

## Review Article

# Digital Marketing Overload and Role of Neurocognitive Training in Enhancing User Experience

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<sup>2</sup>DY PATIL International University Pune, India**Submitted:** 2025, Oct 10; **Accepted:** 2025, Oct 30; **Published:** 2025, Nov 10**Citation:** Khatwani, M., Khedwala, M. (2025). Digital Marketing Overload and Role of Neurocognitive Training in Enhancing User Experience. *J Addict Res*, 9(2), 01-07.**Abstract**

Today, no marketing strategy operates without digital media—this has created distinct and unique risks for campaign content and has also added to the problems arising of digital marketing overload (DMO) and user experience (UX). The study examines the relationship between DMOs and UX among corporate staff in India and examines the role of cognitive training (CT) in reducing negative results. A total of 200 participants (100 men, 100 women) aged 25–35 years, and Delhi-NCR, Indore, Kolkata and other Indian cities, completed the standardised measures of DMO and UX. The initial analysis confirmed the reliability and generality of the scale. Independent T-tests indicated that employees with cognitive training reported much better user experience than those without training. Correlation analysis revealed an important negative relationship between DMO and UX. The hierarchical regression further demonstrated that the NCT moderated the relationship, weakening the adverse effects of surcharge. There were no major variations noted between the genders; however, the city-level analysis indicated a higher surcharge in Delhi-NCR compared to Indore. The conclusions emphasise the need for cognitive intervention to enhance digital agility, increase user satisfaction, and guide both corporate wellness programs and digital marketing strategy.

**Keywords:** Digital Marketing Overload, User Experience, Cognitive Training, Corporate Employees, Information Overload, India**1. Introduction**

In the current situation, companies must have digital marketing if they want to reach consumers in different channels. But as businesses are capturing the attention of consumers, there are several ads, offers and messages that are resulting in overload for digital marketing. This is known as digital marketing overload. From emails about sales and push notifications to ad on social media and pop-up windows -everything is competing for attention. Although companies look forward to more reach and more recall, the capacity of users to understand and respond actually runs a risk. This problem is not only related to marketing. It's a Neurocognitive challenge. Our brains are fast-fused to filter information, but when digital food exceeds our mental ability, it leads to fatigue in decision making, short attention span and complete avoidance of marketing. Understanding how Neurocognitive training can improve the user experience is not just relevant; This is important.

Digital Marketing Overload (DMO): DMO means that when the marketing activity is given quite a lot of attention in the digital media. This may cause campaigns to be less effective.

Examples include banner blindness, which occurs when users ignore online banners because of seeing too many; content fatigue, which refers to users becoming tired of constantly consuming marketing content; and even subtle resistance from users who feel overwhelmed by the promotional messages. Factors that help DMO boost include advertisement frequency, channel saturation, content personalization and openness of users to market something. Cognitive Load: Neurocognitive load is one of the primary elements that influences consumer experience. It indicates the mental struggle to date to process information. High Neurocognitive mass from virtual situations can cause terrible reminiscence, gradual selection and emotional distraction. User Experience

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(UX): UX includes the user's overall satisfaction with digital material or platforms, emotional reactions, comfort and harassment. In the case of a busy digital selection, improving UX requires a careful balance between information related to material density and Neurocognitive simplicity.

Neurocognitive Training: Neurocognitive training includes systematic exercise and techniques that help improve mental processes such as attention, working memory, decision making and form recognition. Text: Including Neurocognitive training in digital marketing strategies - simplifying user interfaces, guiding user attention or making interactive experiences more like games – can increase users' engagement with the content and prevent Neurocognitive overload. Frequent ads can cause emotional exhaustion, adverse preference and user departure from content. Behavioral measures such as clicking rates, rolling depth, bouncing rate and the time spent on a page are important indicators of how excessive load and Neurocognitive fatigue show in users.

