

# Aesthetics as a Decisive and Motivational Factor for Online Training

Anaïs Niveau and Jean-Christophe Sakdavong

*CLLE CNRS UMR 5263, University of Toulouse, 5 allée Antonio Machado, Toulouse, France*

**Keywords:** E-Learning, Digital Learning, Aesthetics, Credibility, Purchase Intention, Learning Motivation.

**Abstract:** In an increasingly competitive world, including that of online education and training, it is important to stand out from the crowd if one wants to attract learners, and therefore customers. Studies show the importance of a website's credibility in influencing the intention to buy a service, while others show the impact of a teacher's credibility on motivation to learn. Researchers have also shown that an important factor in an individual's assessment of credibility is based on visual appearance, or "aesthetics". This is why we wanted to check that, for the same training content, an individual would be more inclined to opt for a site that he or she considered aesthetically pleasing than for another that he or she did not consider aesthetically pleasing. We therefore had 2 training websites evaluated, one "aesthetic" and the other "non-aesthetic", divided randomly between 2 groups of participants (82 in total). The results of our survey show a preference for the "aesthetic" site when it comes to evaluating the credibility of the site, the credibility of the training, the intention to buy and the motivation to learn. We then suggest some avenues for future research.

## 1 INTRODUCTION

Digital technology is omnipresent in education, leading to an abundance of scientific studies and the principles that stem from them. For example, Mayer's multimedia learning principles (2001) guide instructional designers in creating pedagogically effective digital resources. In order to guarantee inclusivity, accessibility and usability are also prioritised, taking into account elements like colour contrast, layout guidelines, and readable font choices.

But design and aesthetics are frequently overlooked in favour of pedagogy, usability, and accessibility, raising the question of why this happens.

The design principle of "form follows function" suggests that aesthetics should follow functionality in design. This principle has both descriptive and prescriptive interpretations, with the latter implying that aesthetics are secondary to functionality (Lidwell et al., 2010). This viewpoint aligns with the historical mind-body dichotomy, where the mind (function) is deemed superior to the body (form) (Gray et al., 2011).

Aesthetics and pedagogical content are inextricably linked for people who create educational resources and digital learning materials in the field of instructional design and graphic design. Numerous

research works, including those by Mayer (2001), Lohr (2007), and Clark and Lyons (2004), highlight the cognitive advantages of aesthetics in supporting learning. To improve the learning process, Lohr (2007) suggests taking visual aesthetics into account while designing instructional materials.

Examining additional factors is crucial, especially in light of aesthetics' demonstrated cognitive benefits.

In this study, we wanted to check if aesthetic has an effect on credibility, intention to buy and motivation to learn in a learning website. Our main findings will show that it has a significant effect on all these variables.

## 2 LITERATURE REVIEW

### 2.1 Observation

The saying "Don't judge a book by its cover" captures the idea that beauty and aesthetics are often perceived as superficial elements that do not necessarily reflect the content or substance. Yet, it is undeniable that colourful and engaging book covers attract the attention of potential readers. The cover is the initial entry point into a book, sparking interest, prompting readers to pick it up, read the synopsis, and make the

decision to purchase it. This principle also applies to marketing, visual communication, and product design, amongst others.

In this context, it is relevant to extend this observation to education and training. In today's world, especially in the post-COVID era, the availability of online learning options is increasing exponentially (KPMG, 2015; Research and Markets, 2023). The global e-learning market has been growing rapidly, and competition amongst educational providers is intensifying.

## 2.2 Research Questions

In this competitive context, what influences prospective learners' choices between seemingly equivalent educational offerings? Does the aesthetics and visual appeal of a learning platform impact the learner's perception of its credibility and, consequently, their intention to enrol (and pay) for a course?

Beyond being a deciding factor, does aesthetics and visual appeal affect the motivation of enrolled learners in a course?

Exploring these questions is the goal of this investigation. To accomplish this, we will start by defining important terms like credibility, learning motivation, and aesthetics through a study of theoretical and empirical literature. We will next synthesize these studies to determine the connections between these concepts and propose one or more research hypotheses. Lastly, we will describe an experimental protocol used to test these hypotheses.

## 2.3 Credibility

Credibility is a fundamental concept in assessing the *trustworthiness* and *expertise* (Choi, 2020; Choi & Stvilia, 2015; Rieh, 2010) of information sources, influencing people's confidence in the information's accuracy. This review explores the dimensions of credibility and its evolving nature, with a specific focus on digital credibility in online learning environments.

According to Rieh (2010), credibility has been traditionally characterized by three primary dimensions:

- *Source Credibility* which refers to the perceived reliability of the individual communicating the information.
- *Message Credibility* which concerns the apparent reliability of the content, structure, language, and presentation used to convey the information.

- *Media Credibility* which deals with the perceived reliability of the channel used for information dissemination, such as television, radio, or newspapers.

The evolution of technology has given rise to contemporary considerations of credibility, particularly in the digital realm. Two significant aspects of digital credibility have emerged:

- *Web Credibility* which relates to the ambiguity of the source and the relative youth of the medium.
- *Computer Credibility* which relates to the computer as a source of information ("knowledge repositories, user instructions, etc."). It comprises four subtypes:
  - *Presumed Credibility*: Based on individual beliefs and assumptions.
  - *Reputed Credibility*: Rooted in what is reported by third parties, such as other individuals, the media, or institutions.
  - *Surface Credibility*: Hinging on initial impressions and superficial traits, such as website design, visual elements, and information architecture.
  - *Experienced Credibility*: Based on individual experiences with the source.

Various frameworks have been proposed to assess digital credibility. Amongst these, Fogg's Web Credibility Framework identifies three key factors (cited in Choi & Stvilia, 2015):

- a. The operator of the site
- b. The content provided
- c. The design of the website, including information structure, technical design, aesthetic design, and interaction design.

Online learning environments found on websites being the focus of this study, it is critical to define the exact criteria that will be used to determine the credibility of these settings. Credibility of online learning platforms is mostly based on elements such as the overall user experience, the calibre of the course content, the platform's navigability, and the standing of the course provider.

