Project no. 619347

EAGLE- EnhAnced Government LEarning

Objective ICT-2013.8.2 Technology-enhanced learning;

c) Holistic learning solutions for managing, reaching and engaging

learners in the public administrations

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UX-Validation Methodology

WP 8 – UX-based Validation
Lead Participant: DHBW

Approval Panel	Name / Partner short name	Department / Function	Date
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1 Introduction

EAGLE's main objective is to equip employees in local government administration in rural communities with a holistic training solution that supports learning of critical transversal skills such as ICT literacy, information literacy and professional management of change situations in entire organisations at all levels.

The EAGLE project applies a user-experience based validation, because ultimately technology and cross-device learning and knowledge exchange do not help, if the user experience is not satisfactory.

2 Validation

Validation aims to collect evidence from different sources to increase the validity of arguments leading to a specific interpretation of collected data. In this project a number of different methods are applied at different stages of the project to find evidence whether the created EAGLE solution actually provides the intended results for the users.

The methodology aims to consider a number of aspects, e.g. through prolonged engagement with the solution and observation of the users, combined with eye-tracking. This triangulation approach is an example how we intend to support the validity of the results. We will also consider content validity, focusing on the contents in relation to change and pedagogy and the user experience validation of the open learning platform.

The external validity will be examined through the transferability of the EAGLE results to communities which are not involved as validation partner, but which are still in the target group or at least in the wider target group such as larger local government organisations. The result will include a description of settings, people, situations to which findings are generalisable.

3 UX-based Validation

UX-based validation means we will use methods known from UX design, but also that the experience of the users determines the interpretation of the validation results. Therefore, in this section we will briefly outline how we define User Experience.

3.1 User Experience in EAGLE

User Experience (UX) describes how a person feels about using a computer system or product (Law et al, 2009), but it also covers a person's perceptions of the practical aspects such as utility, ease of use and efficiency of the system, which is also a way to describe usability. UX is influenced by knowledge and experience of the user, the user's concerns, expectations, skills and abilities (Väänänen-Vainio-Mattila, Roto and Hassenzahl, 2008). Most of these aspects will also have an impact on learning (Moebs and McManis, 2010). In the context of the EAGLE project we include not only usability, but also accessibility to consider a wide variety of users in the user experience validation.

Usability is defined by flexibility, how the system can support changes in main use of the system by the user, learnability, how easy it is to use the system and memorability, whether it is easy to remember how to use it (Sharp, Rogers and Preece, 2007; Stone et al., 2005).

Initially we use the ISO definition for usability (ISO, 1998) and user experience (ISO, 2009). Usability describes whether the learning solution will provide satisfying usage by a distinct user group in a specific context, reaching defined goals effectively and efficiently. User Experience (UX) particularly focuses on the perception and reactions of the user on the actual or expected use of the learning solution. It aims to consider emotions, perceptions, preferences, typical behaviour during as well as after the use of the learning system. UX can be assessed partially by criteria for usability.

These activities are combined with approaches that include accessibility in the mix (Petrie and Bevan, 2009).

3.2   UX-Validation Methodology

The following sections briefly outline how user requirements collected at the beginning of the project, summarised in scenarios and personas, will be used throughout the validation phases. Participant selection and the challenges connected with recruitment of users and keeping them engaged throughout the project are considered, followed by an outline of the validation phases.

3.2.1   User Requirements in Validation

The user requirements collected in WP2 were condensed into regional scenarios, an EAGLE scenario and a set of personas, representing the users in our target group. Summarising and analysing the requirements identified in scenarios and personas is a common technique in UX-based projects. Personas and scenarios will be the main requirements documents used for validation.

In the validation these scenarios and personas will have several roles:

- Validation of the interpretation of the requirements
- Validation of the requirements
- Documentation of changes necessary during validation

The collection of requirements always comprises of the possibility of a misunderstanding between the users and the people gathering data. Feeding back the condensed requirements to the users as personas and scenarios provides an easy interface to identify whether they have been understood and implemented correctly by the project team. The main question in this context is: Do the personas represent typical users and does the scenario describe the ideas developed and the requirements collected during the requirements workshops?

