Mobile Web Design: The Effect of Education on the Influence of Classical and Expressive Aesthetics on Perceived Credibility

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Abstract. Research has shown that the *perceived credibility* of mobile web design can be largely determined by the two dimensions of *visual aesthetics*: *classical* and *expressive*. However, there is limited research on how users' education moderates the relationships between both dimensions of *visual aesthetics* and *perceived credibility*. To bridge this gap, we conducted an empirical study among 526 subjects to investigate how education moderates the influence of *classical* and *expressive aesthetics* on the *perceived credibility* of mobile website. Specifically, we focused on four visual designs of a mobile website homepage, in which products and/or services are laid out. Our results show that, irrespective of the level of education of users and the visual design of the mobile website, the perception of both dimensions of *visual aesthetics* has a significant impact on *perceived credibility*, with *classical aesthetics* having a stronger impact than *expressive aesthetics* overall. Moreover, we found that the effect of *classical aesthetics* on *perceived credibility* is stronger for higher education users than for lower education users, while the effect of *expressive aesthetics* on *perceived credibility* is stronger for lower education users than for higher education users. Our findings suggests that *classical aesthetics*(perceived visual clarity) is more likely to influence higher education users than lower education users to perceive a mobile website as *credible*, while *expressive aesthetics* (perceived visual enrichment) is more likely to influence lower education users than higher education users to perceive a mobile website as *credible*. Web designers of e-commerce mobile websites can leverage these findings to enhance the *perceived credibility* of their websites by the respective user groups.

Keywords: Mobile website · Classical aesthetics · Expressive aesthetics · Credibility · Education

1 Introduction

Credibility is an important factor in the design of websites and users' decisions to use them as their source of information, online products and services. Research [1] shows that users use *perceived credibility* to determine whether they should stay on a website or move to another. More importantly, users employ visual cues, such as aesthetic attributes, to determine the *credibility* of websites. Prior research [2, 3] has shown that

A. Marcus and W. Wang (Eds.): HCII 2019, LNCS 11584, pp. 66–79, 2019.
https://doi.org/10.1007/978-3-030-23541-3_6

visual aesthetics—composed of two basic dimensions (*classical aesthetics* and *expressive aesthetics*)—has the ability to predict the *perceived credibility* of mobile websites. *Classical aesthetics* has to do with the traditional notion of *aesthetics*, which borders on user interface (UI) simplicity, clarity and pleasantness. On the other hand, *expressive aesthetics* has to do with the expressive/creative power of the designer, particularly his/her ability to go beyond de facto standards and conventions. It borders on UI complexity, sophistication and enrichment [4]. Prior research [2, 3, 5] shows that both dimensions are strongly related and individually influence the *perceived credibility* of mobile websites. However, there is a limited understanding of how demographic factors, such as education, moderate the interrelationships between both dimensions of *visual aesthetics* and *perceived credibility*. Prior research [2, 3] mostly focused on the moderating effect of demographic factors such as age and gender. To bridge this gap, we conducted an empirical study among 526 subjects from a mixed population to investigate how education moderates the relationship between *classical* and *expressive aesthetics* and their individual influence on the *perceived credibility* of mobile website design. We based our investigation on four different aesthetic mobile website (homepage) designs: (1) multicolor list-based website, (2) minimalist list-based website, (3) moderate-color list-based website, and (4) moderate-color grid-based website. We used multiple website designs to examine how the moderating effect of education with respect to the three interrelationships is replicable or generalizes across different visual designs to confirm our findings.

Our results show that, irrespective of the level of education of users, both dimensions of *visual aesthetics* have a significant influence on *perceived credibility*, with *classical aesthetics* having a stronger influence than *expressive aesthetics* does. This finding is replicated across at least three of the website designs. Moreover, we found that the influence of *classical aesthetics* on *perceived credibility* is stronger for higher education users than for lower education users, while the influence of *expressive aesthetics* on *perceived credibility* is stronger for lower education users than for higher education users. In a nutshell, our findings suggest, irrespective of the level of education of users, both dimensions of *visual aesthetics* are important factors users consider in the judgment of the *perceived credibility* of a mobile website. More specifically, the perception of *classical aesthetics* (pleasantness, clarity and simplicity) is more likely to influence higher education users than lower education users in the judgment of the *perceived credibility* of a mobile website. On the other hand, the perception of *expressive aesthetics* (sophistication, enrichment and complexity) is more likely to influence lower education users than higher education users in the judgment of the *perceived credibility* of a mobile website. E-commerce and other domain-specific website designers can leverage these findings to enhance their website designs and their *perceived credibility* by the respective user groups.

