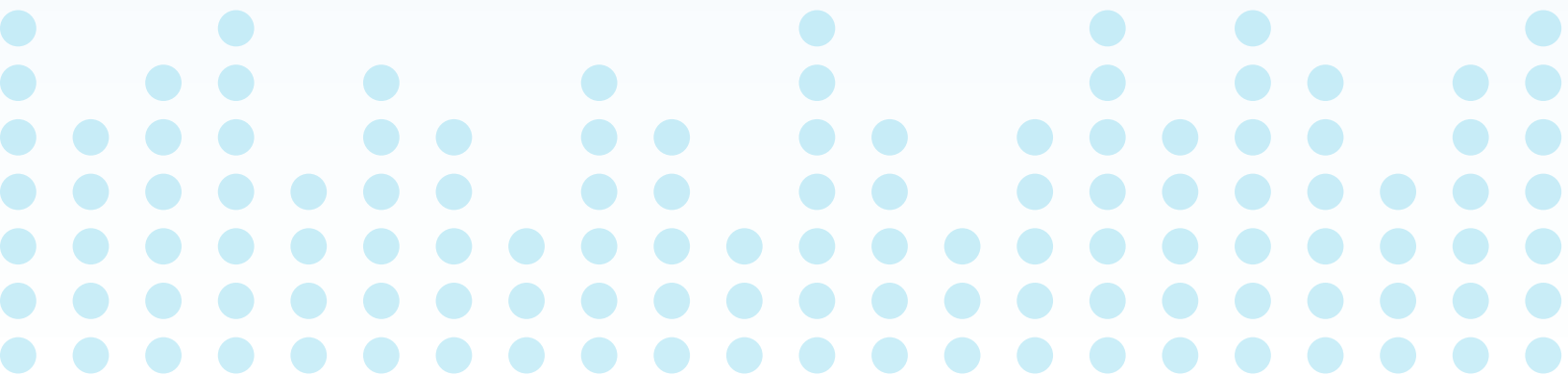




Creating a Happier, More Productive Workforce:

**How Most Loved Workplace® Uses
Data and Machine Learning
to Drive Change**

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Because employees play a vital role in achieving organizational success, companies must continuously strive to keep their employees engaged and motivated. Our research at Most Loved Workplace® indicates that fostering emotional connectedness is the key to achieving this goal. This paper aims to describe our new tool for listening to employees' feedback that supports a culture of feedback and predicts employees' love of the workplace and organizational commitment.

The relationship between employers and employees has changed in recent decades due to shifts in workforce requirements, generational values, and where and how employees work. This already tenuous connection was further strained by the COVID-19 pandemic, which generated unprecedented levels of burnout that led many employees to reconsider the role of work in their lives. As a result, productivity is at a historic low, with 2022 having seen the most significant annual decline in US labor productivity since 1948 (Workforce, May 2021). This change in productivity makes increasing the emotional connectedness of employees more vital than ever to achieving organizational success.

Emotional connectedness describes genuine love towards one's workplace beyond mere affective attachment (Meyer & Allen, 1991) or satisfaction. It is a mutually reinforcing dynamic that benefits both employees and the organization; employees experience a sense of belonging and *psychological safety*, which is the shared belief among team members that it is safe to engage in risk-taking (Edmondson, 1999). In return, employees provide loyalty, intense initiative, and goal alignment. Furthermore, emotionally connected employees are predicted to be more engaged and willing to put extra effort into doing their work with consistent feedback (Goldsmith & Reiter, 2007).

Love of Workplace Index™ (LOWI) Pulse Validation

Most Loved Workplace® conducted research with over 3,600 participants to develop the validated measure of employees' Love of the Workplace (Carter, 2019) *LOWI Pulse Validation*. This survey has become the cornerstone of the Most Loved Workplace® data analytics and survey platform.