In a next step the personas and scenarios function as a means for an expert validation of the requirements. The mock-ups can be validated against the needs of the different personas and the features described in the scenario. The main question in this context is: Do the mock-ups consider the needs of the different personas and does the system outlined in the mock-ups support the implementation of the scenario?

Finally the scenario and the personas are updated according to results of the validation and other user input. The progressively changing personas and scenarios reflect the progress of the EAGLE solution.

3.2.2   Participants

Participant recruitment for validation before a complete product is available is always a challenge. In this project users can be divided into different user groups according to personal characteristics, such as IT literacy, abilities and disabilities and so on and how they will use the system in the work context. In addition to this, user groups will be differentiated by location, from different countries and cultural backgrounds. These differences have an impact on the use of the learning solution, as well as on the way different validation methods can be applied. It will also affect their attitude towards the EAGLE project as a European project. A general scepticism towards European projects can be found in all regions, especially when there is doubt about the benefit of digital collaboration in general. A common theme is also scarce time resources. This is even more a pressing issue, as users from our target group often are responsible for more than one area of responsibility, due to the size of their organisations.

The largest partner country in EAGLE, Germany, presents an additional challenge. Unlike all other regions, the German local governments were invited after the start of the project, according to one of the requests during the project preparation negotiations. This creates a different situation when approaching these communities. Rather than feeling part of a successful team, as the other three regions, the German communities react as if they are doing someone a favour, helping with the project. In the other countries people have been involved in the pre-study and have expressed their interest before the start of the project.

The group of participants for the validation activities are slowly shifting. These different types of users are also reflected in the personas. Initially validation is supported by advanced users (Brandtzæg et al, 2011) within our partner region local governments. They provide insights, whether the proposed solution is usable within the local government setting and mind set at all. They are also expected to function as pioneers, drawing in more reluctant users, which we expect will be the majority of the target group. Hence, the initial validation activities are at the beginning conducted with smaller groups, and later expanded to other users as availability allows.

Generally the participants should represent different levels of hierarchy and seniority, gender and IT literacy, to allow for a feedback from a variety of perspectives.

The methods selected allow for different formats of interaction. As we know from our previous contacts in the regions, some users can be involved in group activities others need to be asked for input on an individual basis. In general, users in the smaller countries, with good public infrastructure are able and willing to attend e.g. workshops; this is the case for Luxemburg and Ireland. Users either in the larger country or smaller countries with a lack of public infrastructure prefer individual formats, at most group events for one municipality only; this is the case in Germany and Montenegro. This has an impact on the selection of UX methods.

3.2.3   UX-Methods

A variety of methods can be found in the literature (Albert and Tullis, 2013; Goodman, Kuniavsky and Moed, 2012; Moule, 2012; Petrie and Bevan, 2009; Rubin and Chisnell, 2008; Sauro and Lewis, 2012), in particular, when also including accessibility in the UX definition. We have selected those methods we expect to be feasible for our user group and the fact that validation has to run in different countries with different context.

We focus on the methods outlined further below. In general we use methods with a high level of interaction with the users, such as open interviews, task-based testing of scenarios, focus groups, observation, and thinking-out-loud testing.

3.2.4   Systematic UX-based Validation

As described in the Description of Work, field trials are differentiated in different phases and there are two main validation periods, the first starting in M20 and the second in M27.

As a general rule, throughout the EAGLE project validation starts with validation partners in their respective regions, it is then extended to other members of the target group. Then communities beyond those who expressed their interest during project development will be involved and will then be open to anyone interested from the local government level. The final round of validation will combine open online validation and individual validation in the regions.

The initial plan from the proposal to early on involve other communities at their main conferences was marred by the fact that there is no one big event where all the communities meet. This is partially compensated by attending some of the regional events relevant to our validation partners or events where the main supporters of those communities from the national level meet such as large public administration conferences, e.g. "neueVerwaltung" in Leipzig in June 2015 or the "8th European Quality Conference – Strengthening the capacity of public administration in tackling current and future challenges – Public administration as part of the solution" in Esch-Belval in October 2015.

In general there are different validation activities focusing on the different key aspects, i.e. e-enabling, change management as well as learning and knowledge exchange. All validation activities in phase 1 and 2 are formative, while phase 3 combines the results as summative validation. This is not to be confused with core validation 1 and 2, which are both part of the summative validation phases.

