The Science Behind the Digital Experience Score (DXS®)

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EXECUTIVE SUMMARY

Medallia Digital Experience Analytics (DXA) is the only analytics software in the world that can automatically score every online user experience to identify and prioritize the most urgent experience issues impacting loyalty and sales.

Since 2014, the data science team at Medallia DXA has been analyzing unique experience data, identifying behaviors and mapping experiences to uncover visitors' state of mind including frustration, engagement, and confusion. The result of these efforts is our Digital Experience Score (DXS®).

DXS is the first and only metric that can quantify the online experience at scale. Today, our AI measures every user session - crunching billions of data points in real time to identify poor experiences across websites and apps, then scores those experiences to prioritize your optimization efforts for best results.

DXS and the technology behind it are built for scale. Medallia DXA's world class algorithms analyze over 150 metrics, across 60 behaviors in real time, that roll up to our 6 experience pillar scores including: navigation, engagement, frustration, technical, form and overall DXS. The five practitioner pillars each hold a score of its own, providing full visibility into the most

significant experience issues impacting the score and direct access to the tools needed to take action and improve at every level. Having pioneered this approach in the digital experience analytics market, Medallia DXA now hosts the richest set of enhanced experience data in the world, resulting in the highest possible accuracy for machine learning models.

Medallia DXA's DXS is the only validated metric of its kind that can predict the probability of online conversion and therefore, revenue. Medallia DXA has conducted numerous validation studies through independent third-party agencies, leading research firms, and data science experts, running regression analysis to correlate the impact of DXS and the achievement of key KPI goals such as loyalty, conversion, and revenue. The results are stunning.

This report will share in detail the journey and foundation of Medallia DXA's Digital Experience Score, leaving no doubt of the integrity and validation of this world-class analytic measure.

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Measuring the Digital Customer Experience – the Inside Scoop

Until now, monitoring digital experience has been a difficult undertaking as the measurements used have been qualitative or subjective in nature. Digital teams have had to sift through dozens of reports or maintain custom KPIs to track the quality of online experiences. Identifying opportunities for improvement has been challenging at best and impossible to do at scale. Tools like session replay and heatmaps are valuable if you know what you are looking for, but using these tools in isolation doesn't allow you to evaluate which optimization efforts will gain the best outcomes for you and your customers.

The real value-add lies in the ability to uncover poor experiences across your websites and apps, then quantify those experiences so you can prioritize your optimization efforts by business impact.

Medallia DXA is the only analytics software in the world that can automatically score every online user experience to identify and prioritize the most urgent experience issues impacting loyalty conversion, and sales. The higher a website's or an app's average DXS, the more conversions and revenue it will generate. Medallia DXA's Digital Experience Score is the first and only metric of its kind developed to quantify online customer experience at scale.

DXS is like a gigantic air traffic control system that monitors and controls the entirety of a company's website and apps, uncovering and alerting the digital teams of potential problems and opportunities for improvement. With DXS, teams have a go-to, universal metric that can be utilized across digital channels for immediate insight into where the biggest wins lie. With this information at hand, Medallia DXA's forensic tools then get to the root cause so you can troubleshoot,

validate hypotheses, and find the fastest path to resolution.

This report outlines the foundation of the Digital Experience Score, how DXS is calculated, the five experience pillars that constitute the score, validation of DXS, and the validation of DXS, proving the correlation between the DXS and achievement of customer goals such as loyalty, conversion, and revenue.

If You Don't Measure it, You Can't Fix it

Leading brands recognize that winning a customer's heart is a process. Those users that repeatedly interact with a brand that meets or exceeds their expectations by not only supplying the goods but delivering a positive experience, turn into customers for life. By building loyalty, companies build trust and grow customer lifetime value- the ultimate goal for every brand.

The first step at improving customer experience is measuring it. However, an ambiguous metric that isn't backed up by data and analytics serves little purpose in companies' efforts to optimize their digital properties. The challenge is to not only understand the digital customer experience but know exactly why the visitors behave in certain ways. This requires the right tools to pinpoint and prioritize the most urgent customer issues, fast and at scale, as well as the ability to monitor progress and adjust as you go. Delivering on these requirements is what separates successful brands from everyone else in the marketplace.

There are several measures for offline real-world Customer Experience, such as NPS, but it is well known in the industry that they do not

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transfer well into a digital environment. For one reason, they do not necessarily relate to a digital experience and are not good at pinpointing customer struggle.

Digital's own metrics such as bounce rates and conversion rates don't tell you the real story about how visitors are engaging with your websites and apps. Historically, digital customer experience has been a challenge to evaluate objectively, or measure at scale. As experience is personal and qualitative in nature, it is difficult to quantify - especially across multiple digital venues (e.g. complex multilingual websites, multiple geo-locations and mobile sites). And it should not be measured solely by the immediate outcome, say, completing the purchase. What good does it do if you miss when a customer got really frustrated along the way and abandoned the site?

It is a complex problem that hadn't been successfully resolved until Medallia DXA's Digital Experience Score was introduced to the world in 2018.

"Digital Experience Leaders expect 25% more revenue growth than DX laggards on their top-line product/service as a result of their investment in DX."

TEK Systems: State of Digital Transformation 2020

The Digital Experience Framework

Digital experience analytics evaluate online interaction patterns, digital performance, and customer and user behavior to find actionable insights that help optimize customer experience. As a foundational measure, DXS takes the manual work out of digital experience analytics; but, how is it calculated? Starting from the collection of digital experience data and culminating with the Digital Experience Score, the Digital Experience Framework can be thought of as a pyramid-like structure. The diagram below illustrates this.
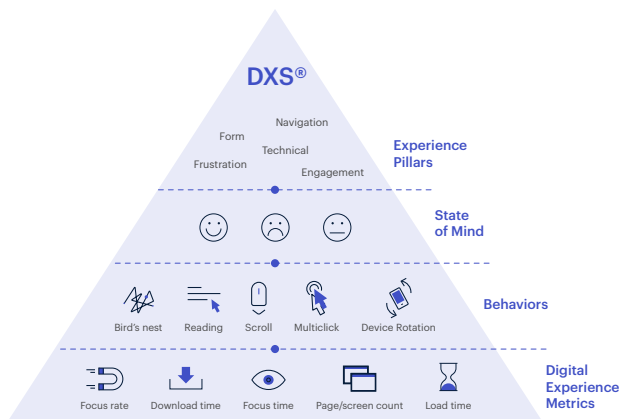
Fundamental to the Digital Experience Framework is the collection of every customer interaction across each digital property.