Credibility is a multifaceted concept that has expanded from traditional dimensions to include several types of digital credibility. Factors impacting credibility in online learning environments are: the information's original source, the calibre of the content, and the platform's functionality and design (Metzger et al., 2013). It is crucial to comprehend and assess credibility in digital environments to make sure that online learners can rely on and trust the information they encounter.

### 2.3.1 Website Credibility

Choi (2020) and Choi and Stvilia (2015) propose to combine the concepts of *trustworthiness* and *expertise* with Fogg's framework (operator, content and design) for a comprehensive assessment of a website's credibility through 6 criteria:

1. Operator Trustworthiness
2. Operator Expertise
3. Content Trustworthiness
4. Content Expertise
5. Design Trustworthiness
6. Design Expertise

Given the vast amount of information available on the internet and the increasing awareness of fake news and disinformation, the importance of source credibility has become clear. This impact is particularly prominent since the 2016 U.S. presidential elections (Azzimonti & Fernandes, 2023; Choi & Stvilia, 2015).

### 2.3.2 Credibility in Education: Cognitive Authority

Within the realm of education, cognitive authority is essential. This term describes people who are regarded as authorities in particular domains, including psychology, education, philosophy, and more (Rieh, 2010; Wilson, 1983). Three essential factors for credibility have been determined by studies conducted by McCroskey et al. (quoted in Finn et al., 2009): perceived benevolence, competence, and reliability. Since the instructor serves as the main information source in teacher-centred learning approaches, credibility is especially important. Students who think well of their teachers are more inclined to enrol in more courses taught by them and to refer others to them.

Trust being a significant factor in e-commerce, users' lack of trust is a common barrier to and an important factor for online purchases (Chong et al., 2003; Saw & Inthiran, 2022). Since online learning often involves financial transactions on websites, e-commerce credibility criteria can be applicable. Ensuring that an online education platform is perceived as credible and reliable is essential for attracting and retaining learners.

### 2.3.3 Aesthetics and Website Credibility: "What Is Good Is Beautiful"

Studies, such as the one by Dion et al. (1972), have shown that visually appealing people can enhance perceptions of credibility. The concept of "what is

beautiful is good" may extend beyond physical attractiveness to include the visual aspects of websites.

### 2.3.4 Prominence Interpretation Theory (PIT): Understanding Website Credibility Evaluation

The Prominence Interpretation Theory (PIT) (Fogg, 2003), sheds light on how people assess the credibility of websites. For the purpose of determining credibility, *prominence* and *interpretation* must both be present. On a website, *prominence* refers to an element's visibility, whereas *interpretation* is the result of user judgement. Both prominence and interpretation are influenced by multiple factors, such as individual differences, user involvement, website theme, user task, and user experience.

In digital contexts, credibility is a complex idea with very large effects. It is crucial for e-commerce, education, and other online activities. Then, it is essential to comprehend the several aspects of credibility, such as the role of aesthetics and cognitive authority, to create and maintain trustworthy online platforms.

## 2.4 Aesthetics

The Cambridge Dictionary defines something as "aesthetically pleasing" as "something that is enjoyable to look at because you think it is beautiful". While this might be commonly understood, it is important to define how this pertains to websites and online education.

### 2.4.1 "What Is Beautiful Is Usable"

The notion that "what is beautiful is good," introduced by Dion et al. in 1972 is extended to the realm of Human-Computer Interaction (HCI) by Tractinsky and colleagues in 2000. Their research demonstrates that users associate aesthetics with usability, emphasizing the significance of aesthetics in the design process. Moreover, Hancock (2004) defines the aesthetics of a digital learning environment as "an emotional response evoked by visual elements within a learning environment". Consequently, several key considerations are outlined for achieving a successful interface. When addressing the aesthetics of a digital object, the focus is not just on displaying images or graphics on the screen but rather on intentionally arranging elements to engage the user's senses and emotions, a practice commonly associated with the principles of Gestalt theory.

### 2.4.2 Gestalt Theory

The *Gestalt Theory*, also known as *Gestaltism*, originated in Germany and Austria in the early 20<sup>th</sup> century through the works of Max Wertheimer, Kurt Koffka, and Wolfgang Köhler (Köhler, 1967). This theory was built on the premise that “the whole is greater than the sum of its parts” (Rock & Palmer, 1990), a fundamental principle that governs sensory perceptions. According to Todorovic (2008), several laws and principles derived from Gestalt Theory are regularly used in fields such as graphic design, interior design, and user interface design (UI). These principles include:

- *Figure-Ground Articulation*: The contrast between a figure and its background, where the figure is perceived as salient and deserving of attention.
- *Proximity Principle*: Elements placed close to each other are perceived as a group.
- *Common Fate Principle*: Elements moving in the same direction are seen as a group.
- *Similarity Principle*: Elements with similar attributes (e.g., shape, colour, size) are perceived as belonging to the same group.
- *Continuity or Continuation Principle*: Aligned or connected elements are perceived as a group.
- *Closure Principle*: Elements forming a closed figure are grouped together.
- *Good Gestalt Principle*: Individuals interpret complex shapes in the simplest possible way.

It is worth mentioning that, still according to Todorovic (2008), there is no definitive list of Gestalt principles but that the aforementioned laws are the most known.

The Gestalt Theory’s wide application in the design of user interfaces and user experiences underlines its relevance in creating effective and functional digital experiences.

### 2.4.3 Facets of Visual Aesthetics for Websites

Moshagen and Thielsch (2010) introduce four objective facets of visual aesthetics for websites, partly based on Gestalt principles, referred to as the *Visual Aesthetics of Website Inventory (VisAWI)*:

- *Simplicity*: Emphasizing unity, homogeneity, order, and clarity, simple presentations tend to be processed more smoothly and are positively appreciated.
- *Diversity*: Stimulating interest and tension, diversity counters low levels of arousal induced by overly simple stimuli.

- *Colourfulness*: The use of colours significantly impacts a website’s aesthetic evaluation.
- *Craftsmanship*: Skilful and coherent integration of relevant design dimensions.

These criteria become central to the assessment of website aesthetics, which is further elaborated in this study’s methodology section.