All validation results will feed into the prototype not only for the open learning platform and its services, but the EAGLE learning solution, including pedagogical strategy and change management guidelines (see Figure 1).
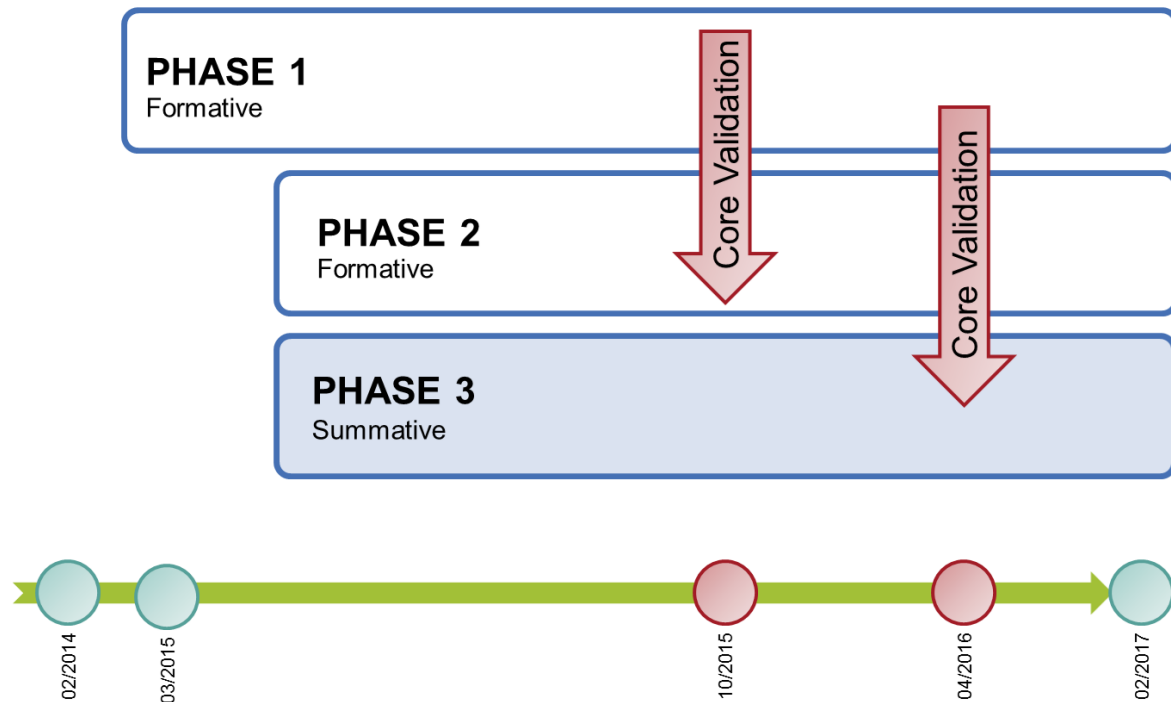
Figure 1: UX-Validation In EAGLE

4 Definition of Field Trials

This section outlines which specific UX-based validation methods are considered to apply, which tools to be used, which additional factors to consider leading to the field trial schedule. The methods are selected for suitability in the setting with a large number of distributed rural local government offices and aim to validate whether the intended objectives of the EAGLE solution can be reached.

4.1 Selection of Tools

In line with the general theme of the project, we use open source tools for validation exercises wherever possible, thus enabling to apply our method by anyone at a later stage. We also aim to keep the number of different tools small, keeping in mind that the validation should also be simple enough to be reused by potential future users implementing the EAGLE solution.

For interviews, card sorting and survey design we use word documents; although not open source, they are almost a de-facto standard and available for the large majority.

Mock-ups are done in *Pencil* (http://pencil.evolus.vn), as a conferencing tool we will use *BigBlueButton* (http://bigbluebutton.org) and in particular the change management guidelines will eventually be summarised in a mindmap, using either *XMind* (http://xmind.net/de) or *freemind* (http://freemind.sourceforge.net).