Medallia DXA captures every moment of interaction within a session, from mouse movements including clicks, speed, angle, etc., hovers and touches, scrolling, device rotations, pinches, and many more – all the while associating these events with the underlying context of the content being viewed.

Moving a level up, this experience data is processed into smart experience metrics based on categories including distance, velocity, movement, focus, and hesitation.

The enriched data feeds our behavior detection algorithms, the next level of the framework, where Medallia DXA automatically uncovers specific user behaviors that in turn indicate the visitor's state of mind – frustration, engagement, or confusion. These behaviors include multi-clicks/touches, bird's nests, select and copy, as well as scroll engagement, and mouse reading behaviors.

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Navigation		
Form Technical		**Experience Pillars**
Frustration Engagement		

State of Mind

| Bird's nest | Reading | Scroll | Multiclick | Device Rotation | **Behaviors** |

| Focus rate | Download time | Focus time | Page/screen count | Load time | **Digital Experience Metrics** |

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This intelligence forms the basis of experience pillars that ultimately constitute the Digital Experience Score. Medallia DXA exposes the workings of the DXS calculation with the five experience pillars, highlighting diagnostic areas that require the most attention.

Teams often focus on improving the scores of relevant experience pillars – navigation, frustration, engagement, as well as technical and form experience – by segmenting their audience and drilling down to specific pain points flagged for optimization.
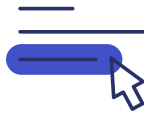
Let's uncover the science behind each component of the technology stack and see how everything connects together to create an ultimate optimization guide designed for the websites and their users.
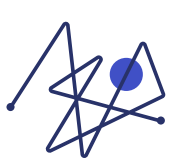
Bird's Nest   Multi-Click   Reading   Select/Copy   Scroll Engagement

DXS
6.4 ▲

Engagement
2.4 ▼

Form
7.8 ▲

Technical
10 —

Frustration
0.3 ▲

Navigation
7.1 ▲

Massive Quantities of Experience Data

Medallia DXA captures massive quantities of unique experience data from the world's most successful brands that cover every action happening on the websites.

Over the last 6 years we have been collecting unique experience data that serves as a foundation for the most accurate machine learning models, identifying behaviors and mapping experiences to uncover visitors' state of mind - frustration, engagement or confusion.

Having pioneered the machine learning approach in the digital experience optimization market, we now host the richest set of enhanced experience data in the world, resulting in the highest possible accuracy of the models.

Over the last 30 days alone we have reached the following numbers:

1.8B Uncovered Experience Issues

280M Recorded Sessions

2.6M Detected Behaviors

192TB of Processed Data

Behavioral Metrics

Medallia DXA is constantly pushing the envelope to uncover hidden insights and behavioral patterns that reveal user experience. The data collection goes well beyond the clicks and includes the insight on what happens between the clicks, e.g. mouse position, focus state, device orientation, key presses, highlighted form elements, and many more measurements.

This allows us to have the most granular view into customer experience at scale. Importantly, the

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time stamps are taken for these actions, to allow for more sophisticated derived metrics to be expressed.

These are some examples of the derived metrics:

Mouse distance linking the coordinates of the different positions of the mouse

Mouse speed relating mouse distance with time

Scroll direction measuring the differences of the page position within the browser's viewport

Focus rate the ratio between focus time and total duration, indicating user engagement

Mouse Direction - Pageview 1 vs Pageview 2:

On Pageview 1 the mouse moved up and down majority of the time, while Pageview 2 reflects a more diversified mouse behavior. In addition, there's more activity on the left hand side of Pageview 2. There could be some interesting elements there that the user is engaging with.

This data will come to light when overlaid with other metrics and analyzed by our systems.

Mouse clicks - Pageview 1 and Pageview 2
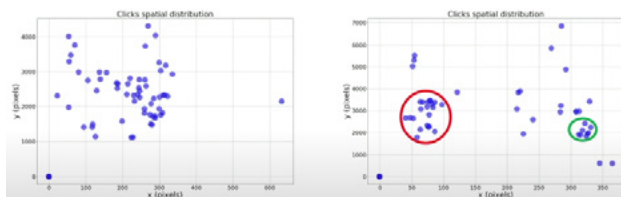
Above are the mouse click patterns on the same two pages. The Pageview 1 doesn't show any particular patterns to a naked eye, while the Pageview 2 seems to have two clusters of clicks. There could be a link that doesn't work, or a button that opens a navigation bar, or even an interactive element. Regardless, this would be an area of interest.

Scroll Speed - Pageview 1 and Pageview 2
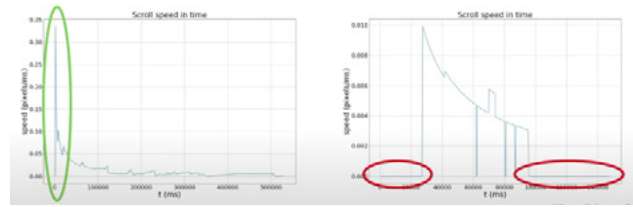
On Pageview 1 the user scrolls very fast. This might be due to them being impatient (a negative behavior or sign of frustration) or they might be familiar with the page and scroll right down to the element they were interested in. The Pageview 2 shows no scroll at first which might reflect a content-heavy top of the page. Then we observe a more engaged, measured scrolling down and potential interactions with the site. Finally, the scrolling stopped as if the user had finished examining the page.

