating.
- C) The tactical Design work (capital D to serve as an umbrella for the various facets of product design) has to go into the tactical backlog — the sprint backlog — and is then executed by designers, primarily, but also in collaboration with the rest of the scrum team. The key is to prioritize this work in a way that allows all team members to work in parallel.
- D) Critically missing from the core scrum team, and necessary for the integration of UX design, is a full-time designer on the team. The only way the tactics in #3 can happen in parallel collaboration with developers, product managers, and scrum masters is if there is a full-time designer on the team.
- E) Sprint review is an opportunity to take a look, together as a team, at the output the team generated during the sprint. This is also an opportunity to review what we have learned during the sprint (aka the outcomes). Activities like design reviews,

discussion, and debate of research synthesis and quantitative analysis inform the work we are considering pushing live and help us focus our next round of both product and sprint backlog prioritization.

- F) It is critical to point out that none of this can happen without a dedicated designer role assigned to the scrum team. The UX designer ensures that relevant activities are proposed, prioritized and implemented. If the design work is outsourced to a designer outside of the team (regardless if that designer is in-house or not) then the team finds itself back in the “Big Design Up Front” style of working also known as waterfall or the “sprint ahead” method — all of which reduce collaboration, shared understanding and trust between team members.

3.2.3 UX TODO'S AT CEREMONIES

Product Backlog: Bringing UX aspects into the definition of epics and user stories, defining UX stories

Sprint Backlog: Selection of the UX stories and coordination of the UX stories with the software development epics and user stories. Define increment

Daily standup: Status info of the work, urgent UX relevant aspects bring in. Not always required

Sprint Planning: Coordination of UX & software development stories

Sprint review: Product review, present evaluation results, etc.

Sprint Retrospective: Addressing UX aspects in the software engineering process

Unplanned Meetings: UX needs to be involved

3.2.4 DUAL-TRACK AGILE

Widely used method to combine UX and Scrum.

- Cycle 1 does not yet have any design input from the “other track” and therefore begins with
 - basic technical work or implementation of fundamentals and inexpensive (possibly easily changeable) UI aspects
- From cycle 2 onwards, the design inputs defined in the previous cycles in the UX design track are implemented.

Crucial for success:

- Understanding of the design inputs (“no interpretation”)
- Openness, communication, inquiries
- UI and interaction design skills of the developer (e.g. button logic)
- Dual track (agile) development
- Cycle 1 has input from cycle 0
- Design for implementation in cycle 2
- From cycle 2 onwards
 - (tested the implemented designs from the previous cycle)
 - Developed the design for implementation in the next cycle.
- UX research activities, user requirements determined for the next but one cycle.
- Crucial for success: communication, exchange between design and development
- Understanding of the UX designer for the technical limits and possibilities
- Understanding of the developer for the UX design tasks
- No “throwing over the fence” of a specification

4 UX Research and Evaluation

4.1 DEFINITION UX RESEARCH AND DIFFERENTIATION TO EVALUATION

Competence level and allocated time	C 3 / 15 min
Learning Objectives	4.1.A. Graduates will be able to define and differentiate UX research and Evaluation activities.
Keywords	Design thinking double diamond, UX research, Evaluation

The purpose of every system development is to solve problems of businesses and people by the means of enabling or supporting specified tasks of its users. The critical core of any development is to validly identify and describe these problems, so that solutions can be worked on. For the design of systems, that solve problems, it is important to “design the right things” as well as “design the things right” (from Design Thinking Double Diamond). Therefore, it is important to carry out UX Research activities (design the right things) as well as Usability and UX Evaluation activities (design the things right).

The Double Diamond model visualizes this very comprehensible.

https://commons.wikimedia.org/wiki/File:Double_diamond.png#/media/File:Double_diamond.png

- UX research describes the systematic **study** of target users, their requirements as well as the contextual aspects of use, to add **realistic insights to design processes**.
- UX Evaluation describes a variety of available methods, tools, and respective skills to assess **how users subjectively perceive a system before, during and after using it**.

- Usability Evaluation describes a variety of available methods, tools, and respective skills to assess how efficient, effective, and satisfactory a system can be used (worked with) by specific users in a given context.