4.2 Validation Methods, Techniques & Artefacts

From the literature (Albert & Tullis, 2013; Goodman, Kuniavsky & Moed, 2012; Klein, 2013; Moule, 2012; Petrie & Bevan, 2009; Rubin & Chisnell, 2008; Sauro & Lewis, 2012; Stone et al, 2005; Wilson, 2014) and previous work conducted in EAGLE, we identified a list of methods and different data collection techniques, which require a small number of artefacts and the tools mentioned above. The methods touch on a number of aspects, for example interaction design, content strategy, user interface design and information architecture.

The methods are selected for suitability of use across the different settings in the participating regions, varying greatly in technical infrastructure, IT literacy, and organisational challenges for project development and roll-out.

Data collection and validation methods selected are mapped in Table 1 and briefly described below.

Methods / Data collection	A/B Testing	Cognitive Walk-through	Expert Review	Five Second Test	Perspective-based Inspection	Proto-typing	Card Sorting
Creativity Workshops						✓	✓
Eye-Tracking	✓			✓		✓	
Focus groups	✓					✓	✓
Interviews/ Questionnaire	✓	✓	✓	✓	✓		
Observation				✓			
Survey						✓	
Thinking-Out-Loud				✓		✓	

Table 1: Data collection and validation methods

Creativity Workshops will be organized within and across regions and include experts as well as participants from local governments from the participating validation partner regions and beyond. The formats range from workshops bringing together experts for feedback on a certain topic and users coming together for example in world café format to discuss identified questions or hands-on workshops creating OERs, thus validating whether the approach of the solution with users creating content is feasible.

Eye-Tracking will be used with selected participants in different regions, as much as we can organise travel with the eye-tracking equipment. We also plan to use it while attending some of the regional or national events, although, as mentioned above, our target group is not very active in this regard.

Focus groups are used for collecting feedback to existing resources, such as the scenario or personas, the change management guidelines or the prototype.

Interviews will be semi-structured, with open-ended questions, allowing structured, maximum user or expert input, while making results comparable across different municipalities and regions. This will be the data collection most often used across all three topics, change management, e-enabling and EAGLE Learning Platform (EAGLE LP).

Observation is applied when users interact with the system, either a mock-up or another prototype.

Surveys are used to collect feedback from a large audience of users regarding the use of the EAGLE solution. The survey can accompany an online prototype or a beta version of e.g. the change management guidelines.

Thinking-Out-Loud is applied again when users interact with the system. This method will be particularly helpful in finding out some of the motivations and expectations of the users, which are crucial for UX.

A/B Testing offers alternative interface designs of specific parts of the prototype to the users during validation to find out which is the better received version.

Cognitive Walkthrough is used by the team before users are exposed to any type of prototype and look at the learnability of the system; this is not how the users learn with the solution, but rather how easy it is to learn to use the EAGLE platform. It considers learnability for new users, learning over time, general memorability, expert and team learning.

Expert reviews for UX are conducted as task-based tests, applying general usability heuristics and the W3C Web Content Accessibility Guidelines (WCAG) in addition to user expectations that can be identified from the scenario and personas.

Five-Second-Tests are used with new users of the solution. It is, as the name suggests, a very quick test to find out whether it is clear what EAGLE does, what it is there for and how to use it.

Perspective-based Inspections use experts who go through the prototype taking on the perspective of one or more of the personas. The experts are provided with a set of tasks corresponding to that persona. This can be combined with the heuristics evaluation, selecting those heuristics corresponding closely to the particular persona.

Prototyping is the bridge between wireframes, storyboard and clickable prototypes. We will validate twice using the clickable prototype, which will have more functionality in the second round as it considers feedback from the first validation round. The clickable prototype can be provided as an online version to reach a larger audience, without the restrictions of arranged meetings in a certain location.

Card sorting is a simple technique used to explore with users how they would categorize the information provided, which can then be used for designing information architecture, workflows, menu structure, or web site navigation. It is literally sorting cards with all the category items on them. It can vary between closed and open sorting; closed sorting providing all categories, while open sorting leaving the definition of the categories to the participants of the exercise.

Scenarios and personas were used to summarise the results of the requirements gathering. They initially serve to validate the requirements and further on as a summary of changing requirements or expectations users have. Personas are fictitious characters, representing the users of the EAGLE solution and are based on the information from requirements gathering and initial survey of the target group. Personas (developed in collaboration with WP2) are also a core component of accessibility validation in an expert review.