### 2.4.4 Use of Colours, Psychology, and Marketing

The choice of colour palettes holds significance in shaping a user’s perception of a website. Several studies have demonstrated the role of colour in influencing the perceived attributes of an object (Papachristos et al., 2005; Singh & Srivastava, 2011; Suriadi et al., 2022). Colours, or combinations of colours, also have a notable impact on brand perception and consumer behaviour. Singh and Srivastava (2011) present a selection of colour meanings used to convey specific messages in marketing. The study underscores the importance of these colour choices, especially when it comes to web design.

The second part of this scientific summary focuses on the impact of aesthetics in education and online learning, considering the role of aesthetics in designing digital learning environments. Hancock (2004) evaluates the impact of aesthetics on student engagement and motivation in digital learning spaces. His research demonstrates a preference for aesthetically pleasant surroundings, emphasising the importance of creating visually appealing e-learning platforms. A study by Ghai and Tandon (2022) evaluates the visual design components that influence the e-learning experience. Their research identifies many aspects, such as graphics, typography, and layout, that greatly contribute to enhancing learners’ engagement and motivation.

Furthermore, this scientific summary discusses the rapid judgments formed by users about the aesthetics of websites, noting that over 45% of users evaluate a website’s credibility based on its appearance (Fogg et al., 2003). A study by Lindgaard and colleagues (2006) suggests that users form opinions about website aesthetics in as little as 50 milliseconds, highlighting the need for a visually appealing website to capture and retain users’ attention.

The role of aesthetics in data visualization, especially in educational infographics, is also explored. This section emphasizes the importance of colour choices and complexity in infographics, as they affect user engagement and the retention of



information in educational materials (Harrison et al., 2015).

We have seen a comprehensive overview of the role of aesthetics in design, particularly in the contexts of web design and online learning. It highlights the essential aspects of aesthetics, incorporating principles from the Gestalt Theory and the facets of visual aesthetics. This study underlines the significance of aesthetics in user experience, engagement, and credibility in digital environments, emphasising the need for designers and educators to consider aesthetics as a fundamental element in their work.

## 2.5 Overview

As we have seen, when it comes to credibility, many criteria can influence its perception by a user browsing a website (Choi, 2020; Choi & Stvilia, 2015; Fogg, 2003; Fogg et al., 2003; Rieh, 2010). However, web credibility is crucial at a time when fake news and all types of disinformation are rife (Azzimonti & Fernandes, 2023; Choi & Stvilia, 2015). In addition, credibility has an important impact for learners at cognitive and metacognitive levels when it comes to cognitive authority, and therefore the teacher (Finn et al., 2009). The same goes for the trust placed by users in e-commerce sites if the user wishes to have confidence before proceeding, for example, with an online purchase (Chong et al., 2003; Saw & Inthiran, 2022).

The factors listed as bearers of credibility very often relate to aesthetics, amongst other elements (Choi & Stvilia, 2015; Fogg et al., 2003; Rieh, 2010). This could be due to the popular perception that “what is beautiful is good” (Dion et al., 1972; Tractinsky et al., 2000) and the importance of making a good impression in the first moments of exposure to the digital element (Lindgaard et al., 2006).

Several empirical studies have noted the impact of the visual aspect of digital resources belonging to the learning framework such as digital training environments (Ghai & Tandon, 2022; Hancock, 2004) and infographics (Harrison et al., 2015) on motivation, engagement and general perception of the resource.

On the other hand, there is, to our knowledge, no study focusing specifically on the importance of aesthetics on the perceived credibility of an online training website and on the training itself, nor on the intention of registration (and therefore purchase), or even on the motivation felt by the (future) learner.

To develop a solid methodology, we will formulate our research hypotheses taking into account the “objective” aesthetic and the “perceived”

aesthetic. The former will be the aesthetic by design (it respects the aesthetic rules) and the latter will be subjectively measured by the users.

In the rest of this article, we will call the “aesthetic” website, the one that respects the aesthetic rules, and the “non aesthetic” one, the one that doesn’t respect them.

## 2.6 Research Hypotheses

H1: an aesthetic website **is perceived as being more aesthetic** than a non-aesthetic one

H2a: an aesthetic website **is perceived as being more credible** than a non-aesthetic one

H2b: a website perceived as more aesthetic **is perceived as being more credible** than if it is perceived less aesthetics

H3a: an online training offered on an aesthetic website **is perceived as being more credible** than on a non-aesthetic one.

H3b: an online training hosted on a website perceived as more aesthetic **is perceived as being more credible** than if it is hosted by a website perceived as less aesthetics

H4a: an individual **will be more inclined to pay** for an online training offered on an aesthetic website than on a non-aesthetic one

H4b: an individual **will be more inclined to pay** for an online training hosted on a website perceived as more aesthetic than on a less aesthetics

H5a: an individual **will be more motivated in his or her learning** with an online training offered on an aesthetic website than on a non-aesthetic one

H5b: an individual **will be more motivated in his or her learning** with an online training hosted on a website perceived as more aesthetic than if it is hosted by a website perceived as less aesthetics.

## 3 METHODOLOGY

To test these hypotheses, 2 websites, one aesthetic and the other non-aesthetic were evaluated by participants. Perception of the aesthetic of the website was measured to verify H1, and perceptions of the credibility of the website, the credibility of the online training course, the intention to purchase and motivation to learn were measured to verify all other hypotheses.

### 3.1 Participants

To allow collection of sufficient data, a bilingual (French and English) online survey was created

through *LimeSurvey* and distributed via public posting on the professional media platform *LinkedIn* as well as direct messaging. This survey was open from beginning of July 2023 to mid-August 2023. In compliance with the RGD, the anonymous data was stored securely on a server at the University of Toulouse.

No selection was implemented other than being over the age of 18 and not to suffer from uncorrected visual impairment, the accurate evaluation of aesthetics being based on visual perception. 82 participants completed the survey (55 women, 27 men, 0 non-binaries).