Research (as well as evaluation) activities must be planned, conducted, and analysed considering the quality criteria validity, reliability, and objectivity (see Foundation Level). Therefore, the selection of the right method is crucial for the success of research activities. A wrong method can lead to seemingly valid data, although it did not uncover any truths or answer any research questions correctly.

E.g., Merely asking somebody how often he/she unlocked his/her phone within the last 2 days will lead to an estimation, which is by no means valid. Logging usage data would be the valid method.

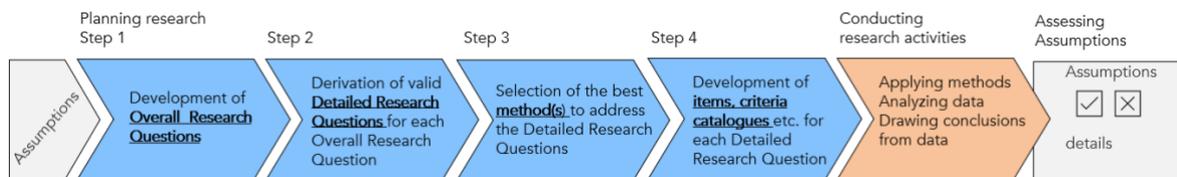
E.g., Observing users while they buy a train ticket at a ticketing machine can decrease reliability if different observers focus on different aspects of the process. A criteria catalogue can solve the issue (best combined with an open observation beforehand to identify criteria for the catalogue).

4.2 PLANNING RESEARCH ACTIVITIES

Competence level and allocated time	C 3 / 30 min
Learning Objectives	4.2.A. Graduates will be able to describe the process of setting up UX research activities. 4.2.B. Graduates will be able to describe the criteria for successfully conducting each step.
Keywords	Overall program question, assumptions, methods, items, criteria catalogue

When research questions are developed, they are mainly derived from preliminary assumptions. Such assumptions exist in every system development, they express the ideas of what a system (respectively its users) will achieve, what problems it will solve. Such preliminary

assumptions are mostly made by business strategists, marketing people or other stakeholders. A critical error that often occurs is that such assumptions are wrongly understood as facts, rather than as a starting point for research activities. Only thorough research can validate (or falsify) the hypotheses that describe an assumptions characteristic.



Based upon the assumptions, overall research questions are developed (step 1) that facilitate their validation (or falsification). To practically carry out respective research activities, more detailed research questions need to be derived from the overall research questions (step 2). Once the detailed research questions are known the best method(s) can be selected, that is/are valid and feasible (step 3). Finally, the concrete items (criteria catalogues etc.) can be developed (step 4). After the research activities have been carried out, the assumptions (meaning the describing hypotheses) can be validated, readjusted or need to be falsified.

4.3 STRUCTURE OF RESEARCH AND EVALUATION METHODS WITH USERS

Competence level and allocated time	C 3 / 60 min
Learning Objectives	4.3.A. Graduates will be able to explain basic types of surveys, observations, workshops, and data analysis approaches for UX means. 4.3.B. Graduates will be able to describe the methodological benefits and drawbacks of these methods.
Keywords	Survey (Ethnographic, Narrative, Episodic, Focused, Problem oriented) (Structured, Semi-structured, Unstructured) Question types (Factual question, Knowledge question, Attitude / opinion question, Behavioral question)

	Observation (Introspection, External observation, Overt, Covered, Participatory, Laboratory Context)
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All research questions that need to be addressed or hypotheses that need to be validated require valid user perspectives. In order to gather these, the right method has to be chosen and applied correctly. The graphic below provides an overview of the most important basic methods every UX researcher needs to know and differentiate. For timely reasons, the Advanced Level does not cover any creative research methods.

Surveys cover interviews as well as questionnaires. It is self-explanatory that some of the descriptive elements only apply to one of these.