The paper is organized as follows. Section 2 provides a background on the main web design concepts and constructs used in the paper; Sect. 3 presents the related work; Sect. 4 presents the research method; Sect. 5 presents the results; and Sect. 6 discusses the results, while Sect. 7 dwells on the conclusion of the paper.

2 Background

In this section, we provide an overview of the mobile web design concepts and constructs investigated in this paper (Table 1).

Table 1. Overview of mobile web design concepts and constructs

Concept	Definition
Web design	Web design refers to the visual design of a website, including the aesthetic design and presentation of graphical/textual elements in a way that is visually and emotionally appealing and easy to use.
Visual aesthetics	*Visual aesthetics* refers to the visual appeal of a website to the eyes and emotions [6]. Basically, it is composed of two key dimensions: *classical aesthetics* and *expressive aesthetics* [4].
Classical aesthetics	*Classical aesthetics* is one of the two key dimensions of *visual aesthetics*. It characterizes the traditional notion of beauty, which is described by terms such as "well-organized," "symmetrical," "clean," "clear," etc. [4]. It is closely associated with *perceived usability* [4, 5].
Expressive aesthetics	*Expressive aesthetics* is the second dimension of *visual aesthetics*. It characterizes the creativity and originality of the designer, including his/her ability to go beyond design conventions to create stimulating and engaging web designs. Thus, it is described by terms such as "creative," "fascinating," "sophisticated," etc. [4]. It is closely associated with *perceived persuasiveness* [7].
Perceived credibility	*Perceived credibility* refers to the believability of a website by its users. According to [8], users judge the *perceived credibility* of a website based on two key dimensions: the *perceived trustworthiness* of the website and the *perceived expertise* of the designer.

3 Related Work

A substantial amount of research has been done with respect to web design in the mobile and desktop domains. We review a cross-section of the related studies. Fogg et al. [9] carried out a large-sample study to investigate the design attributes that will most likely influence the *credibility judgment* of websites. They found that *design look* (a construct related to *visual aesthetics*) has the strongest influence on the *perceived credibility* of websites, followed by *information design/structure*. Similarly, Robins and Holmes [1] investigated the relationship between the *perceived aesthetics* and *perceived credibility* of a website. They found that websites with high-aesthetic treatment are more likely to be judged *credible* than websites with low-aesthetic treatment. In the mobile domain, Oyibo et al. [10, 11] investigated the interplay of *perceived aesthetics*, *perceived usability* and *perceived credibility*. The authors found that, irrespective of gender [10] and culture [11], *perceived aesthetics* has a stronger influence than *perceived usability* on the *judgment of credibility*. At a finer-grain level, Oyibo et al. [2, 3] investigated the interplay of the two dimensions of *visual aesthetics*

(*classical aesthetics* and *expressive aesthetics*) [4] and the *perceived credibility* of mobile websites. With regard to tourism-based websites [2], they found that, irrespective of age and gender, *classical aesthetics* has a stronger influence on *perceived credibility* than *expressive aesthetics* does. Similarly, with regard to health-based websites [3], they found that, irrespective of gender, *classical aesthetics* has a stronger influence on *perceived credibility* than *expressive aesthetics* does. Specifically, in the health domain, the influence of *expressive aesthetics* on *perceived credibility* turned out to be non-significant. Moreover, different studies, such as [2, 3], found that there is a strong relationship between both dimensions of *aesthetics*.

However, to the best of our knowledge, as evident in our review, there are no studies that have investigated the moderating effect of education on the interrelationships among *classical aesthetics*, *expressive aesthetics* and *perceived credibility* in web design. Our study aims to bridge this gap by focusing on the mobile domain which, given the portability and ubiquity of smartphones, has been growing in leaps and bounds over the years [12].

