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Heuristic Evaluation of Mobile Web E-Commerce Checkout: A Domain-Specific Binary Checklist and Scoring Method

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ABSTRACT

We present a heuristic checklist for the checkout of online stores on the mobile web: 58 binary criteria in seven categories, from the cart up to, but not including, the payment screen. Every criterion is based on HCI guidance, web-form research, WCAG 2.2, or research on dark patterns. General heuristics, such as Nielsen's, say nothing about typical mobile web checkout problems, such as small tap targets, input formats, or consent. We built the checklist from an expert audit of 100 Ukrainian online stores and applied it to the same stores. It gives a transparent overall score and seven category sub-scores that show clear differences between checkouts, before any usability test is run.

KEYWORDS

heuristic evaluation, mobile web checkout, e-commerce, web forms

1 INTRODUCTION

For an online store, the checkout is where intent becomes revenue, and where it is most easily lost. Known reasons for abandonment include total cost not shown upfront, required registration, and long or confusing forms [1, 2]. Usability testing finds such problems well, but it is resource-intensive. Heuristic evaluation is a faster and low-cost alternative, which only requires researchers to check an interface against a list of usability principles [3, 4].

However, Nielsen's classic heuristics are very general. They say nothing about the typical problems of mobile web checkout: small tap targets, phone fields without an input mask, validation that works only after the form is sent, or marketing consent that is checked by default. So practitioners have to use a variety of separate sources, such as industry guidelines, accessibility standards, and data-protection law. This makes consistent, repeatable evaluation difficult.

In this paper we offer an instrument for this domain. Our contributions are: (1) a checklist of 58 binary criteria in seven categories that covers usability, accessibility, and consent in mobile web checkout, where most criteria check only one condition and each criterion is based on a reliable source; (2) a transparent scoring procedure that anyone can apply and that turns the checklist into an overall percentage and a profile of seven categories; and (3) a first benchmark of Ukrainian online stores. We did not invent heuristic evaluation. We built our instrument with the first stages of an existing methodology (Section 3) and wrote each criterion as a yes/no check, so that the evaluator needs less interpretation.

2 RELATED WORK

Heuristic evaluation was formalized by Nielsen and Molich [3]. Nielsen's ten classic heuristics, still used today, were published in 1994 [5]. The method has known weaknesses: different evaluators find different problems; this is called the evaluator effect [6]. Also, inspection and usability testing find different kinds of problems [7].

General heuristics miss many problems of a specific domain. For this reason, researchers often build domain-specific heuristic sets [8], and Quiñones et al. [9] described a step-by-step methodology for this.

Several instruments target online stores. Bonastre and Granollers [10] give 64 e-commerce heuristics with a scoring scheme, but their set covers e-commerce websites as a whole: checkout is only one of six groups of heuristics, and there is nothing about accessibility. Swaid and Suid [11] propose heuristics for m-commerce, but for native apps, not the mobile web. The checklist by Hashim et al. [12] for mobile shopping apps is not checkout-specific either: it checks only one quality attribute, operability, with 14 questions, and gives no overall score. The work closest to our combination of usability and accessibility is by Pascual-Almenara and Granollers-Saltiveri [13]: thirty-two evaluators scored eight e-commerce sites with a general heuristic instrument of 60 questions and, separately, against WCAG 2.1, and the two results were averaged into one index. The authors used general heuristics on purpose, not e-commerce ones, checked accessibility only on the homepage, and note themselves that averaging two separate instruments counts some problems twice. Finally, the Baymard Institute has the most developed checkout instrument (110+ guidelines, a 7-point weighted benchmark) [2], but its full guidelines are available only through a paid subscription, and it uses weighted ratings, not simple binary criteria.

Three further lines of work inform our criteria. Checkout is largely a web form: Bargas-Avila et al. [14] derived 20 guidelines for web forms, and Seckler et al. [15] showed in an experiment that forms improved with them are completed faster and with fewer submission attempts. For consent, Gray et al. [16] give a taxonomy of dark patterns for UX practitioners, and Mathur et al. [17] crawled 11,000 shopping sites and found dark patterns on 1,254 of them, including pre-selected options and hidden additions (sneaking); our user-control category covers these consent problems. For operationalisation, tools such as the consistency checker SHERLOCK [18] and Baymard's AI-based audit UX-Ray [19] already turn heuristics into conditions that can be checked; our binary criteria follow this idea.