4.3 Additional Factors to Consider

While selecting suitable validation methods, tools and methods are the obvious factors to consider. However, they are not the only things to keep in mind. There are four additional factors which heavily impact the choice of methods; accessibility, creation of documents for validation, maintenance of documents, input from and feedback for different aspects or work packages of the project as well as resources and training of regional partners to ensure similar activities in the different regions.

Accessibility as a topic will be included in the tools and methods, e.g. the variety of personas reflecting different levels of abilities. Accessibility testing can be included in any expert review. This is to validate whether accessibility has been considered in the previous work, leading to the results being validated.

Any of the methods require some documents that have to be created, for example interview questions. These questions have to be tested with the regional partners, to ensure similar understanding and thus guarantee valid results. Scenarios were written in regional versions and then summarised in a core EAGLE scenario. Using scenarios requires the use of an EAGLE scenario, with regional adaptations, for example adjust names of personas.

These documents mostly have to be maintained; the scenarios will be adjusted as well as personas. The changes reflect a changed set of requirements, which has to be documented in a backlog as well. This activity is crucial for the continued adaptation of the EAGLE solution to the users' needs and expectations.

All documents used for validation have to be mapped to the different aspects of the EAGLE project (change, learning and sharing, use of the system). Again the number of different resources is crucial for the practicability of the validation.

The validation will run in four regions in at least four different languages. This requires training for the regional partners conducting interviews, workshops or doing user testing. Otherwise the validity of the results will be in doubt.

In summary, while we try to have a mix of methods that can be maintained, regarding resources needed and training of regional partners, we try to use the same resources for different methods, e.g. mock-ups or personas, to keep the number of those resources small. This allows keeping up with maintenance and documentation. While providing a mix of methods that suits the topic and the users involved, we try to keep the number of methods as low as possible. This is to avoid a large number of training sessions, preparing partners in the regions for validation and to make it more usable for future use beyond the EAGLE project.

4.4 Field Trials Schedule

The field trials are divided into three phases, reflecting the increasing completion of the EAGLE solution (see Table 3 for details), with two main validation rounds starting in months 20 and 27. As outlined in the proposal, the trials have a basic structure, however, with a different timeline, due to the initial delays in availability of the communities.

VALIDATION PHASES	2014	2015	2016	2017
PHASE 1 (formative)				
Engagement Model		DE, IE, L, MN		
Focus Groups on Learning Needs		DE, MN		
Focus Groups on Change Management		L		
PHASE 2 (formative)				
Observation, Eye-tracking & Thinking out Loud		DE, IE, L, MN		
Online Conference		DE, IE, L, MN		
BYOD World Café			**DE,** IE, L, **MN**	
Online Collaboration			DE, IE, L, MN	
Online Workshop			DE, IE, L, MN	
PHASE 3 (summative)				
Interviews				DE, IE, L, MN
Online Conference				open for all

Table 2: Overview of Core Validation

Phase 1 started in March 2015 and will run until September 2015.

The first activities included engagement model, persona and wireframes testing in the regions; this was conducted until May with a small user group (five users per region) to feed into the mock-ups.

Selected users were interviewed in June 2015 to validate identified learning needs, again using the personas and scenarios as a resource.

Regional focus groups are scheduled for September 2015 to identify expectations about changes in work processes. They will work with the change management guidelines drafted in WP3 and this will provide information, whether the questions and explanations of the topics are understandable. We expect to involve 10 to 20 participants from Luxemburg in total.

Phase 2 will start in October 2015, run until April 2016 and it includes the main validation round 1.

An international workshop to discuss changes in work processes identified in phase 1, scheduled for late November to mid-December. It will be organized as an online workshop with a group of dedicated local government representatives and will include presentations, interactive online displays and discussions. We expect to involve 20 to 40 participants in total across the four regions.

Validation round 1 will run as task-based observation, thinking-out-loud testing and eye-tracking in the regions, using clickable mock-ups and the first prototype. The prototype will have built-in feedback items, to gather user feedback while users work through the tasks given. We expect to involve 40 to 100 participants in total across the four regions.