### 3.2 Materials and Apparatus

Participants were asked to evaluate 2 websites: one objectively considered aesthetic (Figure 1) that respects general rules such as Gestalt principles and colour uses, and one objectively non-aesthetic (Figure 2) that doesn't respect these general rules. Both were inspired by existing e-learning websites, from which 3 screenshots were extracted for each. To reduce

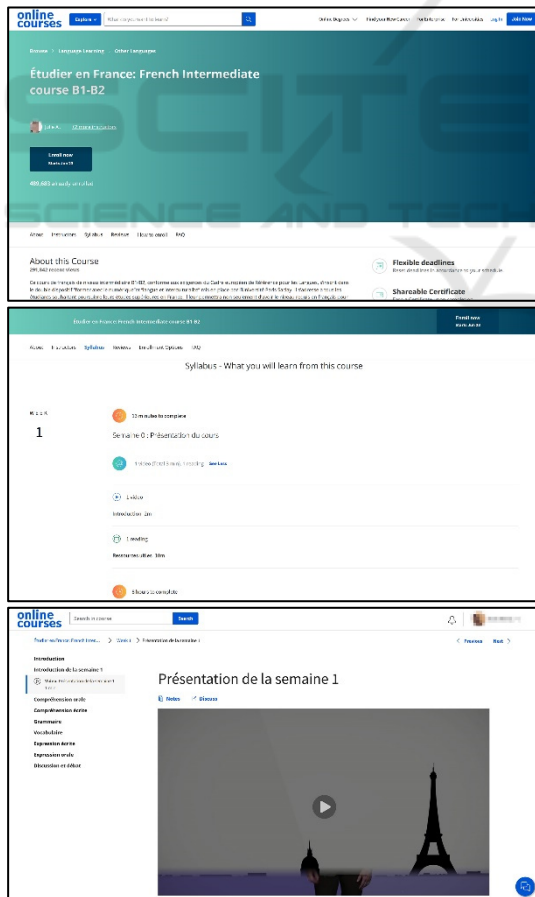


Figure 1: 3 Screen captures of the aesthetic website.

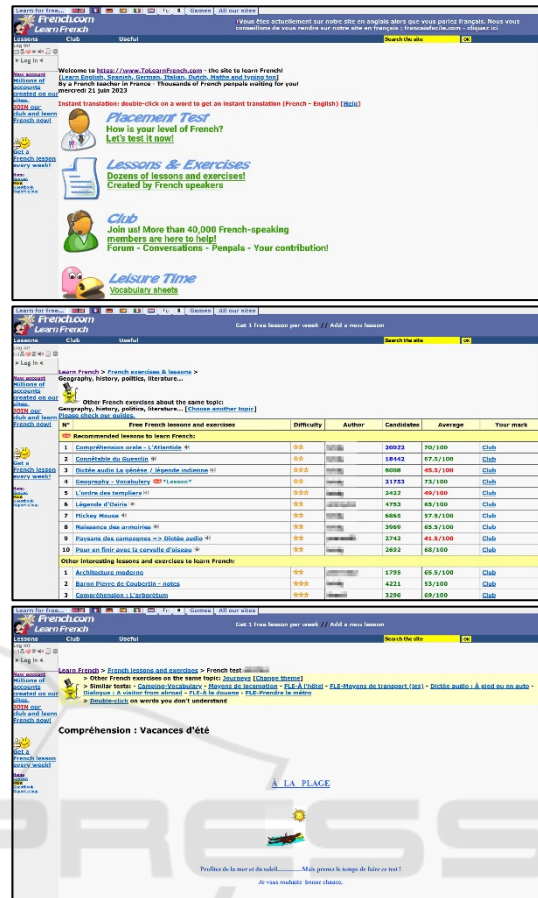


Figure 2: 3 Screen captures of the non-aesthetic website.

potential biases, each site was evaluated by a separate group, was sufficiently modified to reduce the risk of potential biases such as prior knowledge of the site (Dam, 2020), and the opinions of Internet users were obliterated to remove the factor of “reputed credibility” (Rieh, 2010), parasitic in the case in question, and to focus attention on aesthetics alone.

To verify the hypotheses, participants must then evaluate the 18 points of the VisAWI (Moshagen and Thielsch, 2010) measured by a Likert scale between 0 and 6 for a total score theoretically between 0 and 108.

4 additional points assessing credibility of a website, credibility of an online training course, potential intention to buy, and motivation to learn were all measured by a Likert scale between 0 and 5 (no neutral choice to ensure a clear statement by the participant) for a total score theoretically between 0 and 5 for each item:

- “I think this website is trustworthy.”
- “I think the training offered by this website is trustworthy.”

- “I would be prepared to pay to register for training on this website.”
- “I find the aesthetics of this website motivating for my learning.”

### 3.3 Procedure

After basic consent and identifying information (age, gender, socio-professional category, level of education, experience of online training, experience of the importance of aesthetics in general), participants were invited to observe, during 1 minute, 3 screenshots from one out of two sites (randomly presented by *LimeSurvey*). Each website, one aesthetic and the second non-aesthetic, was evaluated by separate groups to eliminate a bias that could arise from exposure to an aesthetic website before evaluating a non-aesthetic one, and vice versa. After the time of observation, participants must evaluate the 18 statements of the VisAWI, then the 4 elements concerning the credibility of the website, the credibility of the online training, the intention to purchase, and the motivation to learn. The survey then finished by thanking the participants for their participation.

## 4 RESULTS

### 4.1 Sample

102 people started the survey and 82 completed it. From this sample, a profile can be drawn up with the following characteristics.

A majority of women responded to the survey, 55 versus 27 men. The average age of the participants is 43.7 years (44.6 years for women, 41.7 years for men).

The most represented socio-professional category is employees (37.8%) followed by executive or higher intellectual professions (30.5%).

In the sample, half of the participants have never experienced paid online training, although the proportion is higher for women (34.1%, compared to 15.9% for men). Only 20.8% of the participants have never experienced free online training (15.9% of women, compared to 4.9% of men)

70.7% of the participants answered in French and 29.3% in English.

Table 1: Descriptive data split by website (aesthetic and non-aesthetic).

