International Specialised Skills Institute

PERFORMING INDUSTRY SKILLS NEED ASSESSMENT AND DEVELOPING TECHNICAL PACKAGES

Using DACUM Job Analysis to Build a Skilled Workforce Capable of Meeting Industry Needs

APPENDIX

A 2015 International Specialised Skills Institute Fellowship.

MD AFTABUZZAMAN, PHD

State Government Victoria — Department of Education & Training

DACUM Research Chart for Class 4 Water Supply Operator

Produced for

OhioEPA

DACUM Panel

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City of Newark Water Treatment Plant
Newark, OH

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City of Fostoria Water Treatment Plant
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City of Piqua Water System
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Produced by

THE OHIO STATE UNIVERSITY
COLLEGE OF EDUCATION
AND HUMAN ECOLOGY

DACUM International Training Center

Columbus, OH

March 24-25, 2016

DACUM Research Chart for Class 4 Water Supply Operator

DUTIES   **TASKS**

A. Maintain Water Quality	A.1 Develop water quality parameters	A.2 Set plant process water treatment goals	A.3 Sample source water	A.4 Sample process water
	A.10 Write test results report	A.11 Develop source water/watershed protection plan	A.12 Implement source water protection plan	A.13 Review plant processes via SCADA system
B. Manage Plant Operations	B.1 Staff plant to minimum required levels	B.2 Produce monthly EPA operating reports	B.3 Produce water quality reports (e.g., chemicals, raw water)	B.4 Order process chemicals
	B.10 Approve contractor requests	B.11 Coordinate planned plant outages	B.12 Verify plant safety procedure compliance	B.13 Conduct plant tours (staff, contractors, vendors)
C. Manage Lab Operations	C.1 Update lab SOPs (e.g., HAB, TCR, LTESWR)	C.2 Maintain lab certification	C.3 Update lab safety plan	C.4 Verify lab inventory
	C.10 Prepare lab for EPA review	C.11 Update distribution sampling site plan	C.12 Test redundant lab equipment	C.13 Procure outside lab testing
D. Manage Plant Maintenance	D.1 Create scheduled maintenance and PM plans	D.2 Prioritize repair jobs	D.3 Create tools/parts inventory	D.4 Update tools/parts inventory
	D.10 Set up new maintenance vendors	D.11 Organize maintenance manuals	D.12 Adjust plant processes to accommodate maintenance operations	D.13 Review maintenance report
E. Maintain Regulatory Compliance	E.1 Schedule sanitary survey	E.2 Facilitate information exchange with district regulatory office	E.3 Update mandated log books (e.g., Ohio EPA, OSHA)	E.4 Oversee record retention
	E.10 Participate in public comment periods for new environmental regulations	E.11 Administer public notices and verification forms	E.12 Develop emergency plans for compliance	E.13 Post current mandated signage

* Water tests are listed on page 3

A.5 Sample tap water	A.6 Sample distribution system	A.7 Perform water quality tests*	A.8 Review sample test results	A.9 Adjust water treatment processes
A.14 Supervise backflow prevention program				
B.5 Enforce plant operations policies	B.6 Update plant standard operating procedures	B.7 Prepare equipment for emergencies	B.8 Coordinate system operation with distribution projects	B.9 Perform plant walkthroughs
B.14 Conduct plant operations meetings	B.15 Respond to plant operations irregularities			
C.5 Replenish lab chemicals and supplies	C.6 Monitor lab safety procedures	C.7 Review lab test results	C.8 Perform lab tests*	C.9 Train employees for lab certification
D.5 Meet with maintenance personnel	D.6 Schedule employees for specialized maintenance tasks	D.7 Procure repair parts/tools	D.8 Oversee parts and tools security	D.9 Research new maintenance equipment
D.14 Outsource contractors for specialized maintenance	D.15 Track critical equipment uses	D.16 Oversee safety programs (e.g., lockout/ tagout, confined space)	D.17 Update maintenance SDS	
E.5 Monitor operating parameters for compliance	E.6 Interpret test results for compliance	E.7 Oversee activities to meet regulatory deadlines	E.8 Update employees on current and upcoming regulations	E.9 Update SCADA alarm points to current regulations