4 Method

This section focuses on the research objective and design, research hypotheses, measurement instruments and the demographic information of participants.

4.1 Research Objective and Design

This study aims to investigate the moderating effect of education on the interrelationships that exist among *classical aesthetics, expressive aesthetics* and *perceived credibility*. Specifically, we set out to answer the following research questions (RQs) in the context of mobile web design:

RQ1. Are the interrelationships among *classical aesthetics*, *expressive aesthetics* and *perceived credibility* moderated by the education of the users?
RQ2. Is the moderation of the interrelationships by education replicable across different levels of visual design?

To answer the above research questions, we designed four versions of a mobile website (hypothetically named "G-Ranch") in the tourism domain.[1] Figure 1 shows all four versions, which are related by the visual design and/or layout. The first version (WA) is a multicolor design based on the list layout; the second version (WB) is a minimalist design based on the list layout; the third version (WC) is a moderate-color design based on the list layout; and the fourth version (WD) is a moderate-color design based on the grid layout. All four web designs were systematically arrived at based on a UI transformation framework we called "Artifact-Action Framework," the detail of

[1] The four web designs (homepages) are adapted from actual websites on the market in 2014: m.wakanow.com, mobile.united.com, mobile.utah.com and tourismwinnipeg.com. They are basically used to search for tourism-based services such as places, hotels, etc. At the time of writing this paper, most of them had been redesigned by their owners [12].

which is explained in [12]. For example, we came about the WB design by transforming the WA design (making it gray and adding icons). Similarly, we came about the WC design by transforming the WB design (making it unicolor—blue color scheme).

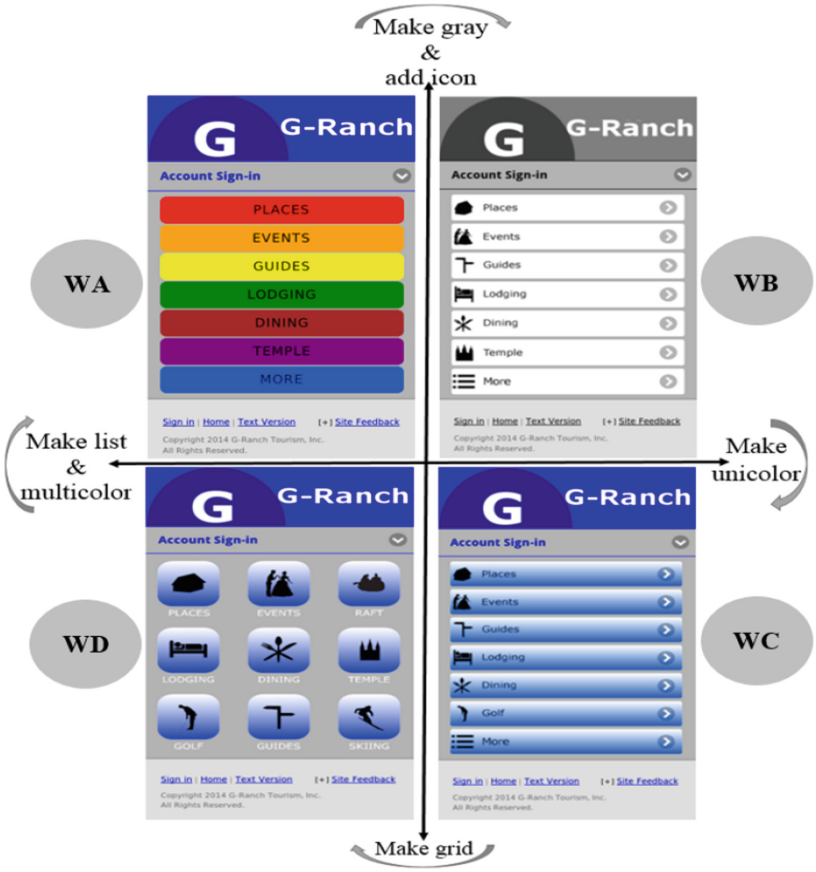

Fig. 1. Systematically designed mobile websites [12] (Color figure online)

4.2 Research Hypotheses

Figure 2 shows a diagrammatic representation of our hypotheses. These hypotheses are based on the existing literature and Lightner's [13] finding, in particular. Specifically, Lightner [13] found that the sensory impact of e-commerce sites became less important with increase in the education level of respondents. Sensory impact refers to how the aesthetic attributes of a site (e.g., stylistic use of visual elements such as color) influence users' buying behavior and/or preferences for the examined website. Thus, given that *expressive aesthetics* is more visually stimulating, arousing and user-involving [4]

than *classical aesthetics*, we hypothesize that the former will be more important to lower education users than higher education users, while the latter will be more important to higher education users than lower education users in the judgment of *web credibility*.