Descriptives	Website	VisAWI (/108)	Website credibility	Training credibility	Intent to pay	Motivation to learn
N	Aesthetic	31	31	31	31	31
	Non-aesthetic	36	36	36	36	36
Missing	Aesthetic	0	0	0	0	0
	Non-aesthetic	0	0	0	0	0
Mean	Aesthetic	46.2	2.68	2.58	1.58	1.48
	Non-aesthetic	24.3	1.28	1.42	0.306	0.417
Median	Aesthetic	45	3	3	2	1
	Non-aesthetic	24.0	1.00	1.00	0.00	0.00
Standard deviation	Aesthetic	13.7	0.748	0.807	0.807	0.996
	Non-aesthetic	13.1	1.06	1.08	0.467	0.692
Minimum	Aesthetic	15	1	1	0	0
	Non-aesthetic	0	0	0	0	0
Maximum	Aesthetic	75	4	4	3	3
	Non-aesthetic	60	3	4	1	2
Shapiro-Wilk W	Aesthetic	0.992	0.836	0.859	0.864	0.876
	Non-aesthetic	0.976	0.860	0.900	0.580	0.629
Shapiro-Wilk p	Aesthetic	0.997	< .001	< .001	0.001	0.002
	Non-aesthetic	0.602	< .001	0.003	< .001	< .001

Table 2: Descriptive data split by aesthetic perception score (VisAWI).

Descriptives		Aesthetic perception group	VisAWI (/108)	Website credibility	Training credibility	Intent to pay	Motivation to learn
N	LOW		33	33	33	33	33
	HIGH		34	34	34	34	34
Missing	LOW		0	0	0	0	0
	HIGH		0	0	0	0	0
Mean	LOW		20.4	1.30	1.30	0.455	0.303
	HIGH		48.1	2.53	2.59	1.32	1.50
Median	LOW		23	1	1	0	0
	HIGH		45.5	3.00	3.00	1.00	1.00
Standard deviation	LOW		9.49	1.13	0.984	0.666	0.585
	HIGH		10.8	0.825	0.857	0.912	0.961
Minimum	LOW		0	0	0	0	0
	HIGH		35	1	1	0	0
Maximum	LOW		33	3	3	2	2
	HIGH		75	4	4	3	3
Shapiro-Wilk W	LOW		0.930	0.847	0.877	0.680	0.568
	HIGH		0.919	0.860	0.866	0.873	0.880
Shapiro-Wilk p	LOW		0.034	< .001	0.001	< .001	< .001
	HIGH		0.015	< .001	< .001	< .001	0.001

## 4.2 Descriptive Processing of Data

To verify H1, H2a, H3a, H4a and H5a, participants are split in two groups, the first one (41) viewing the “non-aesthetic” website and the second one (38) viewing the “aesthetic” website.

To verify H2b, H3b, H4b and H5b, participants are also split in two groups using their answer to the VisAWI questionnaire to separate them. The first group (“LOW”) is composed of the participants having a score lower than the global average score, and the second group (“HIGH”) with a higher score.

As participants were not in a controlled environment, precautions were taken, and 15 outliers were identified using *Jamovi* software and excluded from the study. 49 women and 18 men remained.

After removing the outliers, there are 36 participants in the aesthetic website group, 31 in the non-aesthetic one. Since the VisAWI average score is 34.5, there are 33 participants in the LOW aesthetic perception group and 34 in the HIGH one.

Table 1 shows that the means of the variables VisAWI score, credibility of the website, credibility of online training, intention to pay and motivation of the “aesthetic group” are much higher than for the other group. It is also true for the medians. These descriptive data are coherent with our hypotheses H1, H2a, H3a, H4a and H5a.

Table 2 shows that the means of the variables credibility of the website, credibility of the online training, intention to pay and motivation of the HIGH perceived aesthetic group are much higher than for the other group. It is also true for the medians. These descriptive data are coherent with our hypotheses H2b, H3b, H4b and H5b.

A Chi-test shows that the language of the participant is well distributed between the two groups (Table 3).

Table 3: Contingency tables between website and survey language.

Contingency Tables		Language		
		fr	en	Total
Aesthetic	Observed	21	10	31
	% within row	67.7 %	32.3 %	100.0 %
Non-aesthetic	Observed	28	8	36
	% within row	77.8 %	22.2 %	100.0 %
Total	Observed	49	18	67
	% within row	73.1 %	26.9 %	100.0 %

$\chi^2$ Tests			
	Value	df	p
$\chi^2$	0.854	1	0.355
N	67		



### 4.3 Inferential Statistics

To evaluate our hypothesis H1, we carry out a T-test between the website (two independent groups) and the VisAWI score (integer value between 0 and 108). As shows in Table 1 with the Shapiro-Wilk test, the two groups are normally distributed for the VisAWI. We proceed to a Levene's test to check the homogeneity of variances. The result of the test ( $p = .721$ ) shows that there is homogeneity of the variances, which allows to use a Student T-Test.

We hypothesize that the VisAWI score will be higher in the aesthetic group.

Figure 3 shows the difference between the two groups.

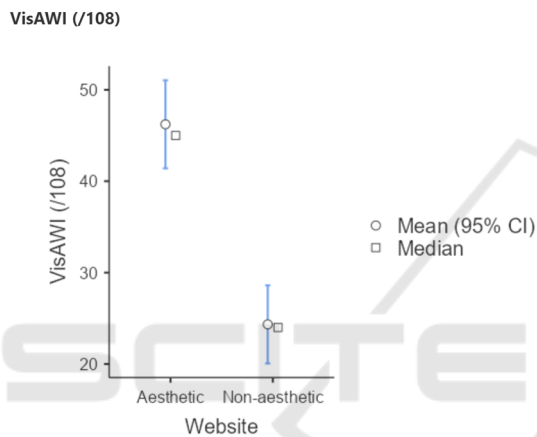


Figure 3: VisAWI score split by website.

There is a significant effect of website aesthetic over the VisAWI  $t(65) = 6.69, p < .001$  with a large effect size of 1.64.

We can conclude that H1 is verified.

To verify H2a, H3a, H4a and H5a, we carry out a test between the website (two independent groups) and the following variables: the credibility of the website, the credibility of the online training, the intention to pay and the motivation to learn (all coded by integer values between 0 and 5). As Table 1 shows with the Shapiro-Wilk test, the two groups aren't normally distributed for all variables. We must proceed a Mann-Whitney U test.