Survey	Description	Application
Ethnographic	Gives insights into the world and everyday life of people and their values. For example, consumers are observed in their natural environment or in their everyday setting (at home, in the vehicle, on the street) and asked about their habits and needs.	Exploring, getting to know the context of use and the user's behavior within
Narrative	Provides a narration of the interviewee's own biography, his own perspective is captured in the form of the subjective contexts constructed by him. Narrators should not be interrupted, and they should, if possible, only tell, not evaluate, or argue.	Getting to know people's perspectives on systems, problems or tasks in detail and also learning about wordings, terms, and mental models without providing a guide or frame for the narration

<p>Episodic</p>	<p>Combines questioning and narration. It is therefore a questioned or controlled narration, a survey that stands between a guide and a narrative survey.</p>	<p>Like narrative, but only the direction and framing of the user's narration (answers) is provided.</p>
<p>Focused</p>	<p>A clearly defined topic or input forms the stimulus for the survey. Based on specific questions at the beginning, the reactions and interpretations are discussed. Then the respondent should express himself as freely as possible, even if these aspects are not expected or planned.</p>	<p>If the topic of a survey is already more closely defined and the user shall not drift away from a main set of questions / a topic.</p>
<p>Problem oriented</p>	<p>The respondents' subjective perceptions and experiences of a specific problem complex are recorded. Open-ended questions are asked so that the respondents can tell their experiences as freely as possible. If necessary, the interviewed person can be repeatedly led back through specific questions.</p>	<p>If a well-defined problem is the core of the survey and the user shall clearly stick to the problem and not go beyond that.</p>

Level of Structuring

Surveys	Description	Advantage / Disadvantage
Structured	<p>A structured survey is linked to a fixed catalogue of questions. The guidelines also provide a number of possible answers. Questions define a closed answer room (variety of possible answers).</p>	<p>Advantage: Efficient data analysis and evaluation of good quality criteria to be met. High comparability</p> <p>Disadvantage: Valuable insights / findings can remain undiscovered, possibly bias due to limited answer options.</p>
Semi-structured	<p>In a semi-structured survey, some of the questions asked are determined in advance, others arise spontaneously. The order in which the questions are asked is flexible and the respondents can answer completely freely.</p>	<p>See the advantages and disadvantages of structured / unstructured surveys.</p>

<p>Unstructured</p>	<p>In an unstructured survey, the interviewer asks questions that have not been planned in advance. Instead, questions arise spontaneously in a free-flowing conversation, which is why different people are confronted with different questions.</p>	<p>Advantage: Insights / findings are widely discovered. Motivation of participants high because they feel really addressed. Disadvantage: Low comparability and reliability Resource-intensive for data analysis and evaluation.</p>
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Written versus verbal

Survey	Description	Advantage / Disadvantage
<p>Written</p>	<p>Written questions are presented that the respondent reads and fills out himself. (Online, offline / paper). With or without a supervisor / moderator present.</p>	<p>Advantage: Large numbers of participants can be included efficiently. High reliability and comparable data Pretests of questionnaires support methodological validity. Disadvantage: Limited answers room (variety of possible answers) or resource-intensive data analysis Risk of comprehension bias Clarifying unclear answers, completeness check, observation of behavior when filling out, only if a moderator is present.</p>

<p>Verbal</p>	<p>In the form of oral communication (in person, via video tool or telephone). In the presence of third parties? Inquiries, completeness check, observation of behavior when filling out possible.</p>	<p>Advantage: Clarifying unclear answers and observation of participants' behavior are possible. Participants are (mostly) more willing to give detailed answers. Disadvantage: Reliability depends on interviewers' skills (comparability of results at risk due to her/his influences). Resource-intensive for data analysis and evaluation.</p>
<p>Combination of verbal and written survey</p>	<p>Combination of both. (in person, via video tool). Objectively / professionally justified depending on the answer type, complexity or number of answer options, or integrated templates (e.g. photos). Inquiries, completeness check, observation of behavior when filling out possible.</p>	<p>See written /verbal</p>

Question types

<p>Factual question</p>	<p>Do you have a smartphone?</p>	<p>Reliability of answer: high</p>
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Knowledge question	Who was the founder of Apple?	Reliability of answer: high
Attitude / opinion question	What do you think of the new US President?	Reliability of answer: medium Best supported by real context scenarios
Behavioral question	Would you buy this product again?)	Reliability of answer: low Best validated through large data sets that level out deviations

Question / answer types

Open or closed answer room	variety of possible answers
Scales	Likert scales, semantic differentials
Single Choice	Yes / No; A or B or C
Multiple choice	A - B - C - ...n
Free expression	textual / verbal