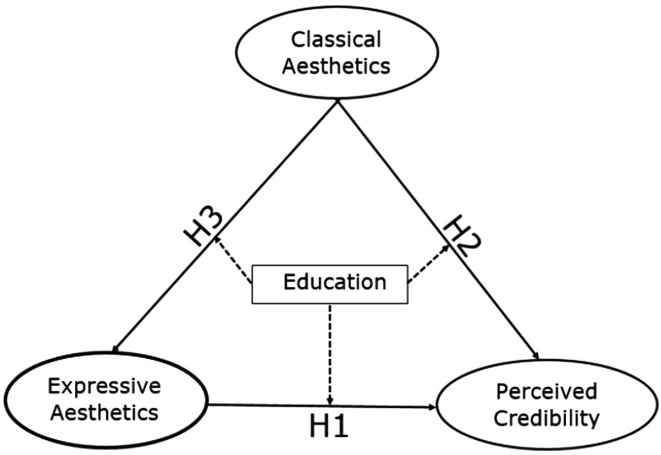

Fig. 2. Hypothesized path model

With regard to the different web designs shown in Fig. 1, our hypotheses are formally stated as follows:

H1a: The perception of *expressive aesthetics* will have a stronger effect on *perceived credibility* for lower education users than higher education users for web design WA.
H1b: The perception of *expressive aesthetics* will have a stronger effect on *perceived credibility* for lower education users than higher education users for web design WB.
H1c: The perception of *expressive aesthetics* will have a stronger effect on *perceived credibility* for lower education users than higher education users for web design WC.
H1d: The perception of *expressive aesthetics* will have a stronger effect on *perceived credibility* for lower education users than higher education users for web design WD.
H2a: The perception of *classical aesthetics* will have a stronger effect on *perceived credibility* for higher education users than lower education users for web design WA.
H2b: The perception of *classical aesthetics* will have a stronger effect on *perceived credibility* for higher education users than lower education users for web design WB.
H2c: The perception of *classical aesthetics* will have a stronger effect on *perceived credibility* for higher education users than lower education users for web design WC.
H2d: The perception of *classical aesthetics* will have a stronger effect on *perceived credibility* for higher education users than lower education users for web design WD.

With respect to H3, given the paucity of research on the moderating effect of education in mobile web design, we used an exploratory approach to determine which of the respective relationships between *classical* and *expressive aesthetics*—those for the lower education group or those for the higher education group—is stronger.

4.3 Measurement Instruments

The scales (see Table 2) we used in measuring the three web design constructs in Fig. 2 are based on the existing literature. Our *classical* and *expressive aesthetics* scales are based on the adapted (short) version [14] of Lavie and Tractinsky's (long) scales [4]. Each of the scales comprises three items. Moreover, the measurement of *perceived credibility* is based on a single item. Prior research [15, 16] shows that single-item scales could be as reliable as multi-item scales. All of the three scales ranged from "Strongly Disagree (1)" to "Strongly Agree (7)" and have been validated in prior studies (e.g., [15]).