DACUM Research Chart for Class 4 Water Supply Operator

DUTIES　　**TASKS**

F. Maintain Emergency Plans	F.1 Update emergency contact data	F.2 Update emergency supply vendors	F.3 Develop new emergency procedures (e.g., HAB, lead, giardia)	F.4 Update emergency plans
	F.10 Oversee plant life/safety equipment (e.g., fire alarms, first aid kits, AED)	F.11 Update emergency supply and equipment lists	F.12 Participate in Ohio WARN	F.13 Coordinate emergency response evaluation with fire department
G. Manage Plant Personnel	G.1 Determine plant staffing needs	G.2 Participate in hiring plant personnel	G.3 Conduct new employee orientation	G.4 Oversee plant personnel training
	G.10 Update staff on CIPs	G.11 Conduct plant personnel performance evaluations	G.12 Determine plant personnel performance improvement strategy	G.13 Provide staff job advancement opportunities
	G.19 Participate in formal grievance processes			
H. Maintain Public Relations	H.1 Respond to customer complaints and inquiries	H.2 Conduct community-based plant tours	H.3 Participate in community events	H.4 Host water industry educational events
	H.10 Participate in city council meetings			
I. Oversee Asset Management	I.1 Maintain source water quantity	I.2 Maintain distribution water quantity	I.3 Oversee asset depreciation (e.g., equipment/plant failure, aging infrastructure)	I.4 Review asset management plans and proposals
J. Manage Plant Budget	J.1 Forecast chemical and equipment costs	J.2 Participate in grant funding procurement	J.3 Gather staff budget requests	J.4 Coordinate department budget process with finance
	J.10 Request budget reappropriations (e.g., transfer, supplement)	J.11 Confirm utilization of budgetary allocations		

F.5 Disseminate updated emergency plans	F.6 Oversee staff emergency plan training (e.g., EPA, HAZWOPER)	F.7 Practice emergency response procedures (e.g., tornado drills, natural disasters, spills)	F.8 Oversee plant PPE programs	F.9 Oversee facilities security (e.g., fence, locks, watershed cameras)
G.5 Authorize staff payroll	G.6 Perform plant personnel scheduling (e.g., vacation, shifts)	G.7 Determine employee work assignments	G.8 Conduct staff meetings	G.9 Evaluate staff work assignment performance (e.g., completion, quality)
G.14 Provide professional development/idea incentives	G.15 Develop plant personnel related policies	G.16 Arrange staff appreciation activities	G.17 Participate in plant personnel mentoring and coaching	G.18 Participate in labor relations negotiations
H.5 Distribute annual consumer confidence report	H.6 Conduct public forums (e.g., lead, copper)	H.7 Participate in media interviews	H.8 Participate in educational programs (e.g., stewardship, career, agriculture)	H.9 Participate in water industry conferences (e.g., AWWA, OTCO, ORW)
I.5 Request quote for new or replacement asset	I.6 Review bids for new and replacement asset	I.7 Develop future asset forecast (e.g., usage, equipment, regulatory)	I.8 Create asset wish list	I.9 Manage capital improvement projects
J.5 Forecast payroll and overtime costs	J.6 Review plant operation anomalies for budget impact	J.7 Create department budget	J.8 Track monthly department expenses	J.9 Authorize plant expenditures

DACUM Research Chart for Class 4 Water Supply Operator

DUTIES   TASKS

K. Engage in Personal Professional Development	K.1 Attend professional conferences	K.2 Complete online training courses	K.3 Participate in table top exercises	K.4 Develop table top exercises
	K.10 Conduct mandatory training (e.g., contact hours, policy, HAB)	K.11 Participate in new equipment training		

* Water Tests

Jar test
pH
Total alkalinity
Total hardness
Calcium hardness
Temperature
Fluoride
Turbidity
Total Trihalomethanes (TTHM)
Haloacetic Acid 5S (HAAS)
Volatile Organic Compounds (VOC)
Synthetic Organic Compounds (SOC)
Chlorine (free and total)
Total Organic Carbon (TOC)
Organics
Metals
Cryptosporidium

Nitrates
Nitrites
Total phosphorus
Cyanobacteria
Algae Identification
Magnesium
Taste and Odor Profiles
Characterization
Giardia
UV254
Stability
TDS
Color
Phenol Alkalinity
Particle count

K.5 Participate in professional organizations	K.6 Review professional publications	K.7 Participate in skill enhancing events	K.8 Participate in mandatory training (e.g., contact hours, policy, HAB)	K.9 Develop mandatory training (e.g., contact hours, policy, HAB)

General Knowledge and Skills

Knowledge
Safety procedures
Policies and procedures
Chemistry
Basic math
Basic accounting
Computer software
SCADA system
Safety program
Labor laws
Management practices
Union policies

Skills
Communication (oral and written)
Strategic planning
Problem solving
Decision making
Multi-tasking
Time management
Leadership
Negotiating
Analytical
Planning
Administrative
Report writing

