

“EAASI” A Gender- and Diversity-Sensitive Usability Evaluation Tool

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goods and protective Infrastructure (separating cyclists from vehicular traffic). The users reported that a wide range of barriers to the use of bike-sharing services still exist. These include: shortage of bikes at the station, limited and unsafe infrastructure, lack of appropriate equipment and accessories and safety. The recommendations of this research highlight four areas of improvements; design of bikes, safety and security, considerations of culture aspects and accessibility issues.

Keywords: Bike-sharing, Gender, cycling, women

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15.00-15.15 / 16.00-16.15 Presentation 35: Thursday, 18th November 2021

“EAASI” A Gender- and Diversity- Sensitive Usability Evaluation Tool

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Abstract

The TInnGO project encourages a gender and diversity perspective in design and deployment of smart mobility products. The project has established 5 key criteria – products should be effective, attractive, affordable, sustainable, and inclusive. To encourage designers to focus on these indicators and to inform procurement teams and organisations choosing a product, we developed ‘EAASI’ - a tool for evaluating smart mobility products from a gender and diversity perspective. The tool consists of a checklist of questions regarding gender and intersectional diversity. It was refined through the design experiences of the UK Hub evaluating products in use and ‘design provocations’ developed during group work with design students. The focus of this tool on gender- and diversity-smart thinking in transport gives it a strong appeal over more generic ‘usability’ methods and assessment tools.

Introduction

One of the aims of the Transport Innovation Gender Observatory (TInnGO)¹ is to encourage the development and adoption of smart-mobility ideas and products that are ‘gender and diversity smart’. The project established five key criteria for assessing gender and diversity smart mobility: *Effective*,

⁷ <https://www.tinngo.eu/>

Attractive; Affordable; Sustainable and Inclusive. To assist users and evaluators of products we have developed an evaluation tool 'EAASI', (an acronym of the criteria) a checklist extending the concept of generic product usability to include 'gender and diversity smart' criteria. The challenge was to make gender and diversity smart criteria *explicit in an evaluation*. In particular, the last criteria 'inclusive' needs to cover a wide brief, reflecting the usual aspects of 'inclusive design' relating to physical and cognitive ability, (in other words, 'accessibility') and a focus on gender and other aspects of diversity.

Context

From a product usability perspective, product evaluation usually combines the use of 'evaluation checklists', (a concept owing much to an Ergonomics approach), together with a practical evaluation methodology involving real human users who represent the target audience (often called a 'usability evaluation' or 'user trial' and ideally used throughout the product design process). The 'evaluation checklist' approach exposes the product to an 'expert review', in which checklists are used to rate the product against standard and mutually agreed criteria. The 'usability trial' approach involves task-based evaluation with real users, representing a range of typical or target users, with an expert facilitator to guide the evaluation and collect data through observation, user feedback, interviews, focus groups etc. To ensure inclusivity and consideration of age, gender and varied ability differences, any checklist or test design should address the needs of a wide range of users.

The traditional criteria considered when focusing on 'Usability' in product evaluation are: Efficient, Effective, Engaging, Error tolerant and Easy to learn, with some variations according to the context, (Van Kuijk et al., 2015). An 'inclusive design' approach should cover product adaptability and accessibility in the early design stages, and return to these as design and development progresses, but in many cases 'accessibility' is often treated as a separate stage or area of responsibility. Inclusivity to extend to gender and diversity is often implicit, not explicit.

The concept of 'Sustainability' is also absent from the traditional functional approach to product evaluation. In TInnGO our five criteria require that 'Inclusivity' and 'Sustainability' be made explicit in the evaluation, while 'Affordability' is also necessary for the widest inclusivity and to comply with the UN Sustainable Development Goal 1 of eradicating poverty, which in our context, means 'transport poverty' affecting access to employment, education, leisure, and services, (Lucas et al., 2016, Iqbal et al, 2020).

Checklists using paper or online forms to generate design-related information are a well-established method in the 'Design for All' arena, since the days of USERfit, (Abascal, 2003)⁸. However, using desk-based research (largely focusing on design resources), we did not discover any one evaluation 'tool' that could combine usability with our key criteria, to focus on gender and diversity mainstreaming, and sustainability within the context of 'Smart Mobility'. To achieve this synergy in EAASI, we brought together the five criteria drawn up by the TInnGO project, developed into a checklist through testing and refinement against existing products and product ideas developed within the project. This is not a 'score-sheet' approach. Rather it is a means of providing relevant 'questions' for designers to ask in evaluating a product or design against all the necessary criteria. Answering these questions provides an overview of how well the product meets its design goals, together with the 'gender and diversity smart' criteria – and where it falls short, to inform designers with a *rich description* of where needs

⁸ USERfit is a well-established methodology focused on the generation of usability specifications. It was created for the assistive technology field and proved to be very suitable for the 'Design for All' paradigm.

are met – or not met, offering scope for further development of the product or design brief to meet those needs.