We hypothesize that all these variables will be higher in the aesthetic group which is confirmed with  $p < .001$  for each variable with medium effect sizes: the credibility of the website ( $d = 0.681$ ), the credibility of the online training ( $d = 0.588$ ), the intention to pay ( $d = 0.788$ ), and the motivation to learn ( $d = 0.599$ ).

We can conclude that H2a, H3a, H4a and H5a are verified as illustrated by Figure 4.

To verify H2b, H3b, H4b and H5b, we carry out a test between the aesthetic perception variable (two independent groups) and the following variables: the credibility of the website, the credibility of the online training, the intention to pay, and the motivation to learn (all coded by integer values between 0 and 5). As Table 2 shows with the Shapiro-Wilk test, the two groups aren't normally distributed for all variables. We must proceed a Mann-Whitney U test.

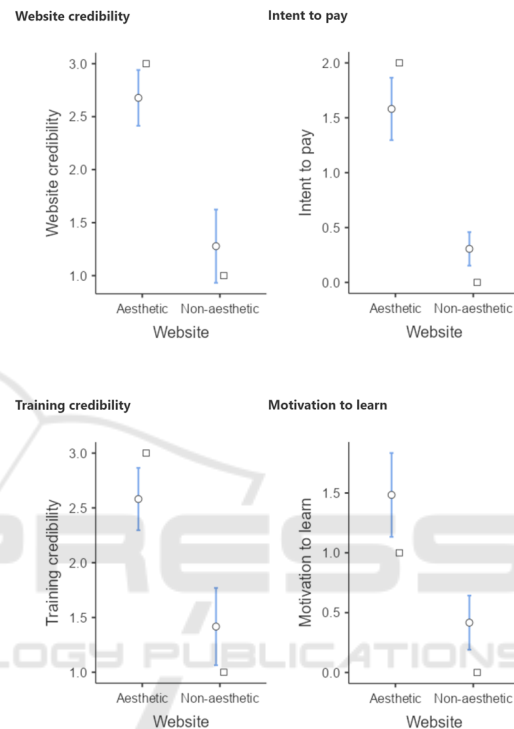


Figure 4: Credibility of the website, credibility of the online training, intention to pay, and motivation to learn split by website aesthetic.

We hypothesize that all these variables will be higher in the HIGH aesthetic perception group which is confirmed with  $p < .001$  for each variable and with medium effect sizes: the credibility of the website ( $d = 0.577$ ), the credibility of the online training ( $d = 0.643$ ), the intention to pay ( $d = 0.535$ ), and the motivation to learn ( $d = 0.684$ ).

We can conclude that H2b, H3b, H4b and H5b are verified as illustrated by Figure 5.

As we distributed the survey in two languages, we must verify that there is no effect of the language on our measures of the VisAWI score, the credibility of the website, the credibility of the online training, the intention to pay, and the motivation to learn, regardless of the website group or the perception group.

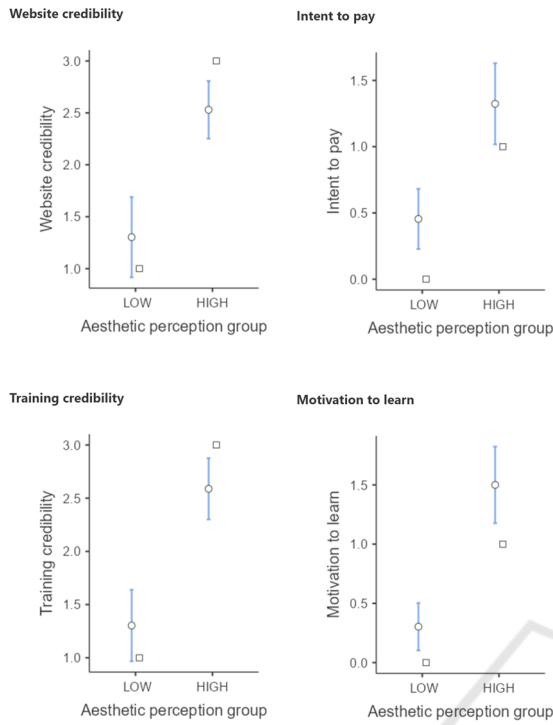


Figure 5: Credibility of the website, credibility of the online training, intention to pay, and motivation to learn split by aesthetic perception group.

This can be done by a two-factor ANOVA with language and website group (or perception group) as factors, and the different scores.

The verification of normal distribution for these 10 ANOVAs ( $5 \times 2$ ) shows that there is normality only for VisAWI scores (split by website or by perception).

For the website split, Shapiro-Wilk test ( $p = .856$ ) and homogeneity of the variances (Levene's test  $p = .407$ ) are good. Table 4 shows that only the Website (aesthetic or not) variable has an effect of the VisAWI, which is necessary to ensure that there is no interference of the language on the measures of VisAWI, regardless of the group.

Table 4: Two-factor ANOVA between language, website and VisAWI.

	Sum of Squares	df	Mean Square	F	p
Language	370.1	1	370.1	2.089	0.153
Website	5320.7	1	5320.7	30.035	< .001
Language * Website	76.4	1	76.4	0.431	0.514
Residuals	11160.4	63	177.1		

For the perception split, Shapiro-Wilk test ( $p = .263$ ) and homogeneity of the variances (Levene's test  $p = 0.560$ ) are good. Table 5 shows that

only the perception group has an effect of the VisAWI, which is necessary to ensure that there is no interference of the language on the measures on VisAWI whatever the group is.

Table 5: Two-factor ANOVA between language, website and VisAWI.

	Sum of Squares	df	Mean Square	F	p
Language	0.4601	1	0.4601	0.00429	0.948
Aesthetic perception group	8543.5590	1	8543.5590	79.61797	< .001
Language * Aesthetic perception group	0.0409	1	0.0409	3.81e-4	0.984
Residuals	6760.3357	63	107.3069		

Table 5 shows that there is no significant effect of the language on the VisAWI scores.