Behaviors

Team player
Dependable
Patient
Flexible
Detail oriented
Trustworthy
Professional
Independent
Punctual
Calm
Open minded
Courteous
Ethical
Safety oriented
Self motivated
Good hygiene
Good temperament
Accessible
Drug free
Ability to distinguish color
Able to work in extreme conditions

Acronyms

PM	Preventative Maintenance
OSHA	Occupational Safety and Health Administration
PPE	Personal Protective Equipment
SCADA	Supervisory Control and Data Acquisition
CCR	Consumer Confidence Report
MOR	Monthly Operating Report
RFP	Request for Proposal
SOP	Standard Operating Procedure
AWWA	American Water Works Association
RFQ	Request for Qualifications
AED	Automated External Defibrillator
OTCO	Operator Training Committee of Ohio
SDS	Safety Data Sheets

Tools, Equipment, Supplies and Materials

Portable generators
Traffic control devices
Mobile phone
Cameras
Electrical test equipment
Computer
Copier
Calculator
Basic hand tools
GPS
PPE
Basic office supplies
Core sampler
Fork lift
Dump truck
Skid loader
Lawn equipment
Gas monitors
Trash pumps
Tap machine
Line stop equipment
Lab equipment
Leak survey equipment
Compressors
Vac-con
Whole hogs
Welder
Water level indicators
Fly ladders
Gate operators
Sludge removal pumps
SCADA system
Coupon rack
Backhoe/trackhoe
Sampling supplies
Road runners - hand held, laptop
Booms

Future Trends and Concerns

Unfunded mandates
New technologies
Stricter regulations
Social media access and speed - example is bad publicity re: lead
Customers' computer literacy
Upgrading of facilities; construction
Decrease in basic water supply quality
Lack of certified operations staff
Increased grants and government funding
"Uncontaminated" regulations (chemicals with no current standards)
Increasingly intense security
Water rate structures

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Table of Contents

i. Executive Summary

Victoria has several competitive advantages that create a diverse, flexible and resilient economy. Despite these advantages, the Victorian economy has underperformed in recent years. The Victorian Government has identified the construction materials and technologies industries as one of several sectors strategically important for potential strong growth and jobs in the State. The construction industry is a major sector in the Victorian economy contributing $21.6 billion or around 6.7 per cent of the State's gross value added in 2014. The Productivity Commission's 2014 Inquiry into Public Infrastructure found some evidence that Australian productivity and efficiency in construction industries lagged behind some comparator countries. Productivity improvement in the construction section is key concern for the overall economic well-being and prosperity of Victoria/Australia.

This research Fellowship aimed to explore the unique industry needs assessment technique (DACUM Job Analysis) for the identification of skills required for the building and construction industry. The construction workforce is dominated by the technician and trade group, followed by labourers, managers and clerical and administrative workers. The workforce needs to be trained according to the emerging skills requirement of the industry. Industry training is accomplished by using training packages. Training Packages are developed by Skills Service Organisations on behalf of industry. They are sets of nationally endorsed standards and qualifications for recognising and assessing people's skills. A Training Package describes what sort of skills and knowledge a person needs in the workplace. Training Packages need to be continuously improved and nationally endorsed to ensure they continue to meet the needs of industry, training participants, and the community. DACUM job analysis can provide a significant input in the development and/or improvement process of training packages.

In the DACUM process, a qualified facilitator works with a panel of experts who collectively and cooperatively describe the occupation in the language of the occupation by developing a job profile chart. The chart contains a list of general areas of competence called duties and several tasks for each duty. Brainstorming techniques are used to obtain the collective expertise and consensus of the panel. The completed chart represents a graphic profile of the duties and tasks performed by successful workers in the occupation. The panel identifies the general and emerging knowledge/skills, tools, equipment, supplies, and materials required of successful workers. In addition, the list includes the important worker behaviours essential for success, and the future trends and concerns likely to cause job changes.