Influences

The EAASI checklist is influenced by The Cambridge Inclusive Design Toolkit, (Clarkson et al., 2007), which focuses on an Ergonomics checklist approach, set against a database of population statistics, to calculate what proportion of the population will be excluded from using a tool, artefact, or service, depending on accessibility criteria. The Cambridge product's focus on *identifying who is excluded and why* is especially useful, when thinking about 'inclusivity' and in respect to the needs of inter-sectional groups, (Waller et al., 2013, Keates and Clarkson, 2004). Asking 'Who is excluded?' is incorporated into the EAASI checklist.

The checklist is also influenced by the UK Design Council's insightful online article 'Designing for Diversity' (Jenkins and Baker, 2019), which takes the concept of 'Usability' beyond the purely functional to accommodate Physical, Sensory and Cognitive features. These features are then set *alongside* an approach 'Designing for Diversity' which considers factors of: Age, Diets, Culture and Customs, Language and Communication abilities, Education and Training, Income and Social Class, Ethnicity, Gender and Sexuality, Size and Shape. The UK

Design Council has also launched a 'systemic design framework': 'Beyond Net Zero: A Systemic Design Approach', (Design Council, 2021). This approach combines a focus on sustainability, with a 'systems thinking' approach to design that includes 'people and planet'; micro to macro; inclusivity and welcoming difference; creating safe, shared spaces and language to bring in multiple and marginalised perspectives; collaborating, reuse and regenerative ideas.

These all point to a general new direction in design thinking. This design framework synergises with TInnGO's focus on sustainability and on inclusivity. The EAASI tool fits very much into this 'people and planet' design framework.

Evaluation against design goals

The EAASI checklist evaluates products or services using what we have learned in the TInnGO project – the five 'smart mobility indicators' are identified by TInnGO as important in achieving smart mobility that is gender and diversity sensitive, inclusive and sustainable. However, the 'Effectiveness' of a product or service must be judged against its own design goals or design brief – who was it created for to solve what problem? Where products are already in the marketplace, we cannot see full briefs or know the full design intention. We can however use online marketing descriptions etc. to discover what design problem the product was intended to solve. When evaluating, it is helpful if the evaluator can discover what the design process was – and how the design brief was created – i.e., was there some co-creation involved – were diverse people consulted? It is not always possible to know this, of course. In the EAASI checklist, this question also acts as a prompt to commissioners/designers to consider their user research and how far they are consulting any target users.

It is important to be specific about what aspect of the product is being evaluated. For example, in the case of a bus design – is it the exterior, entrance and exits, or aspects of the interior – or both? Are we including the service model, such as ticketing – or simply the product itself? EAASI ensures this is made clear on the evaluation.

Recommendations are also an important method of prompting deeper thinking, for example, in EAASI evaluators can suggest 'What would need to change about this product – to make it better from a 'Gender and Diversity Smart' point of view?'

Intersectionality

TInnGO has focused on the concept of intersectionality – that a person is made up of more than one characteristic – so assessing the design of an artefact will not be from just one perspective e.g., older people, different abilities, women, but consider potential intersecting characteristics (Hankivsky, 2014). We aim to broaden the evaluation of transport and mobility needs, so EAASI repeats a list of groups for each criterion, to prompt evaluators to keep intersectional characteristics in mind when looking at context of use and fitness for purpose. To assist evaluators to visualise ‘Intersectionality’, the EAASI tool introduces the ‘TInnGO InterSectional Design Wheel’. This is an emerging output of TInnGO which helps to visualise the layers of intersecting characteristics against the five indicators. In this diagram we indicate three different levels, with intersectional characteristics in the yellow and pale blue circles, with the five EAASI indicators set against them. Any of these layers could spin around the circle and intersect with elements on the other discs.