For the other variables, we cannot proceed with an ANOVA using the group because of the non-normality of the distribution, but we can do a non-parametric Mann-Whitney U test using only the language as a factor. Table 6 shows that there is no significant effect of the language on our measures.

Table 6: Mann-Whitney U Test on the effect of language on the credibility of the website, of the online training, the intention to pay and the motivation to learn.

		Statistic	p
Website credibility	Mann-Whitney U	396	0.509
Training credibility	Mann-Whitney U	414	0.698
Intent to pay	Mann-Whitney U	382	0.374
Motivation to learn	Mann-Whitney U	425	0.809

Note.  $H_0: \mu_{fr} = \mu_{en}$

## 5 DISCUSSION

### 5.1 Summary of Results

Following a literature review on the importance of aesthetic factors on dimensions such as credibility and education, we wanted to verify several hypotheses related to these aspects. To do this, we proposed a survey allowing participants to evaluate the visual appearance based on 3 screenshots of a website. Two websites were proposed to enhance the results and to be able to compare them to each other: the first respects the rules of aesthetic design, while the second does not.

Thanks to this study, we were able to verify several hypotheses.

The first one (H1) allowed us to show that a website designed in accordance with the rules of

aesthetic design is perceived more aesthetic than another site that does not respect these rules.

We then wanted to verify certain variables that, in our opinion, follow from “successful” aesthetics. Indeed, an “aesthetic” website (H2a) and online training (H3a) are considered to be more credible than when these rules have not been respected. Similarly, an individual will be more likely to pay for training (H4a) based on an aesthetic website than if the site that hosts it is not. Finally, an individual will feel more motivated in their learning (H5a) if the training is designed by respecting these rules of aesthetics.

Moreover, we were able to show the same results (H2b, H3b, H4b, H5b), provided that the individual perceives the site or training as being aesthetic for them, even beyond all considerations of aesthetic rules. This could be explained by the fact that, while aesthetics must respect rules, it remains a matter of taste, and a person can naturally find something more aesthetic than another person, whether for cultural or other reasons.

These very positive first results give us leads for additional research that could be conducted.

## 5.2 Research Perspectives

Here we have proposed 2 existing sites positioned at the extremes of an aesthetic prism: one professional respecting the rules of aesthetics, and the other amateur not respecting them. However, it could be interesting to evaluate the impact of the aesthetics of sites with “intermediate” aesthetics as well. Or, just as Hancock (2004) did by comparing 2 versions of the same LMS (Learning Management System), propose an “aesthetic” version and a “neutral” version of a training; or by varying only one parameter to try to define more precisely which aesthetic rule predominates, or which rule can be a real deal breaker, THE rule that cannot be broken at the risk of losing all credibility.

It would also be possible to repeat the same study but, this time, not to exclude people with a visual impairment, and instead target one or other specific visual impairment (such as colour-blindness) to measure its impact on the results.

We could also consider extending the questioning beyond the simple website hosting the training to include presentation slides by a teacher or trainer, infographics (like Ghai & Tandon, 2022), educational videos, and any other educational support or resource.

Finally, the sample being composed of voluntary individuals for the needs of this experiment, one can wonder what the results would be if one asked the question of purchase intention to real visitors of a

website offering online training, and the question of motivation in learning to real learners enrolled in a training. Since our sample did not necessarily have a real interest in the training offered on the sites used in this experiment, even if we instructed them to base their judgment only on the visual aspect, perhaps the result would be even more convincing on real users. Indeed, while aesthetics has been repeatedly highlighted as being a primordial factor of credibility, it is naturally not the only and unique evaluation factor, as we have been able to develop in the state of the art. Other variables could therefore be included to verify their relevance.

## 6 CONCLUSION

Our aim here is to highlight the importance of aesthetics in the world of education. Often, form is disregarded in favour of content: the focus is on the content, to the detriment of the visual aspect of the resource or medium, which is considered to be secondary or even a nuisance. Yet in an increasingly competitive world, and with the exponential growth of online training, it is important for any company, large or small, to be able to stand out from the crowd. While content is of course essential, it is also vital to make a good impression on potential future customers, and in increasingly record times. Faced with multiple offers for the same training course, we need to find that little bit extra that will make someone decide to sign up for our training course, or, in other words, to pay for the service we offer.

One of the most direct ways of making a good impression is based on the visual aspect, since this is the first approach that people (without visual impairment) will have. We have therefore been able to demonstrate this impact from a number of angles in order to highlight the importance of thinking aesthetically about the educational services on offer, and in so doing try to eradicate the idea that content is all that matters.

## REFERENCES

- Azzimonti, M., & Fernandes, M. (2023). Social media networks, fake news, and polarization. *European Journal of Political Economy*, 76, 102256. <https://doi.org/10.1016/j.ejpoleco.2022.102256>
- Choi, W. (2020). Older adults' credibility assessment of online health information: An exploratory study using an extended typology of web credibility. *Journal of the*