Observations

	Description	Important for conduction
Introspection	Every “questioning” about internal processes requires introspection. UX area: e.g. diaries, photo diaries, tally sheets	Reactivity of this process: the fact that you observe yourself influences behavior.
External observation Overt: participants know they are being observed Covered: participants do not know they are being observed Participatory: observer is part of the group / activity (overt or covered)	Can provide precise information about external conditions. Cannot deliver any information about their subjective meaning or corresponding inner curtains (decision-making processes, motivations, etc.). A supplementary survey is absolutely necessary here. UX area: e.g. by observing UX researchers, video (attention to data protection and personal rights), logging / tracking of technical constructs	If participants know that they are observed, they automatically change their behavior. (Mostly adapt it to what is socially appropriate/ expected)
Criteria catalogue	Observers have a list of criteria, that they must take notes or capture numeric aspects of. Anything outside of the criteria is ignored.	High reliability of the results, but interesting behaviors /insights might go lost.
Open (no criteria)	Observers have no criteria, they take notes of everything they find interesting.	Results show a low reliability but they provide a wide range of insights.

Observation laboratory versus in the Context of use (in the field)

<p>Laboratory</p>	<p>A context is set up, that allows a moderator and a test participant to concentrate on a task at hand fully. As many influences on the participant are eliminated or actively shaped.</p> <p>UX area: e.g. usability tests</p>	<p>Standardization of influencing factors is possible.</p> <p>Unnatural context: influences behavior, results are not optimally valid</p>
<p>Context (real context of use)</p>	<p>Users are observed while</p>	<p>It is not possible to standardize influencing factors.</p> <p>Natural context: largely unaffected behavior, results show a high validity.</p>

(Big) Data analysis

	Description	Important for conduction
Quantitative	<p>Extensive data sets: web analytics, market research, business analytics, A / B tests, etc.</p> <p>Information about “what” users do, rarely “why” they do it.</p> <p>The amount of data can compensate for various influencing factors.</p>	<p>If the available data is derived from valid sources and enough to run statistical analysis.</p>
Qualitative	<p>Smaller “narrative” data: customer center, support, trainer, ...</p> <p>Shedding light on where problems lie, good guesswork as to why.</p>	<p>The frequency of detected issues / problems can only be validated with appropriate numerical data.</p>
Snapshot of a given state	<p>Existing data sets are analyzed “we look at what is there” (e.g., use Google Analytics)</p> <p>Good starting point to start creating the first hypothesis.</p>	<p>The quality and validity of any included data must be assessed beforehand.</p>
Planned period	<p>It is planned in advance what data shall be collected and analyzed at time $t + x$ (e.g., A / B test)</p> <p>Data can address and clarify specific questions.</p>	<p>Challenge: Which data is the right one to answer a given question or validate/falsify a hypothesis?</p>

Workshops

	Description	When to apply
Develop hypothesis	<p>Getting to know a complex topic, problem area, field of application or groups of people.</p> <p>Moderated open conversation, narrative character, picture / video material often helpful in context, group work.</p>	If the topic in question is still undefined (often paired with ethnographic studies).
Validate hypothesis	<p>Assessing existing hypotheses and ideas for a system or any relevant aspect of it.</p> <p>Strictly moderated conversation, narrative character, image / video material often helpful in the expected context.</p>	If hypotheses have already been created on topics, problem areas, fields of application or groups of people that need to be checked or questioned (can they be falsified?).

4.4 BASICS OF DEVELOPING VALID SURVEYS

Competence level and allocated time	C 3 / 25 min
Learning Objectives	4.4.A. Participants will be able to name the relevant criteria of developing survey items.
Keywords	Scales, semantic differential, Likert scale, monotony, Bias, answer options, attributes, dimensions, introductory barriers,

Putting down a question in writing does not make it an objective inquiry. Putting down many questions in writing does not make a valid questionnaire. It is very important for people working in UX to understand the accuracy with which questionnaires must be developed. A badly made questionnaire puts a project at risk, because stakeholders think they have collected data they can build decisions upon, although the data is invalid. (The same accounts for interviews and observations, but here the effect seems to be more obvious to stakeholders.)