Technical Metrics

In addition to behavioral metrics, Medallia DXA tracks a number of technical metrics. For instance, the amount of time it takes a website to load represents a significant factor in the quality of a user's experience. As load time increases, so does the incidence of negative user behaviors: increased bounce rates, decreased number of pages viewed, reduced focus time and goal completions. To make a proper assessment of load capabilities we track the browser load time performance, server load time, and even the user's connection.

Tracking how users manage the tabs on their browser during a session offers further useful insights. Do they open several tabs and read them one by one? Or do they open a couple of tabs and bounce in between them, as if comparing something? These metrics overlapped with focus time, scrolling action, and others, together will later contribute to an exciting story about user experience.
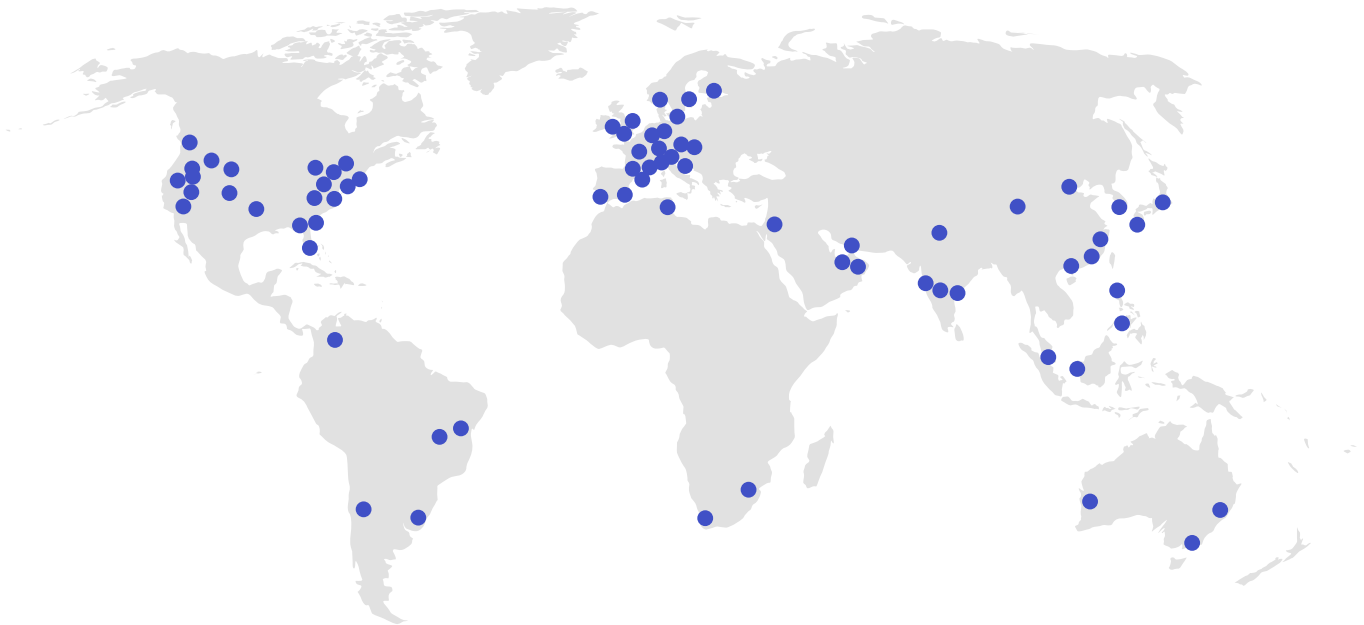
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Enterprise-Grade Data Infrastructure and Security

Medallia DXA offers a secure, resilient, reliable, and scalable infrastructure that opens integration points to ensure the capture of critical data from all digital properties. We use Amazon Web Services (AWS) as our cloud provider for the greatest scale and the broadest set of services and features. Medallia DXA's security and privacy measures are grounded in principles of robust transparency. Medallia DXA works with some of the world's most regulated companies and has built a data infrastructure to meet the strictest privacy and security requirements.

Data is collected by Medallia DXA's global CDN (Content Delivery Network) in the location geographically closest to the visitor. Medallia DXA boasts over 200 edge locations with average download speeds between 40 and 70ms. After collection, data is transferred to the relevant regional data center for processing. Data in transit (regardless of whether it includes PII) is encrypted at all times between leaving the browser and being processed and stored on Medallia DXA's servers

Clients always own the data collected by Medallia DXA, and any reports you generate using Medallia DXA. Data centers used for processing and storage of data are operated by our enterprise data facility partners and are compliant to ISO 27001 and SSAE 16 standards.

Revealing Digital Behaviors

To start building a story around the quality of user experience on the website, Medallia DXA brings together what users experience (i.e. the content, load times, pop ups, and errors), and how they interact with it (i.e. how they move their mouse, when they click, pinch or tap, how they scroll, and much more).

This holistic view into customer interactions - taking into account everything that occurs on both sides of an online experience - serves as a foundation for Medallia DXA's data science team who has been working tirelessly over the last 6 years to unpack interesting, meaningful insights from the mass of data collected.

Part of that work involves identifying particular user behaviors from within the unique interaction metrics we track then finding patterns in the digital language we observe. These patterns are folded into "behaviors" that help define what makes a good and a bad experience.

This paper details six of the most intriguing behavioral patterns – both positive and negative – our data scientists have explored across the 7.7 billion user sessions we have collected, and discusses what they mean in relation to digital customer experience. Moreover, it highlights real examples from some of the world's largest websites and apps, where digital teams have used these behaviors to better understand their customers and further refine their digital properties.

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DETECTING USER BEHAVIORS

1. Multiclick

- **What is it? Users rapidly click or tap on an on-page element**

- **Which device? Desktop, Tablet, Mobile**

- **What does it mean? Frustration**

- **How do teams utilize it? To locate and fix friction in the customer journey**

Multiclick behavior refers to when a user rapidly clicks or taps on an on-page element. It can be further broken down to 'unresponsive multiclick', where the behavior falls on an unresponsive element, like a paragraph of text or an image, and 'responsive multiclick', where the behavior falls on a responsive element, like a slider or a carousel.

