Looking inside - new tools for training package transparency
Digital transformation

Can new digital tools assist:

• training package development
• system rationalisation
• course design
• transition and career pathway mapping?
CISC concerns

The proliferation of qualifications

The large number of units

Keeping the system up to date

Flexible access to units of relevant training
Problem

How do we identify:
- actual or functionally duplicate units
- opportunities for unit consolidation
- assurance a suitable unit does not already exist when one is proposed
- improve transparency of the corpus of documents as a whole
Research Question

Can algorithms and machine learning assist?
How effective are they?

\[ \text{tfidf}(t, d, D) = \text{tf}(t, d) \cdot \text{idf}(t, D) \]

\[
P(W, Z, \theta, \phi; \alpha, \beta) = \prod_{i=1}^{K} P(\phi_i; \beta) \prod_{j=1}^{M} P(\theta_j; \alpha) \prod_{t=1}^{N} P(Z_{j,t} \mid \theta_j)P(W_{j,t} \mid \phi_{Z_{j,t}})
\]
A new tool is hosted on training.gov.au
What does the tool do?

Two functions:

**A search function**: that searches the whole of unit content on key terms to return a list in priority order

**A cluster function**: that groups units according to their similarity and dissimilarity.
Search function

**VET Search**

- **Search For Units With...**
  - Any of these terms: 
  - All of these terms: counselling
  - None of these terms:

**Results - 138 units**

- CHCFCS004: Provide grief and loss counselling
- CHCFCS003: Provide counselling to children and young people
- CHCFCS002: Provide relationship counselling
- CHCCSL001: Establish and confirm the counselling relationship
- CHCCSL003: Facilitate the counselling relationship and process
- CHCCSL006: Select and use counselling therapies
- CHCFCS001: Facilitate the family counselling process
- CHCCSL005: Apply learning theories in counselling
- CHCFCS004: Provide grief and loss counselling
- CHCFCS003: Provide counselling to children and young people
- CHCFCS002: Provide relationship counselling
- ... (more results)

**top of list**

**bottom of list**
Click through to TGA
Unit of competency details
CHCFC004 - Provide grief and loss counselling (Release 1)

Elements and Performance Criteria

Element

CHCFC004 - Provide grief and loss counselling (Release 1)

Performance Criteria

1. Engage with clients and develop an understanding of grief and loss issues

1. Establish a safe and supportive environment to engage with clients

2. Use a range of communication skills to engage with clients

2. Establish a safe and supportive environment to engage with clients

3. Assess clients' understanding of grief and loss issues

3. Establish a safe and supportive environment to engage with clients

4. Plan the support plan for grief and loss issues

4. Establish a safe and supportive environment to engage with clients

5. Provide grief and loss counselling

5. Establish a safe and supportive environment to engage with clients

6. Establish a safe and supportive environment to engage with clients

6. Establish a safe and supportive environment to engage with clients

Performance Evidence

This unit is a skill that requires the ability to communicate effectively in a range of contexts. It is also a critical component of the process of grief and loss. The assessment criteria are as follows:

1. The learner demonstrates an understanding of grief and loss issues.

2. The learner communicates effectively with clients.

3. The learner provides grief and loss counselling.

Assessment requirements

Modification History

Note: Assessment evidence is required to demonstrate competence in this unit. Evidence must be collected in a way that satisfies the requirements of the ASV and the Australian Standards for Training Providers.

Performance Evidence

This unit is a critical component of the process of grief and loss. The assessment criteria are as follows:

1. The learner demonstrates an understanding of grief and loss issues.

2. The learner communicates effectively with clients.

3. The learner provides grief and loss counselling.

Unit mapping information

No equivalent units.

Links

[For further information on the unit and its requirements, please visit the course's official website or contact the course provider.]
Limit the search to selected TPs
Search For Units With...