## 2. Literature Review

Over the past decade, digital marketing has grown more personalised and pervasive, often exposing consumers to excessive ads, offers, and notifications. This digital marketing overload can cause decision fatigue, stress, and impulsive purchases. Neurocognitive training techniques such as mindfulness, inhibitory control exercises, and attention regulation have shown potential to strengthen self-control and improve decision quality in such high-stimulus environments. Integrating these strategies into user experience design offers a way to protect consumers while maintaining engagement. The following review covers 20 studies from 2015 to 2025 that explore the effects and how Neurocognitive training can enhance the digital marketing experience.

### I. 2015

Nair & Das (2015) found that doing quick emotion-regulation exercises before checking out can actually reduce the guilty feeling you get after buying something. They think it's because it gives your brain a break from all the marketing stuff.

### II. 2016

Zhu, Chen & Li (2016) showed that when websites push you to buy things with little pop-ups, it can make you buy impulsively because you're not paying attention to other stuff. They say websites should be more upfront and give you a chance to cool down before buying.

### III. 2018

Zhang, Chen, Zhou & Hu (2018): Called out sneaky dark patterns online that wear you down and make you not trust websites.

### IV. 2019

Bruce, Potenza & Wiers (2019): figured out that you can actually train yourself to be less impulsive with an app, which can help you make better choices every day.

### V. 2021

Huang, Gao & Chen (2021): did a big review and found that too much information on social media is what makes people tired of it. They think social media should remind you to take breaks and show you what's important first.

### VI. 2022

- Vihari, Sinha, Tyagi & Mittal (2022): linked being mindful and emotionally smart to buying less stuff online without thinking. This means training your brain could help.
- Chen, Li & Zhao (2022): noticed that too much stuff on e-commerce sites makes people stressed, worried, and make bad choices. They suggest letting people filter what they see bit by bit.
- Li, Chen, Liu & Peng (2022): pointed out that being overloaded makes you buy things impulsively, feel bad about it later, and then want to return them.
- Haynes, Kemps, Tiggemann & others (2022) found that just one session of impulse control training can make you want tasty things less. This supports the idea of little interventions in apps.
- Wang, Lee & Hao (2022): saw that when there was too much COVID-19 information, people didn't want to pay attention to anything, which is similar to what happens with marketing.

### VII. 2023

- Jones, Stillman & team (2023): did a big study and confirmed that being able to control your impulses helps you buy less when you're overwhelmed.
- Hawkins, Gullo, Allen & team (2023): found that training yourself to stop and think makes tempting things less appealing, which gives UX designers ideas for adding friction to the design.
- Schoenebeck, Seering, Dain, Chambers, Witt, Gossett, Durand & Frey (2023): did a study in the real world of e-commerce and found that too many choices aren't always a problem, which means websites should customize their UX.

### VIII. 2024

McGreen, Lim, O'Dwyer & Ben-Tovim (2024): did a big study and found that exercises that help you control yourself can cut down on overeating. This also applies to not clicking on too many things online.

Yin, Li, Li & Zhao (2024): saw that brain training on phones can help people control themselves better. This could be useful for adding helpful tools to apps.

Khan, Imran, Farooq & team (2024): figured out that too many ads that are annoying make people want to avoid them. Fewer ads make users happier.

Zhang, Ma, Ni & Wang (2024): said that too much stuff on social media makes people switch to other platforms. This means social media sites should help people take it slow.

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## IX. 2025

Rokicki, Piotrowicz & Ray (2025): reviewed digital tourism marketing and noticed that too much content and wrong personalization cause people to feel overwhelmed. They suggested showing information bit by bit.

Li, Sun & Wu (2025): discovered that using social media a lot can cause burnout because of information overload. They think social media should have built-in tools to help people manage their usage.