These are the most important basic aspects that need to be covered:

Issue	Result, effect if not developed accurately
Interest in the inquired topics is very high for the development team but mostly just a short activity for the participant	Attention, willingness to invest time and think thoroughly, understanding of the importance of contents.
Each question influences all consecutively provided ones	Introducing bias if sequence is not designed accurately
Level of Face validity (see Foundation Level) has to be explicitly decided upon, otherwise it causes bias	Conscious or unconscious nudging of answers towards socially appreciated behaviour or towards reactance

Usage of Scales, semantic differential, Likert scale	Wrong application introduces bias; in answering as well as statistical analysis. Bias of forcing choice of direction.
Using an Even number of options in scales	Miscomprehension bias
Invalid opposite attributes	Wrong statistical scale level bias
Invalid scaling dimensions	
Definition of attributes, choices	Questionnaire developer's mental model effect
Dealing with "no answer" and "not applicable"	Effect on the whole questionnaire; respective questionnaire now invalid, Data analysis and interpretation problem
Handling introductory barriers	Motivation bias
Questioning past numerical incidents	Memory bias
Direct versus indirect questions	Face validity and miscomprehension bias

4.5 JOURNEY MAPPING (CUSTOMER JOURNEYS AND USER JOURNEYS)

Competence level and allocated time	C 3 / 40 min
Learning Objectives	<p>4.5.A. Participants will be able to explain the benefits of journey mapping.</p> <p>4.5.B. Graduates will be able to name the components of a journey map.</p> <p>4.5.C. Graduates will know how to develop and interpret a journey map.</p> <p>4.5.D. Graduates will be able to describe the two different approaches towards developing a journey map.</p>

Keywords	Journey map, journey mapping, Journey Phases, Actions, Mindsets, and Emotions, Opportunities
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A journey map graphically presents the interaction points that a person experiences when dealing with a system or organization. A user journey map targets the interaction points with a system, a customer journey map the ones with an organization. The points are needs and pain points.

Definition: A journey map is a visualization of the process that a person goes through in order to accomplish a goal. (see NNg Nielsen Norman group)

4.5.1 PURPOSE AND PARTICIPANTS OF A JOURNEY MAPPING

Journey maps facilitate effective communication within an organization or design team. They make sure the team / organization can focus team effort on the right outcomes (not outputs!) by the means of decreasing miscomprehensions and aligning knowledge and perspectives. The practice of journey mapping itself is often the most valuable part of the process, not the resulting visualization itself. Therefore, the mapping should be a collaborative activity.

Journey mapping ideally includes the people / insights from marketing, customer services, sales, and related areas. These hold important knowledge about the journey one plans to map. It is very beneficial to include respective people and not just data, because reports do not narrate a story as people do. It is always valuable to include executives and senior management in the process. They have the authority to make changes, still they very often have the least experience with the customer/user or his needs.

4.5.2 STRUCTURE OF A JOURNEY MAP

Typically journey maps include 3 zones:

- a lens that provides focus and context for the journey being mapped
- an area depicting the user’s experience,
- a third zone for insights derived from analyzing the journey.

Zone A: The lens provides constraints for the map by assigning (1) a persona (“who”) and (2) the scenario to be examined (“what”).

Zone B: The heart of the map is the visualized experience, usually aligned across (3) chunkable phases of the journey. The (4) actions, (5) thoughts, and (6) emotional experience the user has throughout the journey can be supplemented with quotes or videos from research.

Zone C: The output should vary based on the business goal the map supports, but it could describe the insights and pain points discovered, and the (7) opportunities to focus on going forward, as well as (8) internal ownership.

Source: NNG <https://www.nngroup.com/articles/customer-journey-mapping/>

There are two major benefits of journey maps:

- The process of developing a journey map facilitates the alignment of mental models and the understanding of the respective system or service. This is crucial for the success of a systems and service design, because mostly, it is no one’s explicit responsibility to look at the entire experience from the user’s standpoint.
- The resulting map can be used to communicate an understanding of users and services to all people involved in the process of development, including various stakeholders. Journey maps can convey information in a memorable and concise way.