Any of these terms:  

All of these terms:  

None of these terms:  

Search

Any: may contain the term  
All: **must** contain the term  
None: **must not** contain the term
Adding key terms changes the priority ordering
This search excludes any units containing the word ‘employee’
Search function evaluation

Evaluation to date is based on our experiments and feedback from SSOs. These are the conclusions:

• Finds relevant material more quickly
• Generates prompts and suggestions
• Useful insights into unfamiliar training packages
• Click-through allows for easy inspection when making in-out decisions.
Search function evaluation - limitations

- Does not search on strings
- Search cannot be limited to parts of a unit e.g. the elements, performance evidence or the knowledge evidence
- Searches on text rather than meaning e.g. searching on the word ‘dog’ will not return units only containing the word ‘greyhound’.
Lessons from experience

• Every enquiry will present its own particular difficulties: mostly about defining scope

• The tool is simple but there are a range of skills that can be developed in using it well

• A double cycle of enquiry: the first to establish key terms the second to use them
Selected units can be clustered
AHC: Detail 1: levels of similarity
AHC detail

AHCIRG334  Operate and maintain gravity fed irrigation systems
AHCIRG303  Measure irrigation delivery system performance
AHCMKH303  Service and repair milking equipment
AHCIRG335  Operate and maintain moving irrigation system
AHCIRG306  Troubleshoot irrigation systems
AHCIRG410  Select and manage pumping systems for irrigation
AHCLSC301  Set out site for construction works
AHCIRG402  Determine hydraulic parameters for an irrigation system
AHCIRG503  Design irrigation, drainage and water treatment systems
AHCIRG415  Interpret and apply irrigation designs
AHCIRG433  Manage irrigation systems
AHCIRG315  Interpret irrigation plans and drawings
AHCIRG434  Manage surface irrigation systems
AHCIRG422  Manage a moving sprinkler irrigation system
AHCIRG408  Schedule irrigations
AHCIRG327  Implement an irrigation schedule
AHCIRG308  Monitor soils under irrigation
AHCMKH403  Design and install enterprise milk cooling and storage
AHCMKH305  Mechanically test milking machines
AHCSAW401  Set out conservation earthworks
AHCIRG426  Evaluate water supply for irrigation
AHCDES504  Design for construction of landscape features
AHCWAT502  Manage water systems
AHCPT505   Evaluate wine
AHCSAW502  Plan erosion and sediment control measures
AHCLSC501  Survey and establish site levels
AHCMKH402  Design and fabricate milking equipment installations
AHCAGB403  Keep financial records for primary production business
Similarity and unit design
### AURVTP012 - Apply air dry and polyurethane refinishing materials (Release 1)

**Application**

This unit describes the performance outcomes required to apply air dry and polyurethane refinishing materials to a variety of vehicle components by spray gun application. It involves preparing for the task, selecting and using specialist tools and equipment, mixing and applying automotive paint materials according to manufacturer specifications, and completing workplace processes and documentation.

It applies to those working in the automotive paint refinishing repair industry. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

**Vehicle Body**

**Unit Sector**

Technical - Paint

### Elements and Performance Criteria

<table>
<thead>
<tr>
<th>Elements</th>
<th>Performance Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prepare to apply air dry and polyurethane refinishing materials</td>
<td>1.1 Job requirements are determined from workplace instructions</td>
</tr>
<tr>
<td></td>
<td>1.2 Application information is accessed and interpreted</td>
</tr>
</tbody>
</table>

### AURVTP011 - Apply solid acrylic two-pack materials to vehicle components (Release 1)

**Application**

This unit describes the performance outcomes required to apply solid acrylic two-pack materials to a variety of vehicle components by spray gun application. It involves preparing for the task, selecting and using specialist tools and equipment, mixing and applying automotive paint materials according to manufacturer specifications, and completing workplace processes and documentation.

It applies to those working in the automotive paint refinishing repair industry. No licensing, legislative, regulatory or certification requirements apply to this unit at the time of publication.