Table 2. Scales measuring all three mobile design constructs

Scale	Items in each scale
Classical aesthetics	1. The mobile website is visual 2. The mobile website is clean 3. The mobile website is pleasant
Expressive aesthetics	1. The mobile website is fascinating 2. The mobile website is sophisticated 3. The mobile website is creative
Perceived credibility	The mobile website is credible

The study adopted a within-subject design, meaning that each participant answered the presented questions on all four web designs: (1) multicolor list-based design (WA), (2) minimalist list-based design (WB), (3) moderate-color list-based design (WC), and (4) moderate-color grid-based design (WD). In the online survey, we presented the four designs to participants in this order: WC, WA, WB and WD. Prior to presenting each of the four website designs and the items in Table 2 to participants, we provided the opening statement to set the tone for the study: "*Assume you were looking for a website on travels and tourism on your mobile phone, and you happened to open this webpage by clicking on one of the links returned by a search engine.*" Afterwards, below the image of each website design, we presented participants with the question: "*Please rate the website [label of website] on the following criteria based on your first impression.*" All of the six items in the *classical aesthetics* and *expressive aesthetics* scales were randomized as a block of questions. Finally, we presented participants with the question on *perceived credibility*: "*Based on your first impression of the mobile webpage [label of website], please rate its credibility level.*" In addition, we asked participants to provide demographic information such as gender, age, education level, etc.

4.4 Participants

The study was submitted to and approved by the Behavioral Research Ethics Board of our university, after which the questionnaire was posted on social media (Facebook), our university website and emailed to potential participants to partake anonymously. A total of 526 participants from Canada, Nigeria, Ghana, Brazil, China and others—after cleaning—took part in the study. Participants were given a chance to win a gift card of CAD $50. Table 3 shows the breakdown of the demographic information of participants based on country of origin.

Table 3. Participants' demographics (adapted from [10])

Variable	Group	NG	GH	BR	CH	CA	OTH	ALL	PER
Gender	Male	115	37	34	46	25	25	282	53.6%
	Female	40	13	16	63	71	31	234	44.5%
	Unidentified	1	0	0	6	2	1	10	1.9%
Age	18–24	118	6	16	51	55	18	264	50.2%
	25–34	32	40	21	59	31	31	214	40.7%
	>34	2	3	13	5	12	6	41	7.8%
	Unidentified	4	1	0	0	0	2	7	1.3%
Years on Internet	<10	116	12	8	82	13	9	230	43.7%
	>=10	50	38	42	33	85	48	296	56.3%
Education	Technical/Trade	8	0	1	12	4	1	26	4.9%
	High School	108	2	8	9	40	10	177	33.7%
	Bachelor	21	36	13	67	42	13	192	36.5%
	Postgraduate	11	9	28	25	11	31	115	21.9%
	Unidentified	8	3	0	2	1	2	16	3.0%
	Subtotal	156	50	50	115	98	57	526	100%
	National %	**29.7**	**9.5**	**9.5**	**21.9**	**18.6**	**10.8**	**100%**	

NG = Nigeria, GH = Ghana, Br = Brazil, CH = China, CA = Canada, OTH = Other countries, PER = %
Technical/Trade and High School = Lower education group (38.6%)
Bachelor and Postgraduate = Higher education group (58.4%)

5 Results

In this section, we present the results of our structural equation model (SEM) analysis, including the assessment of the measurement models, analysis of the structural models and the multigroup analyses based on education level.

5.1 Evaluation of Measurement Models

Our SEM models [17] was built using the Partial Least Square Path Modeling (PLSPM) package ("plspm" [18]) in the R programming language. Prior to analyzing the structural models, we evaluated the respective measurement models for the four website designs to ensure the required preconditions for structural analysis were meant. The results of the evaluations are now presented.

Indicator Reliability. This criterion was met, as all of the indicators in the respective measurement models for the four website designs had an outer loading on their constructs that was greater than 0.7 [17].

Internal Consistency. This criterion, for each construct, was measured using the composite reliability metric (Dillon-Goldstein rho), which was greater than 0.7 [17].

Convergent Validity. The Average Variance Extracted (AVE) was used to assess the convergent validity of each construct in the respective measurement models. Our results showed that the AVE for each construct exceeded the threshold value of 0.5 [17].

Discriminant Validity. This criterion was evaluated using the crossloading of each construct on the other constructs. With respect to each construct, we found no indicator that loaded higher on any other construct than the one it was meant to measure [17].

5.2 Analysis of Structural Models

Figure 3 shows the structural models of the interrelationships among all three web design constructs (*classical aesthetics*, *expressive aesthetics* and *perceived credibility*) for the two user groups and for all four web designs.