To avid online shoppers, this might be a familiar behavior. If a confirmation button is slow or unresponsive, for example, clicking rapidly on it until you give up might be a common reaction.

Digging into the data, our data scientists confirmed how widespread this multiclicking phenomenon really is – and how indicative it is of user frustration.

On a major financial services website, we analyzed 3 million user sessions that interacted with the site's 'Get a Quote' form. We found that the average completion rate of the form was 77%.

For sessions that contained a responsive multiclick behavior, however, the completion rate was just 17%. And for unresponsive multiclick behavior, the completion rate was even lower, at 14%.

Figure 1: The completion rate (%) of users interacting with the "Request a Quote" form on a major financial services website.
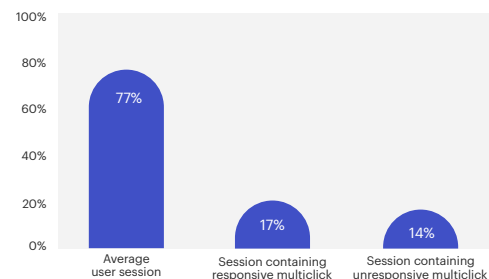

Figure 1: user session containing multiclick behaviors have a significantly lower form completion rate than average.

Figure 1 shows that sessions containing responsive multiclick behaviors have a 78% lower completion rate than the average user, while theunresponsive multiclick behavior have an 82% lower completion rate.

Automated detection of multiclick behavior is incredibly useful for optimization teams. The digital team at British Airways, for instance, discovered a problem with their hotel photo slideshows after being alerted to a responsive multiclick behavior. The Medallia DXA-powered session replay showed that whenever users clicked 'Next' on the first photo in a slideshow, a 'Previous' button appeared in its place, shifting the position of the 'Next' button along. This led to some users mistakenly clicking the 'Previous' button, which would disappear again once the user had unintentionally returned to the first photo in the slideshow.

Users bounced between the same two photos in a loop by frantically clicking the button, growing in frustration.

2. Reading

- **What is it? Users follow on-page content with their mouse**

- **Which device? Desktop**

- **What does it mean? Engagement**

- **How do teams utilize it? To inform content strategy**

When a user directly follows the content they are reading with their mouse, Medallia DXA detects the reading behavior. It is rare that a user will follow, say, an entire paragraph - but a line or so is rather common. This behavior is indicative of user engagement similar to what a customer would do when picking up and interacting with a product in-store.

Medallia DXA's clients use it to measure how their customers respond to different messaging, and to identify the content that stands out to a reader. One of the fashion clients, for example, has a reading behavior alert set up on any new product page they launch to evaluate which content best captures user attention.

Figure 2: The average number of goals completed by users per session on a major media site.

Medallia DXA defines achievement of the goal when a user completes a desirable action on the website.

These could be downloading a piece of content, signing up for a newsletter, or completing a purchase or booking.

Looking at 6 million sessions across a major media site, our data science team analyzed reading behavior in relation to the number of goals completed by users. The goals were configured to trigger when users fill out a form, hit a call-to-action, or visit the paid subscription area of the website.

The study illuminated that average user sessions completed 0.31 goals per session, while user sessions containing reading behavior completed an average of 0.98 goals.
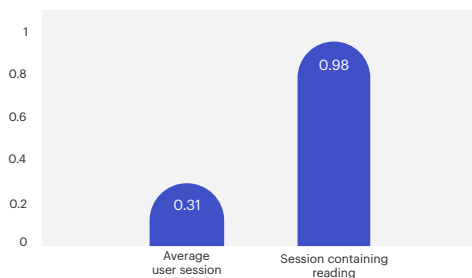

Figure 2: user session containing reading behaviors complete significantly more goals than average.

Figure 2 shows that user session containing reading behavior complete over three times as may goals as the average user.

3. Bird's Nest

- **What is it?** Users rapidly dart the cursor around, resulting in jumbled trail

- **Which device?** Desktop

- **What does it mean?** Confusion, Frustration

- **How do teams utilize it?** To locate and fix frustrations in the customer journey

Bird's nest behavior occurs when a user rapidly moves their cursor around, leaving a jumbled trail that, in session replays, resembles a bird's nest. When a website crashes, a form refreshes empty, a page gives no clear indication of where to go next, a user would frequently rattle their mouse in frustration.

As with multiclick behavior, being alerted to bird's nest behaviors is incredibly useful for digital teams. It significantly cuts down the amount of time required to find frustrations in the user journey, and pinpoints exactly where improvements can be made.

One of our ecommerce clients, for example, was alerted to bird's nest behaviors on the payment stage of their checkout process. It revealed users struggling with a lengthy, confusing form. On clicking submit, some users would be directed back to the start of the form with no clear indication as to why they couldn't proceed to the next stage of the checkout, leading to a bird's nest jumble of frustration and confusion. After investigating further with Medallia DXA's Form Analytics, the digital team designed a new, streamlined delivery form that demanded less of a user, and led to a surge in conversions.

In another example of a major ecommerce website, Medallia DXA's data scientists looked at just under 1 million user journeys that corresponded to the site's 5-step conversion funnel. The funnel steps included:

- **User browses**

- **User adds items to basket**

- **User proceeds to checkout**

- **User submits payment and delivery information**

- **User confirms purchase**

The Medallia DXA team found that, while an average user completed ~1.96 funnel steps - in line with the conversion rate we'd expect from an ecommerce store - users who exhibited bird's nest behaviors completed an average of just under 1. In other words, while an average user would at least add items to basket, those who demonstrated their frustration with a bird's nest behavior did not get beyond the browsing stage before quitting.