With the support of the relevant industry bodies, the knowledge and insight gained from DACUM job analysis can be applied to develop strategies for conducting industry needs assessment and improving curriculum and training packages for Australian industry sectors. In addition, the industry needs assessment component of DACUM analysis can be used to (i) identify the occupational areas which have enough employment opportunities to attract students, (ii) investigate the learning gaps which can jeopardise an individual's employment opportunity, and (iii) develop innovative instructional methods that bridge the gaps between what is offered in the classroom and what is going on in the real work of work. Finally, DACUM process can be repeated to identify future and emerging industry skills requirements and develop the required curriculum and can become a continuous improvement mechanism for the training packages.

ii. Abbreviations & Definitions

Abreviations

ABS	Australian Bureau of Statistics
AQF	Australian Qualifications Framework
BSCAA	Building Service Contractors Association Australia
CCF	Civil Contractors Federation
CBA	Competency-Based Assessment
CBT	Competency-Based Training
CFMEU	Construction, Forestry, Mining and Energy Union
ELT	Entry-Level Training
LLN	Language, Literacy and Numeracy
MBA	Master Builders Australia
MPA	Master Plumbers Australia
NCVER	National Centre for Vocational Education Research
NFIA	National Fire Industry Association
RCC	Recognition of Current Competencies
RTO	Registered Training Organisation
SSI	Spatial Science Institute
STA	State Training Authority
STEM	Science, Technology, Engineering and Mathematics
VET	Vocational Education and Training
WMAA	Waste Management Association Australia

Definitions

AQF (Australian Qualifications Framework): the AQF provides a comprehensive, nationally consistent yet flexible framework for all qualifications in post-compulsory education and training.

Competency (also competence): the ability to perform tasks and duties to the standard expected in employment.

Competency Standard: an industry-determined specification of performance which sets out the skills, knowledge and attitudes required to operate effectively in employment. Competency standards are made up of units of competency, which are themselves made up of elements of competency, together with performance criteria, a range of variables, and an evidence guide. Competency standards are an endorsed component of a training package.

Competency-Based Training (or CBT): training which develops the skills, knowledge and attitudes required to achieve competency standards.

Credit: (also called status or advanced standing) the acknowledgment that a person has satisfied the requirements of a module (subject) or unit of competency either through previous study (credit transfer) or through work or life experience (recognition of prior learning). The granting of credit exempts the student from that part of the course.

Customisation: tailoring to individual requirements; (in vocational education and training) the process of tailoring a program to meet the specific needs of clients. Customised qualifications are devised by Registered Training Organisations, created through combining competency standards drawn from two or more different endorsed Training Packages to create a new qualification outcome. Such qualifications must meet the requirements of the Australian Qualifications Framework, the Customisation Policy of the National Training Quality Council and the customisation advice of the relevant Training Packages.

Endorsed Component: the central part of a training package, endorsed by the National Training Framework Committee, comprising competency standards, assessment guidelines and qualifications. Compare non-endorsed component.

Evidence Guide: the part of a competency standard which provides a guide to the interpretation and assessment of the unit of competency, including the aspects which need to be emphasised in assessment, relationships to other units, and the required evidence of competency.

Flexible Delivery: a range of approaches to providing education and training, giving learners greater choice of when, where and how they learn. Flexible delivery may involve distance education, mixed-mode delivery, online education, self-paced learning, self- directed learning, etc.

Industry Restructuring: a process of changing the forms of work organisation within enterprises and across industry to improve productivity, competitiveness, quality and flexibility. This may involve job redesign, award restructuring, new technology, and ongoing training or retraining of workers.

Mixed-Mode Delivery (also called mixed delivery): a combination of learning modes to deliver a course or module, such as distance education and face-to-face study in classes, tutorials, practical sessions or workshops.

National Training Framework: the system of vocational education and training that applies nationally. It is made up of the Australian Quality Training Framework and nationally endorsed Training Packages.

Non-Endorsed Component: the parts of a training package not required to be endorsed by the National Training Framework Committee, including support materials for learning, training, assessment, and professional development.

Performance Criteria: the part of a competency standard specifying the required level of performance in terms of a set of outcomes which need to be achieved to be deemed competent.

Recognition of Current Competencies (RCC): the acknowledgment of competencies currently held by a person, acquired through training, work or life experience. More commonly known as recognition of prior learning.

Recognition of Prior Learning (RPL): the acknowledgment of a person's skills and knowledge acquired through previous training, work or life experience, which may be used to grant status or credit in a subject or module.

Training Package: an integrated set of nationally endorsed standards, guidelines and qualifications for training, assessing and recognising people's skills, developed by industry to meet the training needs of an industry or group of industries. Training packages consist of core endorsed components of competency standards, assessment guidelines and qualifications, and optional non-endorsed components of support materials such as learning strategies, assessment resources and professional development materials.

Unit of Competency: a component of a competency standard. A unit of competency is a statement of a key function or role in a job or occupation. See also element of competency, performance criteria, range of variables.

1. Fellowship Background

1.1   Aims of the Fellowship

The aim of the Fellowship program is to learn and explore the unique industry needs assessment technique (DACUM job analysis) for the identification of skills required for industry. Together with the relevant industry bodies the Fellow intends to apply the knowledge and skills gained from DACUM job analysis to develop strategies for conducting industry needs assessment and improving curriculum and training components in building and construction industry in Australia.