For brevity and easy comparison of model parameters, we have combined all eight models for the lower and higher education groups in one overall model. In general, the models are characterized by three parameters: goodness of fit (GOF), coefficient of determination (R^2) and path coefficient (β). The GOF for each model indicates the predictive power of the model, i.e., how well the model fits its data [18]. The R^2-value for each model represents the amount of variance of a given endogenous construct explained by its exogenous constructs. Finally, the β-value indicates the strength of the relationship between two constructs in the respective models. Overall, the GOF values for our models range from 62% to 74% (which is deemed acceptable), while the R^2 values range from 48% (moderate) to 75% (high) [18]. Moreover, except for the relationship between *expressive aesthetics* and *perceived credibility* for web design WC, all of the interrelationships are significant. Specifically, the relationship between *classical aesthetics* and *expressive aesthetics* is the strongest (ranging from 0.75 to 0.86, $p < 0.0001$), followed by the relationship between *classical aesthetics* and *perceived credibility* (ranging from 0.33 to 0.68, $p < 0.0001$) and the relationship between *expressive aesthetics* and *perceived credibility* (ranging from 0.15 to 0.39, $p < 0.01$).

Moreover, our multigroup analyses showed that there are significant differences ($p < 0.05$) between the two user groups with respect to the three interrelationships. First, the relationship between *classical aesthetics* and *perceived credibility* is stronger for the higher education group than the lower education group. This finding is

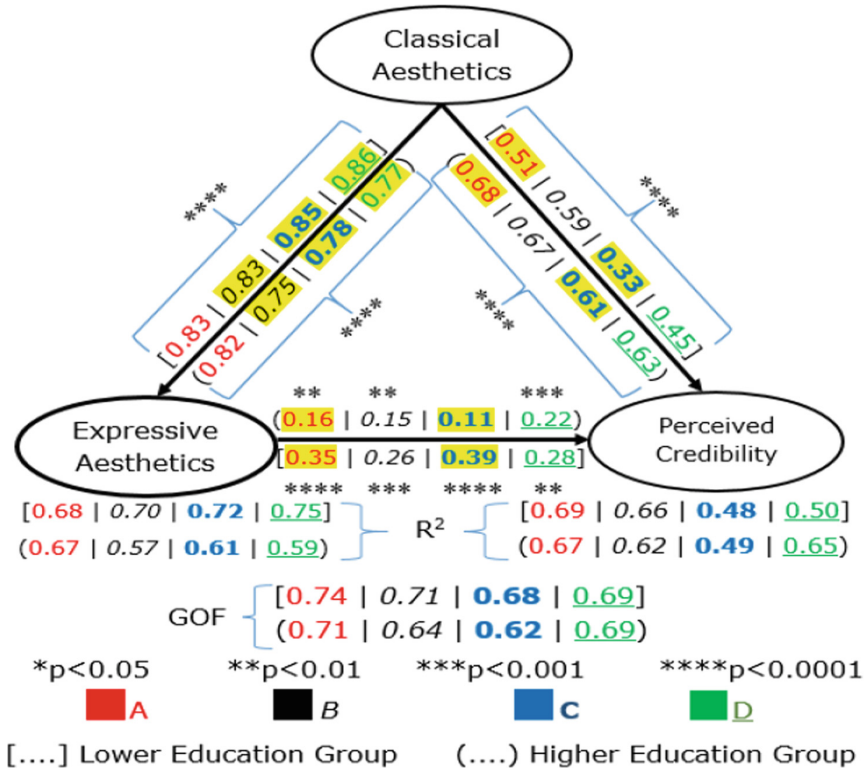

Fig. 3. Subgroup models (highlighted coefficients indicate multigroup differences, $p < 0.05$)

replicable across at least two of the website designs (WA and WC) as evident in the highlighted β-values. Second, the relationship *between expressive aesthetics* and *perceived credibility* is stronger for the lower education group than the higher education group. Similarly, this finding is replicable across at least two of the website designs (WA and WC) as evident in the highlighted β-values. Finally, the relationship *between classical* and *expressive aesthetics* is stronger for the lower education group than the higher education group. This finding is replicable across three of the web designs (WB, WC and WD) as evident in the highlighted β-values. We discuss these significant group differences in Sect. 6.