**Vehicle Body**

**Unit Sector**

Technical - Paint

### Elements and Performance Criteria

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</tr>
<tr>
<td>1.3 Refinishing materials are selected and inspected for quality</td>
<td>1.3 Acrylic two-pack materials are selected and inspected for quality</td>
</tr>
<tr>
<td>1.4 Hazards associated with the work are identified and risks are managed</td>
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<tr>
<td>1.5 Tools and equipment, including personal protective equipment (PPE), are identified and checked for serviceability</td>
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</tr>
<tr>
<td>1.6 Work is planned to identify air dry and polyurethane refinishing method, minimise waste, and prevent damage to vehicle</td>
<td>1.6 Work is planned to identify solid acrylic two-pack application method, minimise waste, and prevent damage to vehicle</td>
</tr>
<tr>
<td>2. Carry out application activities</td>
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</tr>
<tr>
<td>2.1 Refinishing materials are mixed and applied according to manufacturer recommended intervals and safety and environmental requirements, and without causing damage to system or components</td>
<td>2.1 Two-pack materials are mixed and applied according to paint manufacturer recommended intervals, and safety and environmental requirements, and without causing damage to vehicle system or components</td>
</tr>
<tr>
<td>2.2 Refinishing materials are dried using approved methods and equipment</td>
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</tr>
<tr>
<td>2.3 Paint finish is checked against specifications</td>
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</tr>
<tr>
<td>2.4 Paint surface faults are removed using compounds, polishes and glazes</td>
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<tr>
<td>3. Complete work processes</td>
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</tr>
<tr>
<td>3.1 Final inspection is made to ensure work meets workplace expectations and vehicle or component is presented ready for use</td>
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<td>3.2 Work area is cleaned, waste and non-recyclable materials are disposed of, and recyclable material is collected and stored</td>
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Team communication

A cluster on the first 784 units from search on:

ALL: team communication
ANY: manage facilitate relationships culture lead people collaborate staff ......

A high accuracy clustering. The handout is one of the found clusters.
Odd combinations

CPCCBC4017A  Arrange resources and prepare for the building or construction project
AHCDRG401  Coordinate and supervise installation of an irrigation drainage system
CPCCPD3031A  Implement safe lead paint and asbestos work practices in the painting industry
CPCCDE4004A  Finalise demolition activities and supervise property handover
MEM234031A  Manage installation, commissioning or modification of machines and equipment
CPPWMT4027A  Select and obtain waste management plant, equipment and materials
RIIRAI505D  Implement the surface mine mechanical plant management plan
MSTTF2007  Produce patterns for 2-D products
CPPWMT3046A  Conduct resource recovery
CPCCJS3003A  Assemble and install stairs
RIIRAI402D  Apply and monitor site plant and resource management plan
CPPACC4006A  Conduct a playground access audit
RIIMPO401D  Supervise mobile plant operations
Outcomes: clustering

Outcomes of clustering experiments:

• Clustering successful in identifying very similar units, including units which do not appear to be very close.

• The solutions it arrives at are better when there is conceptual integrity around the initial selection of units.

• Clustering can produce a rough map to inform further research; it supports conceptualisation.

• The usefulness of the output is relative to the task at hand.
Evaluation of clustering

- Business purpose
  - Evaluation of output against business purpose

- Document selection
  - Output

- Hyper-parameters
  - Bag of words
  - Bag of vectors
  - LDA clustering
Clustering – future developments

• There are ways in which the clustering function could be developed
• The difference would lie in the inputs and to some extent in variations to the clustering algorithm.
• Clustering could be applied to word vectors or files specially constructed for a specific research purpose that exclude irrelevant content.
Outputs to Excel and pdf

- The dendrograms can be exported to a pdf.
- The clusters as a list can be exported as a csv file.
- The unit of competency list in term frequency order can also be exported as a csv file.
- These can be compiled in Excel and combined with other Excel based information
General interest in Natural Language Processing (NLP)

The subtlety of language makes NLP a challenge for machine learning processes.

Its application is of interest to government including in linking training documents with employment related documents.

It may prove useful in mapping possible student journeys and testing the availability of training for skills in demand.

It may prove useful in the development of more dynamic and responsive taxonomies.
Access to the tool

• A log-in can be obtained by emailing me at Michael.Wyndham@education.gov.au.

The application should state your position and your interest in using the application.

Access comes with an assumption that you will provide feedback when requested to allow us to evaluate the tools usefulness and scope for improvement.
Questions

- Is this a tool you can see yourself using?
- In what application?
- Questions