- Association for Information Science and Technology*, 71(11), 1295–1307. <https://doi.org/10.1002/asi.24341>
- Choi, W., & Stvilia, B. (2015). Web credibility assessment: Conceptualization, operationalization, variability, and models. *Journal of the Association for Information Science and Technology*, 66(12), 2399–2414. <https://doi.org/10.1002/asi.23543>
- Chong, B., Yang, Z., & Wong, M. (2003). Asymmetrical impact of trustworthiness attributes on trust, perceived value and purchase intention: A conceptual framework for cross-cultural study on consumer perception of online auction. *Proceedings of the 5th International Conference on Electronic Commerce*, 213–219. <https://doi.org/10.1145/948005.948033>
- Clark, R. C., & Lyons, M. (2004). Graphics and learning: The role of illustrations, diagrams, and photographs in complex learning tasks. *Journal of Educational Psychology*, 96(1), 157–168.
- Dam, T. C. (2020). Influence of Brand Trust, Perceived Value on Brand Preference and Purchase Intention. *The Journal of Asian Finance, Economics and Business*, 7(10), 939–947. <https://doi.org/10.13106/jafeb.2020.vol7.no10.939>
- Dion, K., Berscheid, E., & Walster, E. (1972). What is beautiful is good. *Journal of Personality and Social Psychology*, 24(3), 285–290. <https://doi.org/10.1037/h0033731>
- Finn, A., Schrod, P., Witt, P., Elledge, N., Jernberg, K., & Larson, L. (2009). A Meta-Analytical Review of Teacher Credibility and its Associations with Teacher Behaviors and Student Outcomes. *Communication Education - COMMUN EDUC*, 58, 516–537. <https://doi.org/10.1080/03634520903131154>
- Fogg, B. J. (2003). Prominence-interpretation theory: Explaining how people assess credibility online. *CHI '03 Extended Abstracts on Human Factors in Computing Systems*, 722–723. <https://doi.org/10.1145/765891.765951>
- Fogg, B. J., Soohoo, C., Danielson, D. R., Marable, L., Stanford, J., & Tauber, E. R. (2003). How do users evaluate the credibility of Web sites? A study with over 2,500 participants. *Proceedings of the 2003 Conference on Designing for User Experiences*, 1–15. <https://doi.org/10.1145/997078.997097>
- Ghai, A., & Tandon, U. (2022). Analyzing the Impact of Aesthetic Visual Design on Usability of E-Learning: An Emerging Economy Perspective. *Higher Learning Research Communications*, 12(2). <https://doi.org/10.18870/hlrc.v12.i2.1325>
- Gray, K., Knobe, J., Sheskin, M., Bloom, P., & Barrett, L. F. (2011). More Than a Body: Mind Perception and the Nature of Objectification. *Journal of Personality and Social Psychology*, 101(6), 1207–1220.
- Hancock, D. J. (2004). *Improving the Environment in Distance Learning Courses Through the Application of Aesthetic Principles*. <https://www.semanticscholar.org/paper/Improving-the-Environment-in-Distance-Learning-the-Hancock/8af1ea310dbd393f896ad241e3155936b2a513ea>
- Harrison, L., Reinecke, K., & Chang, R. (2015). Infographic Aesthetics: Designing for the First Impression. *Proceedings of the 33rd Annual ACM Conference on Human Factors in Computing Systems*, 1187–1190. <https://doi.org/10.1145/2702123.2702545>
- Köhler, W. (1967). Gestalt psychology. *Psychologische Forschung*, 31(1), XVIII–XXX. <https://doi.org/10.1007/BF00422382>
- KPMG. (2015). *Corporate Digital Learning—How to Get It “Right”* [<https://assets.kpmg.com/content/dam/kpmg/pdf/2015/09/corporate-digital-learning-2015-KPMG>]
- Lidwell, W., Holden, K., & Butler, J. (2010). *Universal Principles of Design, Revised and Updated: 115 Ways to Enhance Usability, Influence Perception, Increase Appeal, Make Better Design ... Design Decisions, and Teach through Design* (Revised edition). Rockport.
- Lindgaard, G., Fernandes, G., Dudek, C., & Brown, J. (2006). Attention web designers: You have 50 milliseconds to make a good first impression! *Behaviour & Information Technology*, 25(2), 115–126. <https://doi.org/10.1080/01449290500330448>
- Lohr, L. L. (2007). *Creating Graphics for Learning and Performance: Lessons in Visual Literacy* (2nd edition). Pearson.
- Mayer, R. E. (2001). *Multimedia Learning*. Cambridge University Press. <https://doi.org/10.1017/CBO9781139164603>
- Metzger, M. J., Flanagin, A. J., Eyal, K. K., Lemus, D. R., & Crawford, A. (2013). Credibility judgments of online information sources: A comparison of cognitive and heuristic processing approaches. *Communication Research*, 40(5), 559–584.
- Moshagen, M., & Thielsch, M. T. (2010). Facets of visual aesthetics. *International Journal of Human-Computer Studies*, 68(10), 689–709. <https://doi.org/10.1016/j.ijhcs.2010.05.006>
- Papachristos, E., Tselios, N., & Avouris, N. (2005). Inferring Relations Between Color and Emotional Dimensions of a Web Site Using Bayesian Networks. In M. F. Costabile & F. Paternò (Eds.), *Human-Computer Interaction—INTERACT 2005* (pp. 1075–1078). Springer. [https://doi.org/10.1007/11555261\\_108](https://doi.org/10.1007/11555261_108)
- Research and Markets. (2023). *E-Learning: Global Strategic Business Report - Research and Markets*. <https://www.researchandmarkets.com/reports/2832322/e-learning-global-strategic-business-report>
- Rieh, S. Y. (2010). Credibility and Cognitive Authority of Information. In *Encyclopedia of Library and Information Sciences* (3rd ed., pp. 1337–1344).
- Rock, I., & Palmer, S. (1990). The Legacy of Gestalt Psychology. *Scientific American*, 263(6), 84–91.
- Saw, C. C., & Inthiran, A. (2022). Designing for Trust on E-Commerce Websites Using Two of the Big Five Personality Traits. *Journal of Theoretical and Applied Electronic Commerce Research*, 17(2), Article 2. <https://doi.org/10.3390/jtaer17020020>
- Singh, N., & Srivastava, S. K. (2011). Impact of Colors on the Psychology of Marketing—A Comprehensive over View. *Management and Labour Studies*, 36(2), 199–209. <https://doi.org/10.1177/0258042X1103600206>



- Suriadi, J., Mardiyana, M., & Reza, B. (2022). The concept of color psychology and logos to strengthen brand personality of local products. *Linguistics and Culture Review*, 6(S1), Article S1. <https://doi.org/10.21744/lingcure.v6nS1.2168>
- Todorovic, D. (2008). Gestalt principles. *Scholarpedia*, 3(12), 5345. <https://doi.org/10.4249/scholarpedia.5345>
- Tractinsky, N., Katz, A. S., & Ikar, D. (2000). What is beautiful is usable. *Interacting with Computers*, 13(2), 127–145. [https://doi.org/10.1016/S0953-5438\(00\)00031-X](https://doi.org/10.1016/S0953-5438(00)00031-X)
- Wilson, P. (1983). *Second-Hand Knowledge: An Inquiry Into Cognitive Authority*. Greenwood Press.