Figure 3: The average number of checkout funnel steps completed by users on a major ecommerce site.
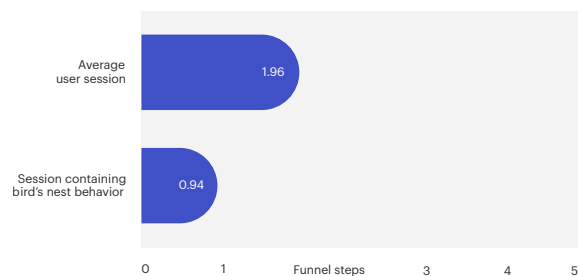

Figure 3: user sessions containing bird's nest behaviors reach significantly fewer checkout funnel steps than average

Figure 3 shows that user session containing bird's nest reaching significantly fewer checkout funnel steps than average.

4. Scroll Engagement

- **What is it? Users scroll up or down in a smooth, regular rhythm**

- **Which device? Desktop, Tablet, Mobile**

- **What does it mean? Engagement**

- **How do teams utilize it?
  To inform content strategy, and for compliance purposes**

Scroll engagement behavior occurs when a user scrolls up or down the page in a smooth, regular rhythm, which typically signifies the consumption of content. This is an especially familiar behavior for those of us who read articles on our mobile phones on public transport, thumbs raking screens. Our data scientists found that it is a common behavior across all devices and signifies positive user engagement.

Looking at the same dataset as that discussed in the chapter on reading behavior – analyzing 6 million user sessions on a major media site in relation to goals completed – our data scientists found that user sessions containing scroll engagement behavior completed an average of 1.01 goals. Average user sessions, by contrast, completed just 0.31 goals

Scroll engagement is an indicative feature for measuring how people are engaging with content. Our publishing clients no longer measure the success of their content based on the hits or shares alone. They also capture the amount of scroll engagement and scroll depth each article has achieved to understand how much of the content has been consumed.

Scroll engagement could also be useful in compliance. A client in financial services, for example, uses scroll engagement and depth to ensure their customers are fully aware of and have read through their regulatory compliance requirements.

Sessions containing scroll engagement behavior complete 3X as many goals as the average user.
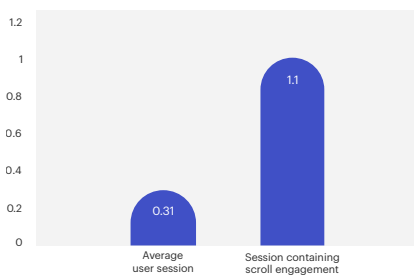

Figure 4: user session containing scroll engagement behavior complete significantly more goals than average

Figure 4 shows that user session containing scroll engagement behavior complete three times as many goals as the average user . The average number of goals completed by users per session on a major media site.

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5. Select and Copy

- **What is it? User selects text and copies it**

- **Which device? Desktop Tablet, Mobile**

- **What does it mean? Engagement**

- **How do teams utilize it?
To inform content strategy, and for compliance purposes**

Select and copy behavior occurs when a user selects text from a website or app and copies it. This direct interaction with content can indicate a number of things. For example, a user could be researching a product by searching elsewhere or comparing it to competitive products. Although this may not point to an extreme engagement, this behavior offers an opportunity to engage the user in the moment and offer, for instance, a discount code or another personalized communication.

By tracking Select and Copy behavior, one of Medallia DXA's international clients surfaced an issue with the translation of the language on

one of their pages. They were alerted to multiple sessions where users would copy vast swathes of text, lose their focus, and switch the tabs. This suggested that users were copying the text to then manually make a translation on an external website. This would take the reader away from the content and disrupt the flow. It is, however, an easy fix.

Being alerted to Select and Copy behavior has a useful application in fraud tracking, as well. With Medallia DXA, alerts can be customized to trigger when this behavior is exhibited on web pages and apps that contain sensitive personal information - a very useful functionality for our clients that handle sensitive customer data.

6. Device Rotation

- **What is it? User rotates device rapidly over a short period of time**

- **Which device? Tablet, Mobile**

- **What does it mean? Frustration**

- **How do teams utilize it? To inform content strategy, and locate issues arising from responsive design**

Device rotation behavior occurs when a user rotates their tablet or mobile device, from portrait to landscape mode or vice versa, within a short period of time. This behavior is associated with frustration, as a website or app's responsive design is not performing optimally for the user, resulting in this see-saw between portrait and landscape.

Keeping an eye on device rotation behavior is helpful especially for conversion-critical paths, like ecommerce checkouts. We often see well-meaning, yet too large, pop-ups offering a discount, that will cover the screen, rendering the user unable to browse the page or complete a purchase. Despite the frantic, desperate rotations, the pop-up will not budge, and the sale will be lost.

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Validating User Behaviors

Identifying and qualifying user behaviors at Medallia DXA is done with the help of machine learning. We spent the last 6 years tirelessly training, retraining and refining the machine learning models to accurately distill these behaviors in the most challenging and confusing situations. We recognize that each customer is unique and special, however, regardless of the industry, type of the website, language, device, or time of the day, users often experience similar behaviors when presented with a digital roadblock or an exciting piece of content.

Medallia DXA's technology knows the user. We've built many different tools to help us experiment, evaluate, and iterate across various types of models, industries, and datasets.

We provide the richest set of labeled data in the industry, resulting in the highest possible accuracy of our machine learning models.

A training pipeline of internal validation methods bakes in all of the lessons that we've learned from conducting experiments. Additionally, Medallia DXA manually validates the algorithms to ensure we are properly capturing and categorizing online behavior across experience metrics and pillar scores. Based on our in-house, daily validation reviews, here are the precision levels of our captured behaviors.

86.3% Bird's Nest

86.4% Reading

83.8% Responsive Multiclick

88.9% Scroll Engagement

86.5% Slow Responsive Multiclick

81.2% Unresponsive Multiclick

The results of Medallia DXA's human validations are used to update the parameters of the behaviors and bots' algorithms which improves the accuracy of their identification. More validations equals more accurate behaviors. This investment is at the core of our ability to innovate and constantly deliver meaningful improvements to our customers.