As far as we know, no existing instrument has all of the following: yes/no criteria focused on checkout; a transparent scoring procedure that anyone can apply; benchmarking across stores; and a clear focus on mobile web, accessibility, and consent together.

3 METHOD: BUILDING THE INSTRUMENT

We built the instrument from an expert audit of 100 Ukrainian online stores in December 2025. We found the stores with Google searches for self-chosen product categories, so this is a convenience sample, not a random one. For each store, the first author went from the cart through checkout on the mobile website as an ordinary user in Google Chrome on a physical iPhone 15 Pro Max, checked the pages in Google Chrome DevTools with iPhone 14 Pro Max emulation, and compared the screens with established guidance [2, 20, 21]. All stores were scored by one evaluator, the first author, a UX designer with ten years of experience; a paid research assistant collected screenshots but did not score any criteria.

Following Quiñones et al. [9], we turned two kinds of audit findings into criteria: recurring problems, and solutions seen in some stores that established guidance, such as Baymard [2], recommends as best practice. Each criterion is written in a positive way (met = good) and is based on at least one reliable source. Most criteria check one observable condition; a few combine closely related conditions (see Section 6). We split broad topics. For example, "accessibility" became separate criteria for contrast and tap-target size (WCAG SC 1.4.3/1.4.11, SC 2.5.8) and for text size (common type-scale conventions, because WCAG sets no minimum). The result is 58 criteria in seven categories. This follows the methodology's advice to keep the number of heuristics small and to add a checklist when more detail is needed [9]: the seven categories work as heuristics, and the 58 criteria as their checklist.

The derivation was both inductive and deductive: the audit showed which failures and best practices really appear in the stores, and we kept a candidate only if a reliable source supported it. We completed only the first stages of the methodology: exploring the domain and the literature, putting together the criteria, and describing each one. The validation stages (an independent expert review, controlled experiments against another instrument, and user testing) would still be needed. So the instrument is fully specified, but not yet formally validated.

The scope has three limits: only the mobile web checkout, not native apps; only accessibility criteria that can be checked in the rendered interface, with contrast measured by WCAG contrast-checking tools (e.g., Stark, Chrome DevTools), not a full WCAG audit or checks with assistive technology (screen readers, ARIA); and only the flow from the cart through checkout, without the payment screen.

Binary criteria leave less room for interpretation. But with one evaluator we could not measure agreement between evaluators [6].

4 THE INSTRUMENT

The seven categories group the criteria by principle, not by their place on the screen: (C1) user control and autonomy, (C2) transparency and predictability, (C3) logical structure and cognitive load, (C4) error prevention and feedback, (C5) accessibility (WCAG), (C6) consistency, conventions and affordances, and (C7) input efficiency and effort economy.

Table 1 lists all 58 criteria with a short source code for each. The criteria have their own numbers, separate from the categories (e.g., #31, not "C31", so they are not confused with C1–C7). The legend below the table links each source code to the references.

Table 1: Mobile web e-commerce checkout heuristic checklist (58 binary criteria). *Src* gives grounding source(s); [c.] = conditional (excluded from the denominator when N/A).