This will be accomplished by:

» Completing a comprehensive training on DACUM job analysis process at the Center on Education and Training for Employment (CETE), The Ohio State University in Columbus, Ohio to become a certified DACUM facilitator

» Interviewing relevant international experts to develop/recommend strategies for education, government and industry leaders for industry skills need assessment

» Conducting industry needs assessment for civil engineering and building construction industry

» Making recommendations to training providers about current and emerging training needs in building and construction industry

» Providing suggestions to accreditation and regulatory bodies about current and emerging curriculum needs in civil engineering industry

» Sharing research findings and recommendations with:

  » Australian Building and Construction Commission

  » Association of Consulting Structural Engineers Victoria

  » Australasian Association for Engineering Education

  » Building Construction and Civil Engineering students

  » Construction and Property Services Industry Skills Council

  » Engineers Australia

  » Housing Industry Association

  » Melbourne Polytechnic colleagues

  » National Centre for Vocational Education Research (NCVER)

  » VET Development Centre

  » Victorian Building Authority

  » Victorian Department of Education and Training

  » Victorian Skills Commissioner.

1.2 About the Fellow

Name

Md Aftabuzzaman. PhD

Employment

Educator/Lecturer, School of Engineering, Design and Construction, Melbourne Polytechnic

Qualifications

» DACUM Training Certificate, DACUM International Institute, The Ohio State University, 2015

» Diploma of Building Surveying, Holmesglen Institute, 2014

» Certificate IV in Training and Assessment (TAE40110), Monash Short Course Centre, 2013

» Graduate Diploma in Education, La Trobe University, 2012

» PhD in Civil Engineering, Monash University, 2011

» Master of Engineering, The University of Tokyo, 2001

» Bachelor of Civil Engineering with Honours, Bangladesh University of Engineering and Technology, 1999

Memberships

» Institute of Engineers Australia (IEAust) – Member (Professional Engineer)

» Australasian Association for Engineering Education (AAEE) - Member

» Victorian Institute of Teaching (VIT) – Member

» Concrete Institute of Australia –Member

» Australian Steel Institute – Academic Member

» Wood Solutions Design and Build – Timber Engineering Teaching Professional Member

» Victorian Building Authority – eMember

» Austroads (Association of Australasian Road Transport and Traffic Agencies) – eMember

» Australasian Transport Research Forum (ATRF) – eMember

» Mathematical Association of Victoria – Ex-member

» Design and Technology Teachers' Association Victoria – Ex-member

Biography

After completing engineering qualifications, Aftab worked in the construction industry. The Fellow then completed additional education and training qualifications and has been working in the Victorian education sectors (secondary schools, TAFE and university) for the last ten years.

The Fellow is currently working at the School of Engineering, Design and Construction, Melbourne Polytechnic as an engineering educator/lecturer. He is involved in the training and education of construction and civil engineering students.

The Fellow intends to work with relevant stakeholders to perform industry skills need assessment and develop training packages to build a skilled workforce capable of coping with the emerging needs of the building and construction industry.

2. The Australian Context

Victoria has several competitive advantages that create a diverse, flexible and resilient economy. These include: world-class industries; a skilled workforce; a multicultural population; proximity and links to the fast-growing Asian region; world-recognised liveability and reputation as a tourist destination; good transport networks with well-connected cities and regions; and access to productive agricultural land and energy resources (ABS, 2011 cited in DEDJTR, 2015). Despite these advantages, the Victorian economy has underperformed in recent years, with high unemployment (particularly youth and the disadvantaged), weak productivity growth and flat business investment. The Victorian Government has identified the construction materials and technologies industries as one of several sectors strategically important for the State. This sector has the potential for strong growth and jobs.

The construction industry is a major sector in the Victorian economy contributing $21.6 billion or around 6.7 per cent of the State's gross value added in 2014. Construction is undertaken within a complex system that coordinates the activities of many actors to design, build and complete projects within regulatory and institutional frameworks. Victoria's construction sector can be considered as the market for Victorian construction materials and construction technologies. The construction sector accounts for 238,000 jobs (Dec 2014) or 8.2 per cent of the workforce, placing it as Victoria's fifth largest industry sector.

The construction sector comprises residential building, non-residential building and engineering construction. Residential construction includes new houses, units and apartments and alterations and additions. Non-residential building includes offices, accommodation, education, entertainment, health and age care, industry and wholesale and retail trade. Engineering construction includes roads, railways, bridges, harbours, water, sewerage, electricity, pipelines, telecommunications and mining.