4.5.3 KEY COMPONENTS OF A JOURNEY MAP

Journey maps can have endless variations in visual presentation and sizes. Still, they all encompass the following 5 key elements:

Actor	The actor is the protagonist of the journey - the persona or user who experiences it. It is crucial to always have one persona in a map in order to build a strong, clear narrative. If within one map, several different personas are “used” (considered), the mental model and empathy that the team should develop is at stake and no common understanding will arise.
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<p>Scenario and Expectations</p>	<p>The scenario describes the situation that the journey map addresses. It includes the actor’s goal or need and expectations. Scenarios can be described for existing products and services or for anticipated ones, for products that are yet in the design stage.</p> <p>Journey maps are best for scenarios that encompass a sequence of events or steps (such as shopping) or describe a process.</p>
<p>Journey Phases</p>	<p>Journey phases are the different overall stages that the actor runs through during his journey. Such phases are necessary to structure the information in the journey map (actions, thoughts, and emotions). The phases vary from scenario to scenario because they depend on the service / product that it is about. For example, phases for a shopping app can be Engage, Search, Evaluate, Decide, Buy.</p>
<p>Actions, Mindsets, and Emotions</p>	<p>The behaviors, thoughts, and feelings of the actor are mapped to the journey’s points within each of the journey phases.</p> <p>Actions are the actual behaviors and steps taken by users, described in a narrative way rather than a step-by-step log.</p> <p>Mindsets are the users’ thoughts, motivations and information needs at different stages in the journey.</p> <p>Emotions are plotted as single dots (connected to a line) across the actor’s journey. In this way, the emotional experiences - positive “ups” and negative “downs” – throughout the actors journey are clearly outlined in the final map.</p>
<p>Opportunities</p>	<p>Opportunities are insights gained from mapping, the outcome that the method is targeting at. Depending on the set up of the journey map – the kind of addressed opportunities - they help draw knowledge from the map.</p>

Difference of Journey Map and User Story Map

User stories are used in Agile to plan features or functionalities. Each user story describes a task (or a set of connected tasks that have an overall goal) in a narrative way. A user story map is a visual version of a user story. A user story map may look like a journey map, but journey maps are meant for broad discovery and thorough understanding (big picture), while user story maps are for planning and implementation (narrow task view).

2 Types of approaches to journey mapping

Research-first approach: Deep customer insights are gathered before mapping the customer journey.

Hypothesis-first approach: A workshop with internal stakeholders results in a hypothesis journey map. This is based on existing knowledge and assumptions only! Then these maps are assessed and questioned with valid research. The inevitably detected discrepancies between hypothesis and reality lead to a revised version of the map.

4.6 TEST METHODS – REMOTE TESTING

Competence level and allocated time	C 3 / 40 min
Learning Objectives	4.6.A. Graduates will be able to decide upon the most suitable testing option for a given project and its context. 4.6.B. Graduates will be able to explain the advantages and disadvantages of moderated and unmoderated remote tests.
Keywords	Remote usability testing, Moderated versus unmoderated testing

4.6.1 BASICS OF REMOTE USABILITY TESTING

Remote usability testing is a usability testing method, where the test participant (user) is dislocated from the test moderator. It does not mean, the test person is in another room within a laboratory, but in a completely different location, e.g., his home, his office, or any other appropriate site. This remote site very often is the real context of use, that the user would be

using the system in (e.g., in a museum, in a fitness center or in public transport). Whilst the user is working on his given tasks the following things are recorded: the screen he is working on (showing his interactions), his voice and sometimes his face.

It does not necessarily require a specific remote-usability-testing-tool. Many collaborations or video conferencing tools that are available on the market can be used. There are specific tools for usability testing, but not having these shall not keep from carrying out a remote usability test.

To carry out a remote usability test, what you need is the possibility to:

- Make the respective system available/accessible on the user's computer /device.
- Share the users screen and his voice with a moderator (if it is a moderated test) or produce a recording of these.
- Make a questionnaire accessible to the user directly after the test.

The basic structure of a remote usability test is the same as if the test participant were onsite. When the remote test is moderated, the questionnaires can be exchanged or supplemented with an interview.

1. Test participant is introduced to the test.
2. In some tests a questionnaire is provided before the start of the task (e.g., demographics or questions that need to be addressed before the test person gets to know the system).
3. Test participant carries out the predefined tasks, one after the other, using a written task instruction for each task.
4. Test participant is given a closing questionnaire.

Important difference of remote testing versus “on site” testing

Test participants selection:

One very important aspect of remote tests, that needs to be considered very closely, is the selection of the test participants. Despite all other user characteristics that need attention, it is crucial to address the technical setup of a test and its implications. A test participant who has the technical skills to take care of everything that needs to be done on the test participant's side,

belonging to a user group, should be seen as technically advanced. (Even though it does not seem to be complicated, a very large group of potential users might not have the know-how to do so.) So, such a test can only target a respective user group. Otherwise, a bias is introduced, that can invalidate the whole test.