C1 — User control & autonomy	
1 Guest checkout available	B,N
2 Guest checkout ≥ as prominent as sign-in	B
3 Cart quantity editable	N
4 Quantity via +/− steppers	B
5 Marketing consent opt-in (unchecked)	GDPR, G18, M19
6 Terms/privacy consent opt-in	GDPR,M19
7 "No confirmation call" not pre-selected	G18,M19
8 Order does not force a manager call	G18
C2 — Transparency & predictability	
9 Item prices & payable total clear	N94
10 Currency labelled once, unambiguously	N94
11 Purpose of phone/e-mail explained	B
12 Unavailable pay/delivery hidden or explained	N94
13 Delivery cost shown	B
14 Delivery time shown	B
15 Free-delivery threshold shown [c.]	B
16 Next-step button labels state next step	Sm
C3 — Logical structure & cognitive load	
17 Natural name-field order	B
18 Logical field sequence	N,BA11
19 Forms >4 fields split into blocks	B
20 Law of proximity respected	N,Sm
21 Order: personal → delivery → payment	Sm
22 Carrier ordering matches input method [c.]	B,W3Ci18n
23 Address ordering matches method & country [c.]	W3Ci18n, GLAI, UPU, B
24 Single-column fields	Bmc,Sm
25 No distracting elements in checkout	Goog
26 Collapsed accordion reveals key content [c.]	B
C4 — Error prevention & feedback	
27 Required fields clearly marked	B,BA11
28 Optional fields clearly marked [c.]	B,Sil,BA11
29 Every field keeps a persistent label	Sil,N,Sm
30 Placeholder shows format, not duplicate label	N,Sil
31 Phone field with input mask [c.]	B
32 On-blur inline validation present	N,BA11,Sk14
33 Inline validation correct (no false errors)	N,B
34 Error fields visually distinct	N
35 Filled vs empty fields distinct	N94
36 No disabled/inactive buttons	Sil
37 Password reveal toggle [c.]	N
38 No forced password re-entry [c.]	N
C5 — Accessibility (WCAG; scoped)	
39 Contrast meets WCAG: text & non-text UI	WCAG,Sm,B
40 Adequate text size	Ap,Sm
41 Minimum tap-target size (SC 2.5.8)	WCAG,B
42 Key content not hidden by scroll	N94,WCAG
43 Content reflows to one column	WCAG
C6 — Consistency, conventions & affordances	
44 Consistent interface language	N94
45 System messages in interface language	N94
46 Visual consistency of fields/buttons	N94
47 Tidy alignment of fields and labels	B,N
48 Standard radio vs checkbox conventions	N
49 Dropdowns show an affordance indicator	N
50 Buttons/links distinct from plain text	N
51 Conventional social-login buttons [c.]	N
52 Primary controls use conventional terms	N94
C7 — Input efficiency & effort economy	
53 Browser autocomplete works, not misleading	Sm,N
54 City search surfaces regional centres [c.]	B
55 Branch searchable by its number [c.]	B
56 "Other recipient" option offered [c.]	B
57 Social login / SSO offered as an option [c.]	N,Sun13
58 Few or no optional fields	Sil,B,BA11

Src codes: B Baymard [2] · Bmc Baymard (multicolumn) [22] · N NN/g [23–28] · N94 Nielsen [4, 5] · WCAG W3C WCAG 2.2 [21] · W3Ci18n W3C i18n address formats [29] · GLAI Google libaddressinput [30] · UPU UPU S42 [31] · Ap Apple HIG [32] · Sm Holst, Smashing Mag. [33] · Sil A. Silver [34] · Goog Google Retail Playbook [20] · G18 Gray et al. 2018 [16] · M19 Mathur et al. 2019 [17] · BA11 Bargas-Avila et al. 2010 [14] · Sk14 Seckler et al. 2014 [15] · Sun13 Sun et al. 2013 [35] · GDPR GDPR Recital 32 [36].

Table 2: Category sub-scores and overall score (%) for an anonymised sample of six stores (two top, two median, two bottom) and the corpus median (n = 100). C1–C7 are the seven category sub-scores.

Store	C1	C2	C3	C4	C5	C6	C7	Overall
A	100	88	80	92	60	100	67	**86**
B	88	75	80	92	80	100	67	**84**
C	100	50	70	92	60	78	50	**74**
D	100	62	60	83	40	89	67	**74**
E	100	38	70	50	40	89	50	**64**
F	75	38	70	75	20	22	50	**53**
Median	88	50	74	83	40	89	50	**74**

5 SCORING AND BENCHMARKING

The checklist gives a numerical score of conformance with the heuristics. It is not a validated measure of usability (see Section 6). Each criterion gets 1 (met) or 0 (not met). If a criterion does not apply to a store (e.g., there is no courier delivery or no password field), it is not counted in that store's denominator. The overall score of a store is the number of met criteria divided by the number of applicable criteria, in percent. We also calculate seven category sub-scores in the same way. Together they form a diagnostic profile that shows where a checkout is strong or weak, not just one number.

We chose equal weights and a binary scale on purpose, instead of severity weights. We do not claim that all criteria have the same effect on users or on business. Severity ratings are subjective and differ between evaluators. If the main score depended on them, it would be harder to reproduce, and reproducibility is the main reason to use a checklist. With equal weights and yes/no answers, the score stays transparent and anyone can recompute it.

To show how the instrument works, we applied it to all 100 audited stores and calculated the overall and category scores for each store. Table 2 shows an anonymised sample (Store A–F) from the top, middle, and bottom of the distribution. Figure 1 shows the category profile of the corpus median next to the best and the worst store in the sample.