The LOWI Pulse Validation contains 28 quantitative questions across the following five content areas that employees respond to using a 5-point scale:

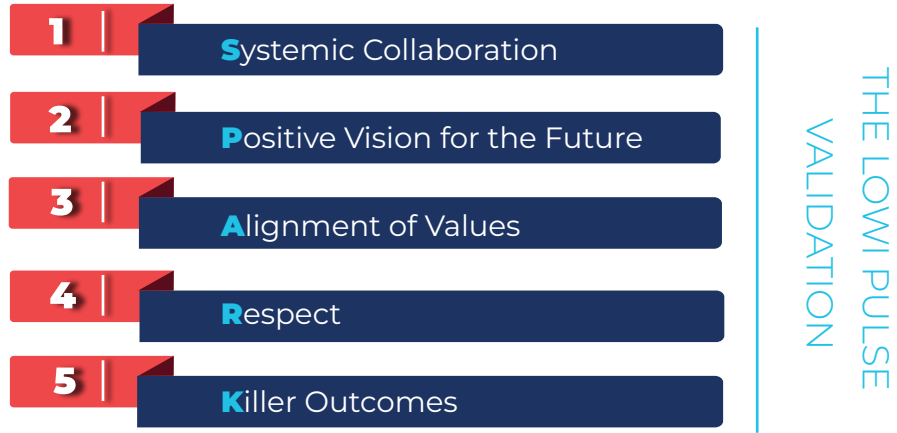


Figure 1. The LOWI Pulse Validation five content areas

The resulting scores for each functional area and the summary SPARK index help organizations determine employees’ level of emotional connectedness to their jobs.

LOWI Qualitative Feedback

To elicit the most profound insights possible, participants are also asked to respond to the following qualitative statements:

“The top 3 reasons I love working for this company are...”
and
“The top 3 things that would make me love working for this company more are...”

Similar qualitative questions have been developed to elicit deep insights into the Employee Experience (EX) across twelve domains:

Parents and Caregivers	Diversity	Young Professionals
Women	Volunteering	Career Advancement
LGBTQ+	Employee Experience	After Action Review
Leader Effectiveness	Manager Effectiveness	Customer Love of Company

Table 1. LOWI Qualitative Question Domains

For each of the 12 domains, employees respond to two specific questions:

“What does your organization do well?”
and
“What can your organization do better?”

Analysis of LOWI Qualitative Feedback

Our analysis of employees’ qualitative feedback was conducted to create a tool for organizations that allow employees to do their best work through a culture of continuous feedback (Goldsmith & Reiter, 2007).

First, we generated a list of common themes for the feedback that align with one of the five SPARK areas. These themes were then manually coded for nearly 4,000 snippets of employees’ responses. Based on this initial analysis, we modified the list of themes and created a list of overarching general topics for them.

	Sentiment Overall attitudes of employees have towards your organization <i>Examples: Positive, Neutral, Negative</i>
	Emotion Specific feelings exhibited by employees and their intensity <i>Examples: Love, Optimism, Neutral, Disapproval, Anger</i>
	Topics Overall trends discussed by employees <i>Examples: Communication, Management, Vision</i>
	Themes Specific organizational strengths/weaknesses mentioned by employees <i>Examples: Clear expectations, Support from management, Planning and prioritization</i>

Note: See Appendix for the full list of items in each category

Table 2. Categories for LOWI Qualitative Questions - Examples

Our research at Most Loved Workplace® demonstrates that the emotion of love, specifically love for one’s workplace, is a central predictor of productivity and success within an organization (Carter, 2015). However, a wide range of emotions are frequently expressed

in employees' feedback, and capturing these emotions is integral to assessing employees' level of organizational commitment. Therefore, we categorized the emotions expressed in employee feedback and the prevailing sentiment as positive, negative, or neutral.

Below are examples of the Sentiment, Emotion, Topics, and Themes categories coded in employees' responses.

Development of a Custom Machine Learning Model

Despite the deep insights provided by qualitative data, it is cumbersome and time-consuming to extract meaningful insights from hundreds or thousands of text responses. We turned to machine learning to help us instantaneously categorize employee feedback and provide organizations with an employee listening strategy that predicts employee and client outcomes.

Although multiple natural language processing (NLP) solutions exist that offer high-level analysis of **Sentiment, Topic, Emotional, or Thematic** content (e.g., RoBERTa [Liu et al., 2019] and Cohere [Smith et al., 2016]), they are typically not designed to analyze multiple dimensions of qualitative feedback simultaneously.

In addition, out-of-the-box models NLP models often come pre-trained. For example, BERT (Bidirectional Encoder Representations from Transformers), was trained on Wikipedia and Google's BookCorpus, thereby ensuring the model has an exceptional understanding of English. Although BERT is unlikely to understand the nuances within employee feedback fully, it is bidirectionally trained, meaning it can better understand language and context than alternative single-direction models¹.