Scheduling:

Scheduling of test participants is easier, because test participants very often find a time slot during the day, because they do not have to include travel time. Also, it is often possible, to get test participants in their real context of use (e.g., office, fitness center or hiking). One drawback of real context of uses might be, that users are more often distracted. Although this might be the reality, it is not always beneficial in a test.

4.6.2 MODERATED VERSUS UNMODERATED REMOTE USABILITY TESTING

A remote usability test can either be carried out with a moderator, a person accompanying the test participant, or without such support. Both methods have their advantages and disadvantages as well as their best scope of use. An unmoderated remote usability test is often referred to as crowd testing.

Moderated remote usability testing

In moderated usability testing, a moderator (real person) is available for the test participant throughout the test. The moderator and participant are communicating and sharing screens via a respective tool (e.g., MS Teams, Zoom, GoTo Meeting). The moderator is there to help facilitate (i.e., moderate) the test. He guides the test participant through the study and is there to answer questions in case the participant encounters any challenges while completing their tasks.

Advantages of moderated remote testing

- Prototypes with limited functionality, a complicated process or concept can also be tested, because you can naturally interact with the user.
- The test moderator can probe a participant for more information if he seems stuck or confused.
- The test moderator can help with following a predefined schema.

- The test moderator can (partly) observe body language and pick up on subtle behaviours and responses.
- The test moderator can change the procedure (e.g., leave out or add additional tasks) when appropriate.
- Test participant feels more important because a real person is devoting time to his participation.
- Test participant is probably more motivated and concentrated.
- The collected insights can be more representative of a wider population because the geographical location can be more diverse.

Disadvantages of moderated remote testing

- Scheduling requires the consideration of the time of a moderator.
- Due to the additional time and resources, moderated testing costs more than unmoderated testing.

Unmoderated remote usability testing (crowd testing)

In an unmoderated usability testing, the test participant is not guided, so no one else is present during the study. The participant completes the tasks and answers questions at their own pace, on their own time, at a time and location of their choosing. Depending on the set up, the time a participant can spend on each task can be limited. Such a test can be conducted by the developing company, a usability service provider or via a respective online service. Such online services also include the recruiting of test participants, they usually have huge databases of potential participants, who are then selected based upon your user criteria.

Advantages of unmoderated remote testing

- Suitable for validating concepts and designs cheap and quickly with a diverse group of participants.
- Great if a large sample size is required.
- Can be done anytime, anywhere, and feedback is typically available within a couple of days if not sooner.

- Users often do not complete an activity in one sitting (or through one channel). In a remote test it is possible to evaluate such omni-channel experience.
- If you use a respective service platform, you can outsource the recruitment of your test participants.

Disadvantages of unmoderated remote testing

- It requires a fixed set of questions and tasks for participants to complete.
- It does not allow for follow up questions or clarification.
- If participants have technical difficulties or do not understand the tasks or questions, you will not have the ability to help them.
- If the participants are recruited via a platform, you might introduce a bias concerning the (technical) interests or the attentiveness of your users.
- The test results and the resulting data (video, face, voice) need to be carefully interpreted by the development team. This easily leads to fallacy and bias if not conducted very thoroughly.

4.7 QUESTIONNAIRES

Competence level and allocated time	C 2 / 30 min
Learning Objectives	<p>4.7.A. Graduates will be able to describe which questionnaires address different criteria or characteristics of a system.</p> <p>4.7.B. Graduates will be able to name questionnaires that are given to users at a specific point of time.</p> <p>4.7.C. Graduates will be able to describe what timely efforts can be required by questionnaires.</p>
Keywords	Hedonistic and pragmatic characteristics, post task questionnaire, post study questionnaire

There is a broad variety of questionnaires available to assess UX. They

- (A) Address different criteria or characteristics of a system (**hedonistic and pragmatic characteristics**).
- (B) Are given to users at different points of time (e.g., post-study or post-task).
- (C) Require **different timely efforts**, from just a couple of seconds to half an hour or more.