All 58 criteria were scored for all 100 stores, using the same December 2025 audit records. Conditional criteria (e.g., the order of carrier branches or of address fields) are marked as not applicable and are not counted when a store does not have that feature.

Across all stores (n = 100), overall scores go from 53% to 86% (median 74%, mean 74%, SD 5.5). So even the best stores in our sample fail about one criterion in seven. The weakest category is accessibility (C5, median 40%), followed by transparency and input efficiency (C2 and C7, both median 50%). The strongest are user control (C1) and consistency (C6), with medians of 88% and 89%.

6 DISCUSSION AND LIMITATIONS

The benchmark shows that the instrument reveals clear differences: scores differ by up to 33 percentage points, and stores with the same overall score can have very different profiles. Stores C and D in Table 2 both have 74% but differ by 20 points in accessibility and 17 in input efficiency. One total number would hide this difference. Accessibility is weak almost everywhere: 91 of 100 stores meet

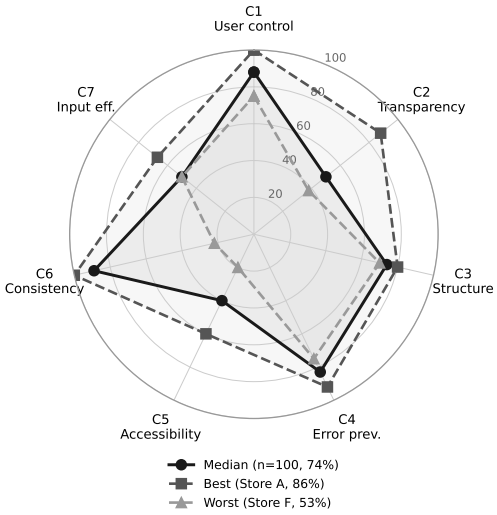


Figure 1: Category sub-score profile (C1–C7, %) for the corpus median (n = 100, 74% overall), the best-scoring store (Store A, 86% overall), and the worst-scoring store (Store F, 53% overall).

at most 60% of the accessibility criteria (C5), and none meets all of them. The accessibility median of 40% covers only the part of WCAG that can be checked in the rendered interface, so it is an optimistic upper limit.

The instrument is not yet validated with usability testing or conversion data. Because inspection and testing find different problems [7], it should support testing, not replace it. Equal weights are a simplification, not an empirical result; weights measured in usability tests, rather than expert severity ratings, could refine the score without losing reproducibility. A few criteria are based on best practice that depends on context (e.g., offering SSO). Some criteria (e.g., #9 price/total clarity, #39 WCAG contrast) combine related conditions that a future version should split.

A more serious limitation is that we built the criteria from the same 100-store audit that we then scored. So the benchmark describes the stores that shaped the instrument; it is not an independent measurement. Failures that were common in these stores were more likely to become criteria, so the checklist looks more complete on this sample than it may be, and failures absent from Ukrainian checkouts are probably missing. So the benchmark shows applicability, not external validity. A natural validation step would be to apply it to an independent sample, ideally outside Ukraine, scored by evaluators who did not write the criteria.

Criteria #22–#23 and #54–#56 follow Ukrainian delivery services, and the phone mask (#31) applies only to a verified local format; other markets are untested.

Accessibility is limited to criteria that can be checked in the rendered interface (Section 3). Checks that need assistive technology or code inspection (e.g., SC 2.1.1, 2.4.7, 4.1.2, 1.1.1) were not audited, so we cannot say whether the sites meet them. Finally, one evaluator, who also wrote the criteria, scored all stores. So the evaluator effect [6] and confirmation bias are not controlled. An external UX expert was consulted during criterion development,

which only partly reduces this risk. Measuring agreement between evaluators and an independent expert review of the criteria would address this.

7 CONCLUSIONS

We presented a heuristic checklist for the mobile web e-commerce checkout: 58 binary criteria in seven categories, most of which check one condition. The criteria are based on HCI, web-form, accessibility, and dark-pattern sources. We also presented a transparent scoring procedure that anyone can apply, and a first benchmark. Because the criteria are designed to limit interpretation and the score is transparent, teams can measure heuristic conformance before any usability test. The category profile shows which parts of the checkout need work first. Two questions remain open: whether different evaluators reach the same scores with the checklist, and whether the score relates to conversion.

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