Therefore, Most Loved Workplace® has built a custom BERT model with dependencies within the **Sentiment, Emotion, Topic, and Thematic** content. The resulting model leverages these dependencies to make

¹ The decision to build a custom BERT model was also based on the results of using existing models for employee feedback. In a comparison of a BERT model vs. RoBERTa for emotion detection, the F1 scores were 35% vs. 4%, respectively, for employees' feedback regarding the top 3 most loved aspects of an organization, and 45% vs. 2%, respectively, for feedback regarding the top 3 things that would make them love the company more. Using Term Frequency - Inverse Document Frequency (TF-IDF) for sentiment detection, the F1 scores were 60% for employees' feedback regarding the top 3 most loved aspects of an organization, and 29% for feedback regarding the top 3 things that would make them love the company more.

logical connections between each categorical group. For instance, employee feedback that contains positive **Sentiment** is likely to contain **Emotions** like love or gratitude rather than disapproval or anger. Below is an illustrative example of the dependent relationships Most Loved Workplace®'s model establishes between categories:

Example feedback: "I love my manager; she is always willing to support the team and help us reach our goals. I'm thankful to work for a company with a fun and positive atmosphere and with management that genuinely appreciates its employees."

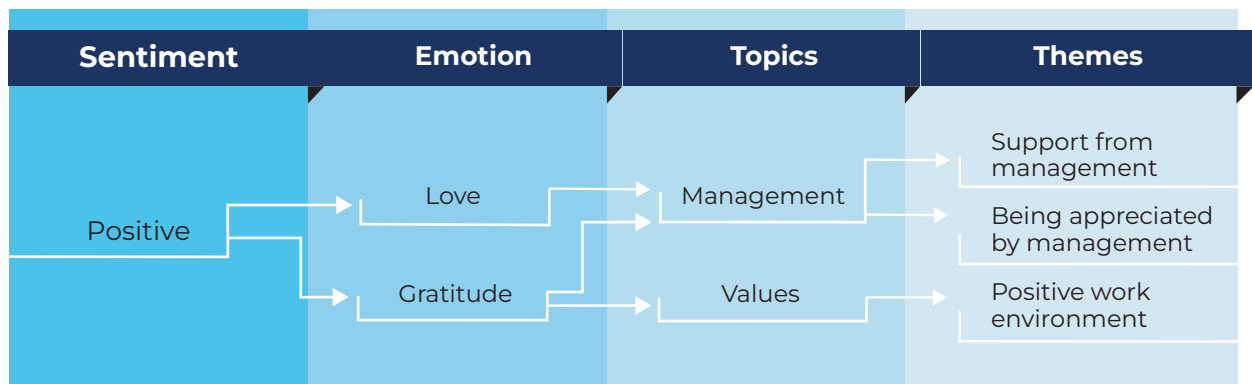


Table 3. Dependent relationships Most Loved Workplace®'s model establishes between categories

Validity and Reliability of the Machine Learning Model

The custom BERT model designed by Most Loved Workplace® are designed to detect survey respondents' attitudes, feelings, and opinions (Medhat et al., 2014). To enable training of the model, 12 employees manually assigned labels for **Sentiment**, **Emotion**, **Topic**, and **Theme** to over 1,800 responses using an online gaming tool. Employees could select multiple responses for each category, which allowed for creating a robust model capable of detecting nuances in the feedback. In Phase 2 of the model development, clients can contribute to labeling their employees' responses to enable even more customized identification of important themes.