Are Behaviors Enough to Describe the Whole Experience?

The behaviors shared earlier are an excellent way to measure experiences that users encounter on websites. However, they may not be present in every single instance. In fact, The following data reflects the average number of selected behaviors over a 7 day period across all Medallia DXA clients:

Scroll engagement 1 in every 5 pageviews, 1 in every 1.2 sessions

Multiclick 1 in every 41 pageviews, SB 1 in every 11 sessions

Reading 1 in every 1 pageviews, 1 in every 28 sessions

Bird's nest 1 in every 2199 pageviews, 1 in every 566 sessions

To complement this, Medallia DXA adopted a variety of other techniques to gather evidence for the experience measurements and accurately calculate the DXS.

The data science team uses regression models to derive the experience indicators, build the complete picture of the user experience, and ultimately assign the DXS. With that, every pageview will have a score regardless of the behaviors' presence, and every session's experience will be measured with a score included in a limited range. This is where the unique and insightful Medallia DXA experience pillars manifest.

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The Five Pillars of Digital Experience

Engagement Score

Frustation Score

Technical Score

Form Score

Navigation Score

DXS is the ultimate recipient of all the intelligence behind each of the five experience pillars. Medallia DXA's AI brings to light the workings behind these calculations to deliver the insights needed to diagnose the areas that require the most attention.

Focusing on improving the scores of each experience pillar - navigation, frustration, engagement, as well as technical and form experience - is the most effective way to measure overall performance across websites and apps.

The engagement, frustration and technical pillars and the respective scores are pageview based. The navigation score is session based, and is calculated for the sessions with four or more pageviews, to better reflect the user's navigation across the entire website. The Form Experience Score is calculated for each interacted form in the session.

The score for each experience pillar is calculated with formulas that factor in several features, with variable weights, according to the models. This is done with machine learning, trained to compose a variety of distinct metrics to assign a score between 0 and 10 to each of the pillars.

Examples of features in each pillar:

- Engagement Score: time spent on images, time spent on reading text, scroll engagement behavior

- Frustration Score: fast and repetitive scrolls, rotation behavior

- Technical Score: high loading time for the page, high number of JavaScript errors

- Form Score: interactions on a single form element, number of form submissions

- Navigation Score: pages visited repeatedly, presence of bad navigation patterns

With over 20 Million pageviews collected by Medallia DXA every day, and therefore 20 Million scores assigned across the board, we now have the complete reflection of the digital customer experience for the full website. Having scores for every session allows us to look into average values, thus reducing the impact of outliers, while having one or more reference scores allows us to track the website's performance in time.

Let's dive into each of the scores.

1. Engagement Score

The Engagement Score evaluates subtle engagement metrics and issues, as well as distinct behaviors.

A user actively navigating through the website and hovering over content, pausing to trace copy with their cursor and zooming in on mobile devices is displaying a high level of engagement. On the contrary, there's a list of issues including low focus and interaction time that will penalize the engagement score, when identified in a session. These negative issues are analyzed at the page level and include:

- Low focus time on images

- Low focus time on text

- Low focus time compared to duration

- Low scroll reach compared to page height

- Low interaction time

We recognize that every page serves a different purpose and includes different layouts and content, so no page is analyzed in the exact same way. The pages intended to log in a user will only require, hopefully, a few seconds of engagement. A product description page might have a gallery of images for scrolling and browsing, and a positive experience will include alternating between those behaviors.

A page presenting an article could produce certain mouse reading behavior. Medallia DXA's machine learning algorithms analyze each page and every action to further quantify them into a single score, offering a much more accurate, sophisticated, and complete look at engagement than the traditional view of page duration.

What is the Value of Engagement Score?

A high engagement score indicates that a user is more likely to become a customer. The content is resonating with them and they've seen something interesting and relevant enough to hold their attention.

Today, the majority of people will begin researching a significant purchase online. It's at this step in the customer journey that the audience is at its largest. The more people one can engage with at this stage, the greater chance of converting them.

Knowing which aspects of digital properties are the most engaging (and which areas are underperforming) gives digital teams specific areas to focus on. Through multivariate testing, Medallia DXA's clients identify the most engaging versions of their websites and continually optimize them for the best possible digital experience.

2. Frustration Score

The Frustration Score is scored between 0-10, which 0 indicating a positive, frustration-free customer journey.

To receive a score indicating low levels of frustration, navigating the website should be smooth and predictable thanks to intuitive layouts, responsive elements and clear information. The score will be penalized over the following issues:

- **Unresponsive clicks**: the number of clicks that are not associated with a specific action in the pageview

- Very **fast mouse moves** and very **fast scrolling**

- **Bird's nest** behavior

- **Unresponsive multi-click** behavior

- **Repetitive rotation**: the number of device rotations

Any erratic or illogical movements performed by users are generally indicative of frustration. These include suddenly scrolling up and down a page, bird's nest behavior, multi-clicking and, on mobile devices, rapidly switching between portrait and landscape orientations.

Frustration at any stage of the customer journey has a knock-on effect. Every instance of it that we experience compounds on the last, so even minor irritations can quickly ruin an experience.

What is the Value of Frustration Score?

Frustration is a key indicator that a customer may abandon a purchase - or worse - abandon the relationship for good. The more difficult the journey is, the more likely they are to click away and head straight to the nearest competitor.

When only the surface metrics like clicks and bounce rate are tracked, all you know is that the

customer didn't complete the journey as planned. It would be all too easy to assume that they had simply changed their mind about the purchase rather than the website or app enraging them to the point of abandonment.

The frustration score points to the exact pages and elements that are causing the most friction. Through session replays and heatmaps, digital teams can evaluate the exact behaviors driving the frustration score and fix the issues losing you customers.

3. Technical Experience Score

Technical experience score is the measurement of the performance of the page itself, regardless of the user activity.