6 Discussion

The results of our SEM analysis (see Fig. 3) reveal that, in mobile web design, the three interrelationships among *classical aesthetics*, *expressive aesthetics* and *perceived credibility* are significant ($p < 0.01$), regardless of the education level of the users and the aesthetic attributes of the web design. Moreover, the variance of *perceived credibility* explained by the two dimensions of visual aesthetics ranges from moderate

(between 30% and 60%) to high (above 60%) [18]. This indicates that the two dimensions of *visual aesthetics* are able to predict the *perceived credibility* of a mobile website to a high degree of accuracy. Particularly, irrespective of the level of education, WA's *perceived credibility* variance explained is the highest (69% and 67% for lower and higher education groups, respectively), while WC's *perceived credibility* variance explained is the lowest (48% and 49% for lower and higher education groups, respectively). Moreover, *classical aesthetics* is able to explain a substantial amount of variance of *expressive aesthetics*, with six of the eight R^2-values being high (above 60%).

6.1 Validation of Hypotheses

Our supported hypotheses (pre-stated and explored) are summarized in Table 4. Four of them (H1a, H1c, H2a and H2c) were pre-stated, while the other three (H3b, H3c and H3d) resulted from the exploratory analysis we carried out.

Table 4. Summary of supported hypotheses

No.	Hypothesis	Remark
H1a H1c	The perception of *expressive aesthetics* will have a stronger effect on *perceived credibility* for lower education users than higher education users.	Supported and replicated across WA and WC
H2a H2c	The perception of *classical aesthetics* will have a stronger effect on *perceived credibility* for higher education users than lower education users.	Supported and replicated across WA and WC
H3b* H3c* H3d*	The perception of *classical aesthetics* will have a stronger effect on *expressive aesthetics* for lower education users than higher education users.	Supported and replicated across WB, WC and WD

*Hypothesis that was not pre-stated but found to be true by the SEM analysis

The validation of H1a and H1c in the first set of hypotheses indicates that users with lower education are more likely than users with higher education to use perceived *expressive aesthetics* as a basis for judging the *perceived credibility* of mobile websites. This finding is replicated across two of the web designs: multicolor website (WA) and moderate-color website (WC). This means that, regardless of the actual visual design, lower education users are more likely than higher education users to use perceived expressive or complex features (*fascinating*, *creative*, *sophisticated*, etc.) to judge the two websites in question as *credible*. This finding is in line with Lightner's [13], who found that the visual impact of e-commerce sites (which employed stylistic use of visual elements such as color) on users' buying behavior and/or preferences became less important as the education level of respondents increased. Thus, based on our finding and Lightner's [13], we conclude that visually stimulating and arousing websites are more likely to be perceived as *credible* by lower education users than higher education users. Moreover, this finding suggests that visually stimulating and arousing websites, which mostly employ expressive features, are more likely to be judged as *credible* by lower education users than higher education users. This finding is evident in Oyibo et al.'s [12] prior study, in which they found that a higher percentage of Nigerian respondents (with lower

education level) ranked the WA design (which, due to its colorfulness, is most aesthetically expressive – from the designer's perspective) as more *credible* compared to the Canadian respondents (with higher education level). On the flipside, a higher percentage of Canadian respondents (with higher education level) ranked the WA design as least credible compared to the Nigerian respondents (with lower education level). However, due to the possible influence of culture, our current finding among a mixed population needs further investigation, especially among a homogeneous population, in which the two education groups belong to the same culture.

On the other hand, the validation of H2a and H2c in the second set of hypotheses indicates that users with higher education are more likely than users with lower education to use perceived *classical aesthetics* as a basis for judging the *perceived credibility* of websites. Again, this finding is replicated across two of the web designs (WA and WC), both of which have different color schemes. This means that, regardless of the actual visual design, higher education users are more likely than lower education users to use perceived classical or simple features of a website (*clean*, *pleasant*, *orderly*, etc.) to judge a website as *credible*. Moreover, this finding suggests that less visually stimulating and arousing websites, which only employ basic features, are more likely to be judged as *credible* by higher education users than lower education users. This finding is evident in a prior study by Oyibo et al. [12], in which the authors found that a higher percentage of Canadian respondents (with higher education level) ranked the WB web design (the least aesthetically expressive – from the designer's perspective) as more *credible* compared to the Nigerian respondents (with lower education level). On the flipside, a higher percentage of Nigerian respondents (with lower education level) ranked the WB design as least *credible* compared to the Canadian respondents (with higher education level). Again, just like in the previous case, due to the possible influence of culture, this current finding among a mixed population needs further investigation among a homogeneous population, in which the two education groups belong to the same culture.