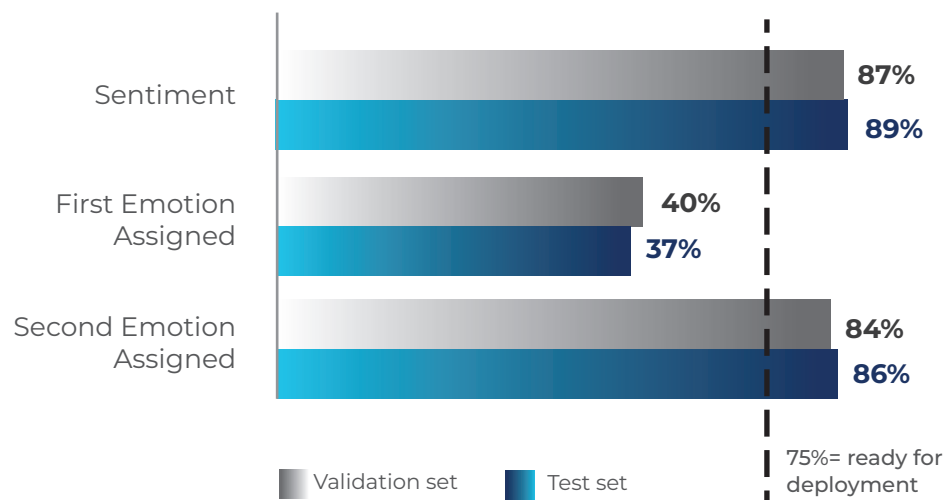
Snippets of feedback:
1,800

Employees hand-coding:
12

Training Data for BERT Model

A rigorous train-test and validating procedure was used to ensure that the model accurately classified both **Sentiment** and **Emotion**. The model was first trained on a total of 1,400 human-coded responses. The model's accuracy was then assessed with test and validation sets, each with 400 human-coded responses. This procedure helps ensure the model's performance generalizes well to new data outside the training set.

The F1 score is a commonly used metric in machine learning. It captures a model's accuracy or predictive ability, i.e., how well it aligns with the human-coded categories. Here, the F1 score was calculated for both the test and validation sets, and the results are as follows:



Note: Emotion 2: at least one of the two emotions assigned is predicted.

Figure 2. F1 Scores for Sentiment and Emotion

As shown above, the model correctly identifies the sentiment and at least one emotion over 85% of the time for both the test and validation sets. These F1 scores exceed 75%, which is generally considered the minimum threshold for deployment.

To be responsible with its AI model, the Most Loved Workplace® will collect more training data for categories with small group responses to avoid overfitting the data or producing biased results. More data will ultimately help the model learn and generalize better. We are now actively working on extending the BERT model for sentiment and emotion, including topic modeling and creating decision rules for thematic analysis.

Conclusions

- The combination of the Machine Learning approach and the gaming tool used by Most Loved Workplace® can be replicated by other organizations to gain valuable insights into the sentiments and emotions expressed by their employees.
- The Machine Learning approach is based upon the initial research conducted by Most Loved Workplace®, which demonstrates that love of the workplace is a reliable and accurate tool to predict outcomes such as organizational commitment, employee performance, and the willingness of employees to engage in workplace behaviors that benefit the organization rather than themselves (Carter, 2019).
- The tool can be used to build and develop a culture where employees love to do their best work with consistent feedback (Goldsmith & Morgan, 2004; Goldsmith & Reiter, 1991).

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Appendix:

Complete List of Sentiment, Emotion, Topics, and Themes



Sentiment

- Positive
- Neutral
- Negative



Emotion

- Love
- Gratitude
- Optimism
- Excitement
- Neutral
- Annoyance
- Disapproval
- Anger
- Fear
- Disgust
- None



Topics

- Accountability
- Benefits, Bonus, and Compensation Related
- Collaboration
- Communication
- Delegation
- Leadership
- Management
- Resources
- Respect
- Support
- Team
- Transparency
- Trust
- Values
- Vision
- General



Themes

- A positive work environment
- Advancement opportunities/Additional advancement opportunities
- Employee autonomy/Autonomy
- Being appreciated by management
- Valuing employees/Being valued as an employee
- Technology/Better computer systems
- Adequate pay/Better pay
- Adequate workspace/Better workspace
- Clear expectations
- Coaching
- Communication between co-workers
- Communication between departments
- Counseling
- Elimination of double standards
- Fast turn around by leadership
- Frequent feedback
- Employee accountability/Hold employees accountable
- Leadership accountability/Hold leadership accountable for their actions
- Improved communication from management
- Limited micromangement/Less micromangement
- Limited politics/Less politics
- Mentorship opportunities
- Diversity & inclusion/More diversity & inclusion
- Privacy/More privacy
- Adequate resources/More resources
- Respect/More respect
- Adequate staffing/More staff
- Opportunities for professional growth
- Planning and prioritization
- Recognition for a job well done
- Remote work opportunities
- Strong vision/Stronger vision
- Supportive management/Support from management
- Career support/Support my career
- Supportive co-workers
- Transparency
- Work-life balance
- None/No recommendation