Examples of OHS Predictive Analytics

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Sequence of Outcomes



Predictive Analytics – Finding Trends in Data to Indicate Certain Behaviours







OHS Technology Systems Piloted on Large Scale Construction Projects



OHS predictive analytics systems have been piloted on the project - the results of which are currently being evaluated by our enterprise. Three systems will be discussed today:

- 1. Biometric identification applied in the training environment field
- 2. Pre-access knowledge assessment & subsequent development
- 3. Safety interventions powered by a quick return analytics platform

Biometric identification applied in the training environment field



Biometric Identification: The Traditional Classroom

Traditional Classrooms:

- 1. Have an instructor who delivers material.
- 2. Have an instructor who answers questions about the material.
- 3. Have an instructor who validates attendance and participation (old school facial recognition).
- 4. Have an instructor or exam proctor who ensures exams/quizzes are taken in line with expectations.





Opportunity: Moving the Traditional Classroom Online

Web Based Training:

- 1. Material delivered that intends to equal an instructor. Highly repeatable and reliable message.
- 2. May or may not have an avenue for participants to ask questions, e.g., best practice is pop up chat with an expert, less effective is to send an email after the course.
- 3. Generally does not validate identity, attendance and participation.
- 4. Generally does not ensure exams/quizzes are taken in line with expectations.





Biometric Verification & Proctoring for Safety & Regulatory Critical Training



"Richardson not only took a computer generated petroleum safety training course (PSTS) at Dial, but volunteered that he had actually done the test on behalf of a couple of other Dial employees. He testified that Gauss knew Richardson had done the course for the others and was "happy" as it was helpful to Dial to have these employees certified."

Whaaat?



WBT's Supported by biometric ID Verification & Proctoring

ID / Participation Verification Process







Then asked to take a picture of their ID document Facial image is compared and authenticated against ID

Data is extracted and participation is monitored against session rules

Session is either cleared or invalid compared to session rules



Biometric ID Verification and Proctoring Results – Due Diligence for Safety Critical Online Training/Awareness Events

Suncor has achieved an unprecedented level of participation integrity for regulatory critical online training/awareness events. The ID verification and proctoring system also allows for the identification of unethical behaviors prior to the arrival of personnel at the worksite in regards to the **Suncor's value of "do the right thing - the right way with integrity"**.



Examples of Invalid Sessions



Participant Sleeping









All images are recreations of actual participant sessions

Predictive Analytics?

- Like in a traditional classroom setting, online ID verification and proctoring allows for the determination of a persons alignment with safety values – if one values safety they will follow the rules for participation in the orientation.
- We can now know this aspect of a persons safety culture alignment before they arrive at our project. ~2% of participants knowingly break the rules for orientation.
- Do we as an industry group want to have safety and regulatory critical training online without the ability to know who is taking the training/learning event?



Pre-access knowledge assessment and subsequent development



Why does Knowledge of OHS Hazards and Controls Matter?





Validate Capability of Personnel to Deliver Organizations Activities, Products & Services – "to effectively do what you do" Ensure Business, Safety & Regulatory Critical Systems Function – "to mitigate risks and maximize the opportunities"



The Problem



Knowledge is not visibly apparent

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Knowledge cannot reliably be self-assessed



Knowledge often presumed by reviewing results obtained – significant safety risk in this approach!



Knowledge assessment prior to commencement of at-risk work is often missing in an organization's management systems



Training is often equated with competence

OH&S Knowledge Assessment Program

- Jurisdiction and industry-specific OH&S assessments provided online by an independent, non-profit organization
- Assessments measure a person's ability to recognize hazards, implement controls and manage technical OH&S requirements in specific workplace situations
- OHS assessments are currently divided into 81 Separate Jurisdictions and 34 Distinct Industries.
- Assessments are completed online, with identity verification and proctoring.



Assessment Methodology



Applicable education and qualifications

The ability to demonstrate OHS specific knowledge at four functional levels (recognition, comprehension, interpretation and application)



Level 1 - Recognition

Level 1 Recognition

 At the recognition level a user is able to recognize equipment, machinery, terms and key hazards associated with the chosen area.



Level 2 - Comprehension



 At the comprehension level a user is able to identify controls mandated by regulation in conjunction with operational risks and/or work site conditions associated with the chosen area.

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Level 3 - Interpretation



 At the interpretation level a user is able to apply regulatory and industry standards and/or best practices to their work site management decisions within the chosen area.









 At the application level the user is able to fully analyze scenarios based on actual highrisk workplace incidents and determine an appropriate course of action that effectively mitigates those risks.





Example Assessment Report - Individual

Assessment Findings



"Competent is defined as adequately qualified, suitably trained and with sufficient experience to perform the assigned work"





Example Assessment Report - Team



Expired Development Plan

Example Assessment Report - Organization





Using Knowledge Assessments to Support Competency Development



- No development plan expected use baseline assessment to align knowledge strengths to work scope
- Baseline assessment provides individual awareness of knowledge
 in need of development









Create development plan based on weakness related to areas of work scope supervised

Reassess areas of

weakness

Monitor competency in accordance with project targets

An OHS Advisor's Knowledge of Hazards and Controls is Foundational!







Baseline Assessment



Create development plan based on high risk areas of project _____

Reassess areas of weakness

Monitor competency in accordance with company targets

OHS Knowledge Assessment Program Outcomes

- OHS hazards and controls are better understood by frontline leaders and advisors, which enables more effective application of key safety processes in the field (e.g. safety interventions, field level hazard assessments).
- Competency development supports incident reduction we found that a lack of OHS knowledge and competency was a concern in over half of our significant incidents and near misses.
- Program enables a shift from a classroom safety training model to a lower cost coaching, mentoring and personal study model where results are measured by assessment rather than classroom time.
- Having an industry average to compare teams and individuals to provides excellent benchmarking and a strong opportunity to reflect OHS due diligence.



Safety interventions powered by a quick return analytics platform



Safety Field Verifications: The Problem

- EHS inspections, BBO's, observations, etc. are written on paper in the field.
- To perform trends in the past we needed to hire administrators
- It took a long time to get the trends, often days or weeks after the events occurred.
- If workers raised items during these events, follow-up on the items required a fair amount of administration.



Field Safety Verification Analytics





Field Safety Verification Systems with Analytics

- Safety Observation System (SOS)
 - Behavior-based observation program
 - Safety concerns, suggestions, hazardous conditions, positive behavior
- Field Level Hazard Assessment (FLHA) Audit
 - Quality audits on contractor's FLHA
- Focused Observations for High Safety Risk Activities
 - Safe Work Permit
 - New Worker
 - Dropped Objects Prevention
 - Excavation and Trenching
 - Confined / Restricted Space Entry
 - Control of Hazardous Energy
 - Cranes & Hoisting
 - Fall Protection



Example Input: Dropped Objects Prevention Observation *Filling out the Forms*



16 Hours Later: Example Output



Analytics profile configured to organizational expectations



Human Analyst vs. Analytics System

- In 2013, one project based analyst would process a maximum of 3000 entries from safety systems per month and generate reports.
- In 2017, the system processes approximately 36,000 entries per month the equivalent of over 12 project based analysts working in the previous role.
- The automated nature of the system allowed us to more effectively follow-up with individual workers when concerned were raised this lead to high levels of support for the program.
- With human analyst constraints removed, the system allowed for unprecedented worker participation in safety programs our project won a president's award for that!



Linking Predictive Analytics with Ultimate Safety Performance



Sequence of Outcomes



Predictive Analytics – finding trends in data to indicate certain behaviours