To receive a score indicating an excellent technical experience, every element of the website page should load promptly without errors, be responsive for all devices, and perform as expected when a user interacts with it.

Any technical problems that affect user experience will count against the technical experience score. The more issues a user encounters, the more frustrated they become and the more likely they are to abandon the website in favor of a competitor.

In addition to creating an unpleasant experience, technical problems can also make the business appear less trustworthy and established. After all, how can you expect a company with a poorly functioning website to deliver a high-quality service?

Here are the issues negatively affecting the Technical Experience Score:

- Broken links

- JavaScript errors (broken links, JS errors generated by clicks, SyntaxErrors, Eval JS errors, many JS errors in a patch, many JS

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errors in the same page)

- Application errors (App crash, App error)

- Loading time (Rendering, downloading, connection time)

- HTTP errors (400, 500, other HTTP errors)

What is the Value of Technical Experience Score?

Consumers today have more businesses than ever competing for their attention. With so many of them offering similar products and services at comparable prices, the experience they offer becomes the key differentiator. It's essential that every interaction they have is as positive and friction-free as possible, lest they click off and head to the nearest competitor website.

Poorly optimized websites built on older technology that place a strain on resources are a big turn-off for visitors. Our report on website and app performance found that, on average, slow loaders have a 72% higher bounce rate than fast loaders, view 68% fewer pages, and have significantly lower focus.

The technical experience score judges various aspects of a website and rates its technical performance. Any issues such as slow load time, JavaScript errors or responsiveness are instantly flagged up to your technical team who can take action.

Like other scores, the technical experience score can be segmented across the audience and rolled up into website pages, instantly demonstrating which specific areas are in need of attention.

72% of slow loaders have a higher bounce rate than fast loaders

68% of slow loaders view fewer pages, and have significantly lower focus

4. Form Experience Score

The Form Experience Score calculates the ease and usability of the form.

For the sessions lacking forms, the Form Experience Score will not be calculated. To receive a high form experience score, interacting with a form on a website should be intuitive and friction-free.

No one actively enjoys completing forms. At their best, they should be quick and painless; but, at their worst, they can cause unending frustration and abandonment, ultimately resulting in lost revenue for businesses.

Here are the factors negatively affecting the Form Experience Score:

- Errors on form submissions

- Repetitive form field interactions

- Form abandonment (when a visitor starts to fill out a form, and then leaves without submitting it)

For digital, forms are fundamentally the only way to exchange contact information and facilitate secure transactions online, so it's essential to get them right.

What is the Value of Form Experience Score?

Forms can single-handedly make or break your conversion numbers. Generally, the more a form demands of the user, the less inclined they are to complete it. Any errors, formatting issues, or surprise refreshes that empty out fields can cause so much frustration that they simply abandon the process.

On top of a loss of conversions, poorly-performing forms also erode trust in a brand and negatively impact customer loyalty and lifetime value. For example, experiencing technical problems while entering card details

for a purchase can make one question how the company manages the security of payment information. When there are competitors offering a similar product or service, it is unlikely that users would rush back to that business.

Smooth, intuitive forms put users at ease. They facilitate both an association of trust and a positive impression of a brand that encourages repeat visits and conversions.

Medallia DXA's Form Experience Score automatically assigns a rating to each form on a website. It weighs up technical aspects of the experience like responsiveness, quality and clarity of form validation errors and the way the user interacts with it. Do they hesitate on certain fields? Repeatedly clear and re-enter data? Are they abandoning it entirely?

Medallia DXA's Digital Experience Intelligence solution will automatically flag up any form issues it identifies, so the technical teams know exactly where to focus their optimization efforts.

5. Navigation Score

Navigation Score is calculated as a user browses different pages of the website, and therefore is a session-based pillar.

It is calculated for the sessions with four or more pageviews, determined as a minimum to evaluate the quality of the navigation experience. To receive a high navigation score, moving around the website and finding the desired information should be as frictionless as possible.

What will penalize the Navigation Score?

- Using back and forward buttons in the browser as opposed to navigating through the links on the website

- Looping behavior: a user would repeat the sequence of visited pages again and again

What is the Value of Navigation Score?

The quality of navigation is one of those things that we only notice when it goes wrong. When a user instinctively follows a natural path, they are almost on autopilot. It's when confronted by unexpected, unintuitive site structure that their experience is suddenly jarred, and the inadequacy of the design laid bare. If a user needs to jump back and forth between pages, spend time using footer links to get around, or repeatedly use text search to find relevant content or products, chances are the navigation of the website should be improved.

With Medallia DXA, any issues with navigation are instantly exposed so digital teams can make the necessary changes and subsequently increase conversions. Segmenting the navigation score by device type, for example, allows clients to easily identify the areas most in need of improvement.

The Digital Experience Score Put into Practice

The Digital Experience Score offers an all-encompassing rating of digital experience. It equips companies with the way to benchmark experiences online, and can be tracked over time as a key performance indicator across all their digital properties.

As well as enabling companies to comprehensively measure experiences, DXS is a predictor of revenue and conversion. Indeed, providing good experiences to customers online establishes trust, increases brand loyalty, encourages repeat business, and ultimately increases market share and revenue. A high DXS, therefore, means the company is ripe for growth – and driving more traffic with, say, digital advertising campaigns, is a sensible investment. A low DXS, meanwhile, suggests advertising spend will be wasted: customers will arrive, have a bad experience, and not return. Resources would thus be better spent on optimizing on-site and in-app experiences.

DXS in Practice

Medallia DXA recently put DXS into practice with our own website redesign. The team wanted to create an engaging, high-converting site that prioritized great digital experiences. The previous design had a DXS of 5.3, with low engagement and high frustration throughout.

With a redesign that focused on improved navigation, simple and engaging product information and a shorter, more impactful demo form, the team saw a dramatic improvement in metrics across the board. With resolving the key issues uncovered, our DXS rose by 1.4 points to a score of 6.4. In turn, conversions increased by 210% and bounce rate was reduced by 10%.