From January to April we will run so-called Master classes in at least two of the regions (Germany and Montenegro) to bring creation, adaptation, learning and knowledge exchange into the regions. Although the communities say they need the EAGLE platform and like the idea of open educational resources (OERs), there is much reluctance to get started with creation and adaptation. Unfortunately, without some open resources suiting their very specific needs, the knowledge exchange will most likely also be very slow. Therefore, we decided to use the Master class format, which allows one participant per community and a maximum of 15 communities respectively participants. We hope that this artificial exclusivity will attract those who are very interested in learning hands-on and bringing the knowledge back to the communities. At the same time it will allow us to validate the tools selected and the upload and use in the platform.

Phase 3 is the final phase, collecting the overall results, and will run from June to November 2016.

Interviews to identify changes in work processes will run in all partner regions. The expectation is that some communities have implemented changes and can give feedback, whether those are sustainable, others will have started introducing changes and will provide

feedback how the change management guidelines were supporting the introduction of changes.

An online conference involving the partner regions, associated partners and experts will provide feedback on the overall results, such as usability and accessibility of the EAGLE platform, the user experience in EAGLE, the involvement in knowledge exchange and learning from each other, creation and adaptation of open learning resources.

Phase	Task	Date	Location	Input material	Method & data collection	Number of participants	Participant groups	Total no. participants
1	Engagement model, persona & wireframes testing in regions	March-May 2015	DE, IE, L, MN	Personas, Scenario(s)	Semi-structured interview questions	5-10 in each region	Hierarchy mix of employees from partner regions, representatives of target group	20-40
	Regional focus groups to validate identified learning needs	Sept 2015	DE, MN	Persona, scenario, 1st mock-up	Flyers Semi-structured interview questions	15	Representatives from target group	15
	Regional focus group to identify expectations about changes in work processes	Sept 2015	L	Change Management Guidelines	Guidelines plus questionnaire	10-20	Representatives from target group in Lux	10-20
2	Observation, thinking-out-loud testing and eye-tracking in the regions	Beginning of Oct to end of Nov 2015 **(validation round 1)**	DE, IE, L, MN	Clickable mock-ups	Questionnaire Task list	10-30 in each region	Employees from different hierarchy levels and language background from all partner regions	40-100
				1st prototype, reduced functionality	Online: built-in feedback Observation:	Online: 20-40 Observation: min. 5 in each region	Online: any communities in partner countries Observation: communities in partner regions	40-60

Table 3: Overview Validation Plan In Eagle (07/2015); red: Core Validation

Phase	Task	Date	Location	Input material	Method & data collection	Number of participants	Participant groups	Total no. participants
2	Online conference with associated partners	Nov to mid-Dec 2015	DE, IE, L, MN	Conferencing software	Change Management Guidelines	Approx. 5-10 from each country		20-40
	BYOD World Café: Creation, Adaptation, Learning, Tools	Jan-Apr 2016	**DE**, IE, L, **MN** (min. 2 regions)	CM Guidelines, OER tools from EAGLE platform	Lecture slides, Explainer video	Max. 15, 1 from each community	Participants selected by communities; Master Class	15
	Online collaboration with associated partners	Apr & May 2016 **(Validation Round 2)**	DE, IE, L, MN	Tasks Feedback questions	EAGLE platform with all features and some OERs	10-30 from each region	All interested participants from target group (priority) and beyond	40-100
	Online workshop to identify changes in work processes		All participating regions , if they introduced changes	Questionnaire Conferencing tool	Change management guidelines	5 from each region	Change management representatives	20
3	Interviews to identify changes in work processes and e-competency	October to November 2016	DE, IE, L, MN	TBD	TBD	TBD	Change management representatives	TBD
	Online conference with associated partners and experts		DE, IE, L, MN and other countries involved	TBD	TBD	TBD	All interested participants from target group (priority) and beyond	TBD

Table 3 (Continued): Overview Validation Plan In Eagle (07/2015); red: Core Validation

5 Conclusion

This document outlines the UX-based validation methodology, considering all aspects of the EAGLE project, in particular change, learning and knowledge exchange, e-enabling and ultimately transferability of the results.

A list of methods has been allocated to certain validation tasks. As the project is evolving methods pre-selected might not be feasible any longer, while other methods might become more appropriate for the changing validation audience. This will be accommodated by adapting the outlined validation plan accordingly. Ultimately, the validation itself aims to consider the user needs, before purely administrative or scientific requirements.

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