For the certification, participants shall be able to choose from characteristics (A) as well as methodological aspects (B and C) to regard a given systems and/or context. The list of questionnaires below provides a good overview of what is state of the art.

- SUS System Usability Scale
- CSUQ Computer System Usability Scale
- PSSUQ Post Study Usability Questionnaire
- UMUX /lite Usability Metric for User Experience
- USE Usefulness, Satisfaction Ease of Use- Questionnaire
- QUIS Questionnaire for User Interaction Satisfaction
- SUMI Subjective Usability Measurement Inventory
- SUPR-Q Standardized User Experience Percentile Rank Questionnaire
- UEQ User Experience Questionnaire
- WAMMI Website Analysis and Measurement Inventory
- AttrkDiff Subjective Impression of handling and appearance
- meCUE Subjective Impression of key aspects of user experience
- ISO Metrics ISO 9241 110 assessment
- NPS Net Promoter Score
- SEQ Single Ease Question
- ASQ After Scenario Questionnaire
- TLX Task Load Index
- SMEQ Subjective Mental Effort Question
- ATI Affinity for Interaction Technology Scale

5 UX Psychology Insights for Design

Competence level and allocated time	C 3 / 240 min
Learning Objectives	5.1.A. Graduates will be able to explain the listed psychological effects. 5.1.B. Graduates will be able to illustrate examples for each of the effects.
Keywords	Cognitive ease, Sequence effects, Context dependent memory, Hicks law, Paradox of choice, Satisficing, Loss Aversion, Extremeness Aversion, Zeigarnik effect, Spatial memory, Peak – End principle, Von Restorff effect, Picture superiority effect, Reactance, Endowed process effect, Framing

Working with and for users requires an understanding of basic human behavioral and cognitive influences. Below is a list of 16 well described effects and characteristics that must be theoretically explained and showcased with examples for both UX design as well as UX Research activities.

- 1) Cognitive ease,
- 2) Sequence effects,
- 3) Context dependent memory,
- 4) Hicks law,
- 5) Paradox of choice,
- 6) Satisficing,
- 7) Loss Aversion,
- 8) Extremeness Aversion,
- 9) Zeigarnik effect,
- 10) Spatial memory,
- 11) Peak – End principle,
- 12) Von Restorff effect,
- 13) Picture superiority effect,
- 14) Reactance,
- 15) Endowed process effect,
- 16) Framing

READING RECOMMENDATIONS

UX Management

- (1) Corporate UX Maturity: Stages 1-4 (<https://www.nngroup.com>)
- (2) UX Strategy: How to Devise Innovative Digital Products that People Want, Jaime Levy, O'Reilly
- (3) User Experience Management: Essential Skills for Leading Effective UX Teams, Arnie Lund, Morgan Kaufmann

UX Software Development

- (4) Kanban: Successful Evolutionary Change for Your Technology Business, David J. Anderson, United States, Blue Hole Press
- (5) Essential Kanban Condensed. Anderson, David J., Carmichael, Andy, Seattle, WA: Lean Kanban University Press
- (6) The Scrum Guide: The Definitive Guide to Scrum: The Rules of the Game, Schwaber, Ken; Sutherland, Jeff. Retrieved May 13, 2020
- (7) Large-Scale Scrum: More with LeSS, Craig Larman, Bas Vodde: Addison-Wesley Professional

UX Research and Evaluation

- (8) UX Research: Practical Techniques for Designing Better Products, Brad Nunnally, David Farkas, O'Reilly
- (9) Usability Testing Essentials: Ready, Set ...Test!: Ready, Set...Test! Carol Barnum, Morgan Kaufman
- (10) Usability Testing for Survey Research; Emily Geisen, Jennifer Romano Bergstrom, Morgan Kaufman

UX Psychology Insights for Design

- (11) Laws of UX: Design Principles for Persuasive and Ethical Products, Jon Yablonski, O'Reilly
- (12) 100 Things Every Designer Needs to Know About People, Susan Weinschenk, New Riders
- (13) 100 More Things Every Designer Needs to Know About People Susan Weinschenk, New Riders
- (14) UX Psychology, Verena Seibert-Giller (published September 2022)

Foundation Level Handbook

- (15) Usability and User Experience, Seibert-Giller, Pucher, Duda, ISBN 978-3-9504772-6-9