To better see exactly how to optimize on-site and in-app experiences, DXS can be broken down into its constituent parts, allowing companies to have unique insight into the core of user experiences on their websites and apps, and understand how to improve them.

DXS in Practice

In a recent project with one of Medallia DXA's energy and utilities customers, Constellation Energy, an elevated Frustration Score was discovered through digital behaviors such as unresponsive multiclicks, 'bird's nest behavior' and page abandonment. Upon further investigation, the team uncovered multiple bottlenecks and broken elements throughout their core funnel.

Redesigning the funnel with these insights lead to immediate gains in both DXS and conversion metrics. Constellation's DXS saw a reduction of -0.4% in Frustration Score and an increase of 6 points, from 3 to 9, in Engagement Score. These successes were reflected in signups increasing by 23%, with mobile sign-ups jumping up by a massive 45%.

Along with the ability to see the workings of the DXS across the individual experience pillars, digital teams can granularly segment the scores across their entire audience and offering.

This means companies can have solid, simple, and immediate answers to formerly awkward questions, such as:

- Do customers coming from search have a better navigational experience than those coming direct? Why?

- Do tablet users have a better technical score than mobile users? What's causing this?

- Which stage of our checkout process causes most frustration?

- Which pages are visitors most engaged with, and how can I replicate this engagement for underperforming pages?

After serving the answers to these questions, Medallia DXA's Digital Experience Intelligence solution provides a whole host of tools for further forensic analysis – including session replays, heatmaps, and funnel analysis – so digital teams can demystify the experience issues impacting their site performance, and then take action to mitigate them.

Medallia DXA users can realize further benefits of DXS through integrations with other key tools in their MarTech stack. For example, LEGO is one of many customers that use a combination of DXS, Adobe Analytics and VoC tools to achieve a holistic view of digital experience on their websites.

An example of a typical use case for LEGO would be the customer experience team receiving a low NPS score through their VoC tool. From here, LEGO would rely on Medallia DXA's session replays to view the DXS and investigate exactly what went wrong.

The team can see at a glance if the NPS is reflective of the actual experience.

Validating the Digital Experience Score

Medallia DXA is committed to serving our customers with the most potent insights on digital customer experience and guiding them through their optimization journeys. With our customers, we routinely prove how improving DXS has a positive impact on their ultimate KPIs - conversion rates, retention, and revenue.

In addition, we run independent validation studies to investigate how the DXS correlates with a variety of goals set by our customers for their websites.

The world's leading tourism group, TUI, for example, implemented Medallia DXA and, through a validation study, found a strong correlation between a higher DXS and conversion. It was revealed that a one-point improvement in DXS (from 5 to 6) allowed TUI to predict $30 million in revenue growth. The study demonstrated the importance of Form Experience Scores in particular for TUI. These scores were very strongly correlated with conversion and quickly became an area of focus for the TUI team.

Another validation study with River Island, a worldwide London-headquartered fashion brand, demonstrated a strong correlation between DXS and the achievement of conversion goals. Specifically, the analysis demonstrated that an improvement of average DXS by 1 point would increase the conversion probability by 43% on average, resulting in a potential monthly increase of $4.2M in revenue. It also confirmed that as the Engagement Score grows, the probability of purchasing greatly increases.

As we've mentioned previously, online retailers rely on compelling visuals and copy to sell their products, so focusing on Engagement Scores is an ideal way for them to understand the strength of their content and make informed changes that boost conversion probability.

"As a business focused on delivering fantastic online experiences, we look to DXS to provide an objective measure of those experiences. We were delighted to see its power validated through this study."

Robert Brown
Head of Digital Practice

RIVER ISLAND

"With DXS, we can focus on customer issues highlighted by low scores and feed those hypotheses to product teams for development and testing. DXS provides a scientific and measurable way of continuously improving our CX levels."validated through this study."

Hirra Sulanki
Head of Digital Analytics

TUI

"With DXS, Medallia DXA enables quantifiable measures so you can put experiences on a numerical scale with an actual, contextual understanding."

Alexander Hamilton
Head of Global Digital Business Intelligence

Fidelity
INTERNATIONAL

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Summary

With the Covid-19 pandemic, competition for the digital customer has intensified. Companies are looking for ways to improve the customer experience across their websites and apps to drive loyalty, conversion and sales.

Medallia DXA is the only analytics software in the world that can automatically score every online user experience to identify and prioritize the most urgent experience issues impacting conversion and engagement. Medallia DXA's AI goes to work uncovering poor experiences across websites and apps, and quantifies those experiences so you can prioritize your optimization efforts. Medallia DXA's DXS is a trusted, science-driven, validated, objective metric used by enterprise organizations around the globe to measure and benchmark experiences online. It is viewed as a reliable key performance indicator across all digital properties.

Medallia DXA does all the heavy lifting to provide an unrivaled, unprecedented, and automatic pathway to website and app success. There is no similar alternative. Finally, a technology that cracks the code to online conversion. Optimizing online user experience has never been this easy.

> "Medallia DXA provides the ability to explain the underlying reason why we are seeing a certain performance [on our website]. It gets you to a much more granular level than any other analytics solution would ever allow you to do. It allows you to measure the experience that is happening in between clicks and in between pages which is not possible through traditional analytics."
>
> **TUI - Tom McCarthy - Digital Analytics Manager**

About Medallia

Medallia is the pioneer and market leader in Experience Management. Medallia's award-winning SaaS platform, the Medallia Experience Cloud, leads the market in the understanding and management of experience for customers, employees and citizens. Medallia captures experience signals created on daily journeys in person, digital and IoT interactions and applies proprietary AI technology to reveal personalized and predictive insights that can drive action with tremendous business results. Using Medallia Experience Cloud, customers can reduce churn, turn detractors into promoters and buyers and create in-the-moment cross-sell and up-sell opportunities, providing clear and potent returns on investment. www.medallia.com

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