Productivity improvement in the construction section is key concern for the overall economic well-being and prosperity of Victoria/Australia. The Productivity Commission's 2014 Inquiry into Public Infrastructure found some evidence that Australian productivity and efficiency in construction industries lagged behind some comparator countries.

The construction workforce is dominated by the technician and trade group, followed by labourers, managers and clerical and administrative workers. The workforce needs to be trained according to the emerging skills requirement of the industry. Several the key strategic training areas are currently being developed, revised or need development and revision across the construction industry sector because of changing skills demand. There are still opportunities to improve/implement best practice in the education and training of this workforce. The outcomes of this Fellowship offer an opportunity for training to be developed to support a consistent long-term training approach using industry standards that bridge the construction industry education and training to the emerging skills requirements at the point of occupation.

The National Training Framework (NTF) is made up of the nationally agreed quality arrangements for the VET sector, the Australian Skills Quality Authority (ASQA), and training packages endorsed by the National Skills Standards Council (NSSC). The NTF underpins Australia's nationally recognised, competency-based training system. The aim of the framework is to ensure that employers who operate in more than one state or territory can put into place common training arrangements across

the organisation the skills and qualifications gained are nationally recognised and are based on levels of competency agreed by industry that training products and services that meet industry and enterprise needs are made available to learners through registered training organisations (RTOs). The NTF is made up of three major components – (i) nationally endorsed training packages, (ii) the AQF and (iii) the national VET Quality Framework (Figure 1).

Figure 1: Three major components of NTF (Source: CPSISC, 2016)

http://www.cpsisc.com.au/resource-centre/CUG/CVET/CNTF Last viewed: 16 March 2016

Training Packages are developed by Skill Service Organisations on behalf of industry. They are sets of nationally endorsed standards and qualifications for recognising and assessing people's skills. A Training Package describes what sort of skills and knowledge a person needs in the workplace. Training Packages are continuously improved and nationally endorsed to ensure they continue to meet the needs of industry, training participants, and the community. To obtain national endorsement, Training Package developers must consult with, and gain the support of, industry and enterprises with an interest in the Training Package.

Training packages provide broad outline of the competencies to be achiever. However, the curriculum and instructional design component is not well-defined in the existing training packages. It is often left to the trainer to develop and design curriculum delivery materials. The strength of DCAUM process is that the process does not only identify the competencies required but also suggest the required curriculum component to achieve the needed skills identified in the process.

Figure 2 demonstrate the positioning/relation of DACUM Job Analysis process in the context of Australian training package development. DACUM job analysis can be initially conducted to identify the skills required in the relevant industry. Training packages and curriculum delivery materials can be developed to prepare workforce capable to meet the industry requirements. Trained workers work in the industry and new skill requirements arises due to changes in the industry. DACUM process can be repeated to identify emerging industry requirements and develop the required curriculum. In this way, DACUM job analysis can be used as a continuous improvement mechanism for the training packages.
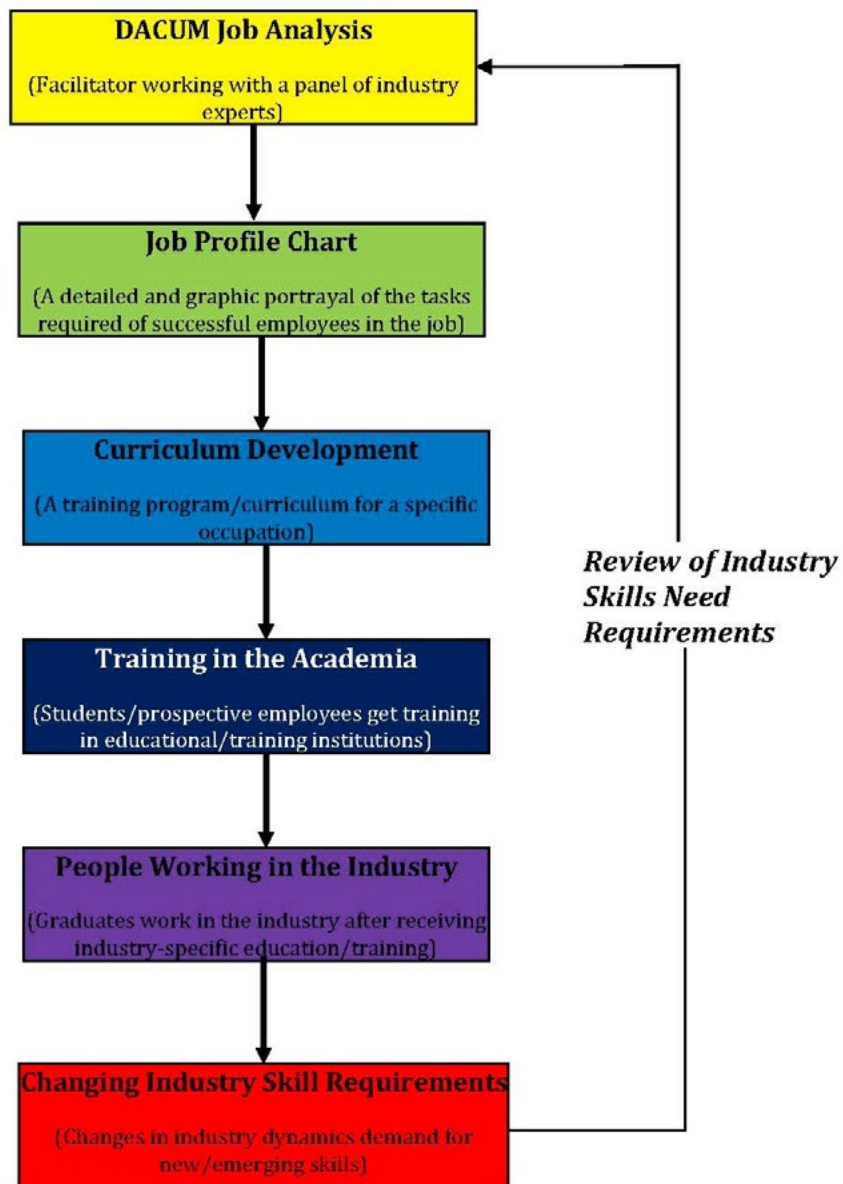
Figure 2: A conceptual map of DACUM process linking between academia and industry to develop curriculum/training program (Source: Author)