### 2.1. Research Gap

The expanding issue of digital marketing overload has become a serious matter because consumers receive numerous advertisements and personalised content as well as notifications, throughout all digital platforms. Research has mainly investigated the adverse effects of digital marketing overload through studies that demonstrate decreased attention capacity and decisionmaking problems, and reduced digital brand confidence. The existing research centers on strategies for businesses to minimise marketing overload, while researchers have mostly focused on ethical design and personalisation and frequency control approaches. The field shows insufficient focus on developing consumer tools to handle digital marketing overload effectively. The field of Neurocognitive training remains an insufficiently researched area of interest. Multiple research studies in psychology and education demonstrate that Neurocognitive training produces benefits for attention capabilities together with working memory performance and self-regulation abilities. Digital marketing applications have yet to fully explore the potential benefits of Neurocognitive training approaches. Research has barely studied Neurocognitive interventions which might enable users to better filter out irrelevant content and resist impulsive marketing cues while making more deliberate buying choices. Research fails to connect Neurocognitive science with digital marketing which generates an unaddressed need for developing user-centered approaches to improve digital experiences. The solution to this gap will create mutual benefits for consumer wellness and marketing success since it enables users to thrive instead of being overloaded within digital environments.

## 3. Method

### 3.1. Research Objectives

- The aim is to quantitatively evaluate the perceived saturation of digital marketing among participants and to compare baseline metrics by gender (75 males, 75 females).
- Additionally, the study seeks to critically assess the effectiveness of a Neurocognitive training intervention in reducing perceived digital marketing saturation when compared to a control group.
- The analysis will also focus on the relationship between changes in perceived saturation and variations in user experience metrics at the post-test phase.
- Lastly, the study aims to explore gender-related differences in initial saturation levels and in the response to Neurocognitive training interventions.

### 3.2. Hypothesis

- **H1 (Primary Training Effect)**
  - **H0<sub>1</sub>:** There will be no significant difference in user experience scores between employees who have received Neurocognitive training and those who have not ( $\mu_{UX\_NCT} = \mu_{UX\_NoCT}$ ).
  - **H1<sub>1</sub>:** Employees who have received Neurocognitive training will report significantly higher user experience scores than those who have not ( $\mu_{UX\_NCT} > \mu_{UX\_NoCT}$ ).
- **H2 (Digital Marketing Overload – UX Relationship)**
  - **H0<sub>2</sub>:** There will be no significant relationship between digital marketing overload and user experience ( $\rho_{DMO,UX} = 0$ ).
  - **H1<sub>2</sub>:** Digital marketing overload will be significantly and negatively related to user experience ( $\rho_{DMO,UX} < 0$ ).
- **H3 (Moderation by Neurocognitive Training)**
  - **H0<sub>3</sub>:** Neurocognitive training will not moderate the relationship between digital marketing overload and user experience ( $\beta_{DMO \times NCT} = 0$ ).
  - **H1<sub>3</sub>:** Neurocognitive training will moderate the relationship between digital marketing overload and user experience, such that the negative association between overload and user experience is weaker for trained employees ( $\beta_{DMO \times NCT} > 0$ ).
- **H4 (Gender Differences)**
  - **H0<sub>4</sub>:** There will be no significant difference in digital marketing overload between males and females ( $\mu_{DMO\_M} = \mu_{DMO\_F}$ ).
  - **H1<sub>4</sub>:** There will be a significant difference in digital marketing overload between males and females ( $\mu_{DMO\_M} \neq \mu_{DMO\_F}$ ).
  - **H0<sub>5</sub>:** There will be no significant difference in user experience between males and females ( $\mu_{UX\_M} = \mu_{UX\_F}$ ).
  - **H1<sub>5</sub>:** There will be a significant difference in user experience between males and females ( $\mu_{UX\_M} \neq \mu_{UX\_F}$ ).
- **H5 (Geographic Differences)**
  - **H0<sub>6</sub>:** There will be no significant differences in digital marketing overload scores across cities ( $\mu_{DMO\_city1} = \mu_{DMO\_city2} = \dots = \mu_{DMO\_cityk}$ ).
  - **H1<sub>6</sub>:** At least one city will significantly differ in digital marketing overload scores.
  - **H0<sub>7</sub>:** There will be no significant differences in user experience scores across cities ( $\mu_{UX\_city1} = \mu_{UX\_city2} = \dots = \mu_{UX\_cityk}$ ).
  - **H1<sub>7</sub>:** At least one city will significantly differ in user experience scores.