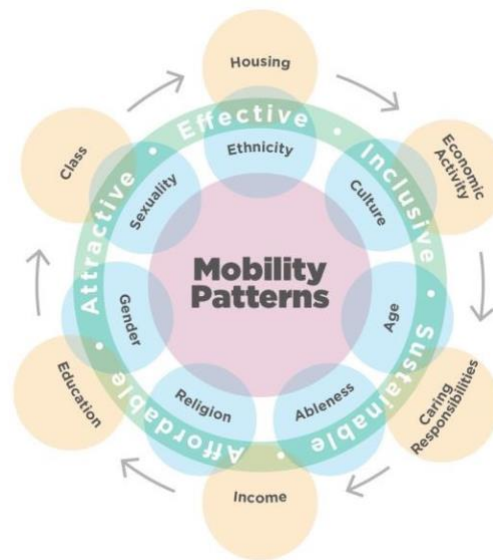


Figure 1 TInnGO InterSectional Design Wheel

Rating System

It is useful to be able to make comparisons, between a group of evaluators, or between products. For this, a rating system needs to be as unambiguous as possible. We trialled a variety of rating systems. ‘Traffic lights’ with colour coding was considered but quickly rejected as being poor ergonomics (issues with colour blindness and different systems for ‘Traffic lights’ around Europe). Awarding ‘stars’ such as in online review ratings was also trialled, where 5 stars was the highest rating to 1 star as the lowest rating, 3 as neutral. A ‘star’ system is very familiar to users of online reviews, however what is not so commonly understood is that the star system is like a 5-point Likert scale in that 1 star is poor, 5 is excellent, and 3 is neutral – so 3 often means only just acceptable. This could easily be confused with a system where even 1 star is a ‘good rating’, up to 5 for excellent, as opposed to no stars at all. Because of this lack of clarity this system was discarded.

We arrived at an evaluation system that focuses more on prompting evaluation comments and recommendations, rather than simply awarding a ‘mark’. In this way, the tool can be useful for designers, developers and procurement evaluating, adding value over the use of a rating scale. Some element of rating is left in the tool with a percentage mark awarded and a 5-point ‘Smiley’ assessment, which is reasonably cross-cultural and doesn’t require translation.













Part C: Overall Assessment				
This is intended to summarize how the product fits with its own defined goals and how far it meets 'Gender and diversity smart' criteria. The Evaluator should complete a rating based on the ratings per each indicator already completed.				
Does the design meet its own goals?	Percent	Smiley	Notes	
<i>e.g. The e-scooter meets the design brief needs of appealing to young people and active, reasonably fit commuters who may choose to integrate use of an e-scooter into their daily commute from a train or bus hub.</i>	80%			
<i>e.g. the e-scooter could be an alternative to bringing a car into the city</i>	70%			
Does the design meet the Gender & Diversity Smart goals - EAASI?				
1 - Effective Is the product effective?	43%		<i>Effective for those who can use it – speedy and anywhere within city</i>	
2 - Attractive Is the product attractive to a wide range of users?	34%		<i>Attractive to certain groups of users, mainly younger persons, possibly more males, but not others</i>	
3 - Affordable Is the product affordable to a wide range of users?	52%		<i>This is a Shared transport solution so affordable depending on charges for users and break even point for providers</i>	
4 - Sustainable Is the product sustainable / does it encourage sustainable behaviour?	55%		<i>Good sustainability, as alternative to car travel, easy maintenance, OK so long as they are not stolen</i>	
5 - Inclusive Is the product inclusive from the point of view of gender and diversity? From the point of view of Accessibility?	6%		<i>Not very inclusive, does not support chained trips, useful only for those with fitness and confidence, appropriate clothing, minimal luggage, reported to have negative effects and even dangerous to some disabled and elder pedestrians. Not inclusive for people with disabilities.</i>	
Key				
Excellent (70 to100%)	Good (60-69%)	Satisfactory (50-59%)	Poor (40-49%)	Fails this indicator (0-39%)
				

Figure 2. EAASI example summary page

Using the checklist

The checklist tool aims to address each of the TInnGO five smart mobility indicators plus some additional checkpoints for Accessibility, incorporating key questions to address gender and diversity, and drawing attention to distinct user groups to ensure that their perspectives are considered in the evaluation. The checklist provides for each Indicator:

A definition of Goals for that product and how it would meet them

A list of questions related to that indicator – with boxes to complete answers

A list of User Groups which might need a special consideration or note – with boxes to complete answers

The list of user groups is *repeated* for every indicator to ensure all groups are considered by the evaluator, apart from 'inclusivity' where it is implicit. Answers can of course be left blank – what is important is asking the questions and thinking about the groups in each section.

The checklist is designed to be used in several contexts: by evaluators, working singly or as a group to evaluate a product for procurement to check how 'diversity or gender smart' it is; by designers as a self-checking tool; or by independent evaluators perhaps comparing marketplace products for review. There is always a subjective element to product evaluation, and although using the checklist will reduce subjectivity, several evaluators are usually better than one alone: a small team could use the checklist (perhaps independently at first) then discuss and evaluate co-creatively and then arrive at consensus.

The EAASI tool can be found with a blank template and a worked example on the TInnGO Website, <https://www.tinngo.eu/>.

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