Table 1 provides the strengths, weaknesses, opportunities and threats (SWOT) associated with DACUM Job Analysis process in Australian context. Strengths and weaknesses are related to the benefits in obtaining the job analysis skill. The key opportunity is to develop technical packages using DACUM Job Analysis to build a skilled workforce capable of adapting rapid technological changes. Weaknesses highlight the issues related to the difficulty in implementing the job analysis process. Threats identify the problems which might arise due to not implementing continuous skills need assessment process.

Table 1 - SWOT Analysis of DACUM process in Australian Context

Strengths	Weakness
» Provide a solid foundation for educational/training program development/ revision	» Design and plan efficient and effective meetings i.e. facilitate productive meetings
» Maximise workers input and buy-in as the process is time and resource efficient	» Existence of weak school-to-work connections/difficulty to foster industry and education linkages
» Use of the most cost effective and efficient analysis tool	» Lack of funding to conduct job analysis
» Result in the identification of all critical duties and tasks	» Industry reluctance to participate in the Job Analysis Process i.e. availability of a suitable panel of experts working in the relevant industry
» Strengthen education-industry linkages and support	» Willingness to collaborate among industry partners for developing job profile
» Improve productivity by tailoring the training program according to industry needs	» Lack of training support from educational institute, state/federal government and construction industry
» Improve existing knowledge base of existing workplace reality	» Lack of local research and development capacity for DACUM facilitators
» Train workforce according to the emerging skills requirement of the industry	» Availability of suitable panel of experts working in the relevant industry
	» Difficulty in defining generic skill sets for jobs in the construction industry due to the fragmented nature of the industry
Opportunities	**Threats**
» Utilise DACUM results for new/emerging curriculum development	» DACUM results might destabilise the traditional curriculum and training components
» Envision the future by updating or creating a strategic training plan	» There exists limited understanding of DACUM Job Analysis process
» Develop specific, measurable, attainable, realistic and timely (SMART) objectives for training needs assessment	» Resistance might arise to use it a basis for instructional and curriculum development
» Establish goals for sound training management decisions	» Inability to obtain a clear picture of current workplace reality
» Generate short- and long-term action plans for skilled worker development and performance evaluations	» Unavailability of a consistent long-term approach for structuring/re-structuring training program
» Engage small and fast growing businesses	
» Identify future needs and skill gaps	
» Developing technical packages using DACUM Job Analysis to build a skilled workforce capable of adapting rapid technological changes	

3. Identifying the Required Skills Enhancement Areas

The skill requirements in the building and construction industry are continuously changing. Training of the workforce of this industry needs to be tailored according to the emerging skills requirement of the industry. Several key strategic training areas are currently being developed, revised or need development and revision across the construction industry sector to meet the changing skills demand. There are still opportunities to improve training packages and implement best practice in curriculum development and delivery for the education and training of this workforce.