### 3.3. Sample

The sample was drawn from 200 corporate employees (100 males, 100 females) aged between 25 and 35 years, from Delhi-NCR, Indore, Kolkata, and other metro Indian cities. Participants were sampled on purposive sampling to reflect a mix of industries. All participants gave informed consent and were assured confidentiality.

### 3.4. Instruments

#### 3.4.1. Digital Marketing Overload Scale (DMO)

Digital marketing overload was measured with a self-report instrument based on known problems of information overload and

advertising overload (e.g., Karr-Wisniewski & Lu, 2010). The adapted scale consisted of 15 items representing perceived intrusiveness, message frequency, and attention fragmentation (e.g., "I feel bombarded by the amount of digital advertisements I receive each day"). Answers were rated from 1 (strongly disagree) to 5 (strongly agree) on a 5-point Likert scale. Higher levels represented more overload. Internal consistency reliability in the present study was assessed via Cronbach's  $\alpha$ .

### 3.4.2. User Experience Scale (UX)

User experience was assessed with a 12-item instrument based on tested UX frameworks (e.g., usability, satisfaction, perceived usefulness, and emotional engagement). Sample item: "I find my interaction with digital platforms to be smooth and satisfying." Participants used a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree). Higher scores indicated more positive user experience.

### 3.4.3. Neurocognitive Training (NCT)

Neurocognitive training was coded as a dichotomous variable. Participants who had completed a standardised training program in attention control, working memory, and digital mindfulness (minimum length = 6 hours across two weeks) were coded as "1" (trained), whereas those without such training were coded as "0" (untrained).

### 3.4.4. Demographic Questionnaire

Data on gender, age, job title, city of work, average daily screen time, and previous exposure to digital marketing analytics were gathered for control and descriptive purposes.

### 3.5. Procedure

The survey was conducted online using a secure website. Research

assistants trained to explain the purpose and to ensure anonymity briefed participants. The time to complete was 20 minutes on average. Screening procedures for the data involved missing value checks, outlier checks, and response biases.

### 3.6. Scoring

For DMO and UX scales, item scores were averaged and summed to derive composite scores. Greater mean values represented greater overload (DMO) and greater user experience (UX). Cronbach's  $\alpha$  reliability coefficients greater than .70 were regarded as adequate.

### 3.7. Preliminary Analysis

The data of 200 participants (100 men, 100 women) in the age group of 25–35 years were used. Data were checked for missing values, outliers, and normality before hypothesis testing. Fewer than 3% of data were missing and imputed with series mean substitution. Boxplots showed no outliers. Skewness and kurtosis statistics were within  $\pm 1.0$ , reflecting approximate normality. Internal consistency reliability for the Digital Marketing Overload scale was good (Cronbach's  $\alpha = .87$ ), as it was for the User Experience scale (Cronbach's  $\alpha = .84$ ).

## 4. Result

### 4.1. Descriptive Statistics

Means and standard deviations of the study variables across Neurocognitive training groups are presented in Table 1. Overall, participants reported moderate levels of digital marketing overload ( $M = 3.25$ ,  $SD = 0.68$ ) and moderately positive user experience ( $M = 3.45$ ,  $SD = 0.72$ ). Employees who underwent Neurocognitive training reported slightly lower overload ( $M = 3.10$ ,  $SD = 0.70$ ) and higher user experience ( $M = 3.72$ ,  $SD = 0.65$ ) compared to those without training ( $M = 3.40$ ,  $SD = 0.66$ ;  $M = 3.20$ ,  $SD = 0.75$ , respectively).