Further, it is interesting to note that, for the other two web designs (WB and WD), the relationship between *expressive aesthetics* and *perceived credibility* is stronger for the lower education users than for the higher education users, except that the numerical differences between the respective path coefficients are not statistically significant at $p < 0.05$. For example, with respect to WB, the path coefficient for the relationship in question is ($\beta = 0.26$, $p < 0.001$) for the lower education group and ($\beta = 0.15$, $p < 0.01$) for the higher education group. However, the numerical difference did not translate into statistical significance. Similarly, for both web designs (WB and WD), the relationship between *classical aesthetics* and *perceived credibility* is stronger for the higher education users than the lower education users, except that the numerical differences between the respective path coefficients are not statistically significant at $p < 0.05$. For example, with respect to WB, the path coefficient for the relationship in question is ($\beta = 0.67$, $p < 0.0001$) for the higher education group and ($\beta = 0.59$, $p < 0.0001$) for the lower education group. However, the numerical difference did not translate into statistical significant. Despite the non-significant statistical differences between the respective path coefficients for the two education groups with respect to WB and WD (discussed above), the numerical differences between them tend to confirm the validation of H1 and H2 across the WA and WC web designs.

Finally, using exploratory analysis, we found that the influence of *classical aesthetics* on *expressive aesthetics* is stronger for the lower education group than the higher education group, which is replicated across WB, WC and WD. This finding is an indication that *perceived expressive aesthetics* partially mediates the influence of *classical aesthetics* on *perceived credibility*. This partial mediation, our mediation analysis showed, is stronger for the lower education group than for the higher education group.

In a nutshell, the overall significance of our findings is that, in the judgment of *perceived credibility* of mobile websites, *expressive aesthetics* (perceived fascination, creativity and sophistication) is more relevant to lower education users than to higher education users, while *classical aesthetics* (perceived pleasantness, clarity and simplicity) is more relevant to higher education users than to lower education users. Web designers can leverage these findings to tailor e-commerce websites to the respective user groups in order to enhance the *perceived credibility* of their websites.

6.2 Limitations and Future Work

Our study has a number of limitations. We focus here on three of the main limitations. The first and foremost limitation is that our study is based on users' perception of the presented websites. This may threaten the generalizability of our findings to the experimental context in which users have to actually interact with the four web designs. The second limitation of our study is that its findings are in the context of mobile web design, which may not generalize to the desktop domain. The third limitation of our study is that our findings are in the context of a mixed (heterogeneous) population, in which important demographic variables such as age, gender and culture are not controlled for in the analysis of the structural models. To address the above limitations, in future work, we recommend further studies be carried out in an experimental setting, in the desktop domain and among a homogeneous population, in which one or more of the aforementioned demographic variables are controlled for, to verify the generalizability of our findings.

7 Conclusion

We presented a model of the moderating effect of education on the interrelationships among *classical aesthetics*, *expressive aesthetics* and *perceived credibility* in mobile web design. We found that lower education users are more likely to use *expressive* (aesthetic) features (perceived creativity and sophistication of the web design) to judge the *perceived credibility* of mobile websites than higher education users. On the other hand, we found that higher education users are more likely to use *classical* (aesthetic) features (perceived cleanness, pleasantness and simplicity of the web design), which are strongly related to *perceived usability* [5], to judge the *perceived credibility* of mobile websites than lower education users. Moreover, we found that the relationship between *classical aesthetics* and *expressive aesthetics* is stronger for lower education users than higher education users. These findings provide interesting insights into how the level of education of mobile website users can moderate the interrelationships among the two dimensions of *visual aesthetics* and the *perceived credibility* of mobile

websites. Designers can leverage these insights in the development of e-commerce websites optimized for the respective user groups based on their level of education.

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