Variable	NCT (n=100) M (SD)	No NCT (n=100) M (SD)	Total (N=200) M (SD)
Digital Marketing Overload	3.10 (0.70)	3.40 (0.66)	3.25 (0.68)
User Experience	3.72 (0.65)	3.20 (0.75)	3.45 (0.72)

**Table 1: Descriptive Statistics for Main Variables by Neurocognitive Training**

### 4.2. Hypothesis Testing

- H1: Effect of Neurocognitive Training on User Experience**

An independent-samples t-test was conducted to compare user experience scores between trained and untrained employees. Results indicated that trained employees ( $M = 3.72$ ,  $SD = 0.65$ ) reported significantly higher user experience than untrained employees ( $M = 3.20$ ,  $SD = 0.75$ ),  $t(198) = 5.21$ ,  $p$

$< .001$ , Cohen's  $d = 0.74$ , suggesting a medium-to-large effect size. Thus, H1 was supported.

- H2: Relationship Between DMO and UX**

Pearson's correlation analysis revealed a significant negative relationship between digital marketing overload and user experience,  $r(198) = -.41$ ,  $p < .001$ . Higher overload was associated with poorer user experience, supporting H2.

Variable	1	2
1. DMO	—	
2. UX	-.41**	—
Note. $p < .01$ .		

**Table 2: Correlation Between DMO and UX**

**H3: Moderation by Neurocognitive Training**

A hierarchical regression analysis was conducted with user experience as the dependent variable. In Step 1, DMO and NCT were entered; in Step 2, the interaction term (DMO × NCT) was added. Results indicated that DMO was a significant negative predictor of UX ( $\beta = -.38, p < .001$ ), while NCT was a significant positive predictor ( $\beta = .31, p <$

$.001$ ). Importantly, the interaction between DMO and NCT was significant ( $\beta = .19, p = .012$ ),  $\Delta R^2 = .03$ . Simple slopes analysis (see Figure 1) showed that digital marketing overload strongly predicted poorer UX for untrained employees ( $\beta = -.45, p < .001$ ), but the negative relationship was weaker among trained employees ( $\beta = -.22, p = .041$ ). Thus, H3 was supported.

Predictor	B	SE B	$\beta$	t	p
Constant	4.25	0.22	—	19.3	<.001
DMO	-0.41	0.08	-0.38	-5.12	<.001
NCT	0.52	0.10	0.31	5.20	<.001
DMO × NCT	0.18	0.07	0.19	2.56	.012

**Table 3: Moderation Regression Analysis Predicting UX**

**H4 & H5:** Gender Differences Independent-samples t-tests showed no significant gender differences in digital marketing overload,  $t(198) = 1.21, p = .228$ , or user experience,  $t(198) =$

$-0.94, p = .348$ . Thus, H4 and H5 were not supported.

**H6 & H7:** Geographic Differences

City	Male (n = 25)	Female (n = 25)	Total (n = 50)
Delhi NCR	25	25	50
Indore	25	25	50
Kolkata	25	25	50
Other Cities	25	25	50
<b>Total</b>	<b>100</b>	<b>100</b>	<b>200</b>

**Table 4**

One-way ANOVA revealed significant city-level differences in digital marketing overload,  $F(3, 196) = 4.12, p = .007$ , partial  $\eta^2 = .06$ . Post-hoc comparisons indicated that employees in Delhi-NCR reported significantly higher overload compared to those in Indore ( $p = .014$ ). No significant differences were found for user experience across cities,  $F(3, 196) = 1.42, p = .238$ .

the body of literature on Neurocognitive load theory and digital behavior to show that overload has a significant adverse effect on user experience, and that specialist training interventions can mitigate these effects.

**4.3. Summary of Findings**

- Neurocognitive training significantly enhanced user experience, supporting H1.
- Digital marketing overload was negatively correlated with user experience, supporting H2.
- Neurocognitive training moderated the DMO → UX relationship, reducing its negative effect, supporting H3.
- No gender differences were observed in overload or experience (H4 & H5 not supported).
- City-level differences were observed for overload but not for user experience (partial support for H6 & H7).

**5.1. The Impact of Neurocognitive Training on User Experience**

Expectedly, Neurocognitive training assisted in the enhancement of user experience significantly. There was a better positive UX of trained employees compared to non-trained employees. This finding supports earlier results that attentional control, information filtering, and the ability to resist digital stress can be enhanced through training [1]. This time around, Neurocognitive training appeared to increase the ability of employees to absorb the unending torrent of marketing stimulation, and thereby to engage digitally.

**5.2. User Experience and Digital Marketing Overload Correlation**

The results showed that DMO and UX have a strong negative relationship. This aligns with prior research that indicates that, in the event that individuals are overwhelmed with marketing communications, mental resources become exhausted and, as a result, become less satisfied, more frustrated, and less trusting of digital platforms [2]. Corporate employees who already require high levels of information processing, but whose working environments

**5. Discussion**

The current study not only compared the impact of digital marketing overload (DMO) and the user experience (UX) of corporate employees in India but also explored the possible moderation effect of Neurocognitive training (NCT). These results contribute to

are crowded with additional marketing clutter, find their experience reduced by the additional marketing clutter.

### 5.3. The Moderating Effect of Neurocognitive Training

It is worth mentioning that Neurocognitive training mediated the influence of DMO on UX. Whereas DMO was significant as a predictor of poor UX in untrained employees, the effect was smaller in trained employees. This is a sign that Neurocognitive training does not eliminate the negative impact of overload, but it equips individuals with the means of coping better with it. This result is in line with the theory of resilience and adaptability, noting that Neurocognitive flexibility interventions can offset the negative influence of digital saturation [3].

### 5.4. Gender and Geographic Diversity

Contrary to hypotheses, gender differences in the field of overload and user experience were not observed. It means that digital marketing overload equally affects and impacts both male and female workers in the corporate environment. However, there were massive geographic differences. Overload was higher among Delhi-NCR workers than among Indore workers, perhaps because urban centres are more prone to digital advertising densities. Interestingly, UX did not vary across geographic settings which would imply that despite differences in levels of exposure, coping and overall experience are similar across geographic settings.

## 5.5. Implications

### 5.5.1. Theoretical Implications

- The research adds to the literature by combining Neurocognitive training with digital marketing research, which is a new cross-field synthesis that highlights the potential of interventions at the individual level to reduce the effects of overload.
- Results provide empirical support to the Neurocognitive load theory that overload has a deleterious effect on user experience and training enhances Neurocognitive resources usage.
- The moderation model adds to the existing literature on resilience through proving the existence of negative impacts of overload that can be reduced, but not eradicated using interventions.

### 5.5.2. Practical Implications

- To Companies: Companies can combine Neurocognitive training programs with employee wellness and digital literacy programs to enable employees to deal with digital clutter in a more effective manner.
- To Marketers: There should not be any oversaturation of digital marketing campaigns. Individual and simple approaches may reduce overload and improve the customer experience.
- To Training Providers: Neurocognitive training that is neuroscience-based and scalable could be a valuable application for corporate employees and customers alike in enhancing concentration and internet wellness.
- To Policymakers: The article advises that there is a need to enact laws that will curb unnecessary digital advertisements, especially in congested market locations like in Delhi- NCR.

### 5.5.3. Limitations

- Sample Scope: Age Group 25-35: only corporate employees in selected Indian cities were included in the study. Findings did not apply to other age groups, rural bases, and other non-corporate occupations.
- Cross-sectional Design: The data were collected at a point in time so there is no way to establish causal relationships with any certainty. Causal inferences would be stronger when developed using longitudinal or experimental designs.
- Self-report Measures: Self-report scales of UX and DMO may be susceptible to social desirability bias or incorrect self-perception.
- Limited Neurocognitive Training Detail: The participants were categorised as trained and untrained, but the content of the training, length of training and mode of training were not explicitly addressed.
- Cultural Context: The results could only be limited to the Indian digital marketing landscape and cannot be used in other countries with varying digital ecosystems or digital advertising cultures [4-25].

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