The focus of all ISS Institute Fellowships is on applied research and investigation overseas by Australians. The main objective is to enable enhancement and improvement in skills, knowledge and practice not currently available or implemented in Australia and the subsequent dissemination and sharing of those skills and recommendations throughout the relevant Australian industry, education, government bodies and the community.

Skills Enhancement 1: The Fellow will learn the needs assessment technique available for the identification of skills required for industry. This will enable him to:

» Identify the occupational areas which have enough employment opportunities to attract students

» Investigate the learning gaps which can jeopardise an individual's employment opportunity

» Learn innovative methods that bridge the gaps between what is offered in the classroom and what is going on in the real world of work.

Action: use the evaluation technique to better understand the skills need of the Australian construction industry.

Skills Enhancement 2: The Fellow will attend a comprehensive workshop on DACUM facilitator training to be able to assist workers in analysing their occupations through the production of a job profile chart. This will enable him to:

» Develop initial occupational profile

» Conduct validation workshop to validate/modify the initial occupational profile

» Perform task analysis to develop a job profile chart.

Action: capable of conducting DACUM job analysis as a workshop facilitator to develop job profile charts for both existing and emerging occupational areas.

Skills Enhancement 3: The Fellow will explore SCID (Systematic Curriculum and Instructional Development) for developing high-quality, competency-based training materials. This will enable him to:

» Identify what should be taught (the latest skills and techniques) to students to meet industry needs and what should not be taught (outdated skills and information)

» Learn highly effective, quick and internationally recognised methods for curriculum development based on industry needs analysis

» Establish a relevant, up-to-date and localised research base for curriculum and instructional development to meet the emerging needs of the industry.

Action: formulate a draft list of recommendations for best practice in regards to curriculum and instructional materials development.

Skills Enhancement 4: The Fellow will explore the interrelation between DACUM process and SCID training materials development program. This will enable him to:

» Establish the connection the DACUM job profile analysis and SCID training materials development

» Identify appropriate instructional strategies tailoring the industry skills need

» Provide a localised research base for instructional materials development to ensure that learning outcomes specified in the training packages are achieved.

Action: based on this research, document the curriculum and instructional design component to be included in the training packages to bridge the gap between the expected learning outcomes and the classroom instruction methods.

Training Packages need to be continuously improved to ensure they continue to meet the needs of industry, training participants, and the community. With the support of the relevant stakeholder, the knowledge and insight gained from DACUM job analysis can be applied to develop strategies for conducting industry needs assessment and improving curriculum and training components in Australian building and construction industry to build a workforce capable of meeting the emerging needs of the industry. DACUM job analysis can be used a continuous improvement tool for the Australian training packages.

4. The International Experience

4.1 Experience One – DACUM Workshop

The Fellow attended a comprehensive five-day 'DACUM Occupational Analysis' workshop at Ohio State University. The attendees worked in a controlled environment with the support and coordination of a trainer facilitator. The DACUM process for occupational analysis involves local men and women with reputations for being the "top performers" at their jobs, working on a short-term committee assignment with a qualified DACUM facilitator. Workers are recruited directly from business and industry. These workers become the 'Panel of Experts' who collectively and cooperatively describe the occupation in the language of the occupation.

Its use with many companies, community colleges, and government agencies has shown the process to be very effective, quickly accomplished, and low cost.

The Panel also identifies the general knowledge and skills required of successful workers, the tools, equipment, supplies, and materials used, the important worker behaviors essential for success, and the future trends and concerns likely to cause job changes. The process produces superior results for all levels – skilled, technical, supervisory, managerial, companies, community colleges, and professional organisations.

Image 1: The Fellow with a DACUM panel of experts

DACUM has multiple and subordinate uses such as management decision-making, human resources/organisational development, career planning/advising, learner assessment, certification and licensure. The process can be used for job analysis, occupational analysis, process analysis, functional analysis, and conceptual analysis.

» DACUM is an abbreviation for Developing A Curriculum.

» DACUM is a job occupational analysis performed by expert workers in the occupation.

» DACUM is an occupational skill profile which can be used for instructional program planning, curriculum development, training materials development, organisational restructuring, employee recruitment, training needs assessment, meeting ISO 9000 standards, career counseling, job descriptions, competency test development and other purposes.

The DACUM philosophy states that:

» Expert workers can describe and define their jobs more accurately than anyone else

» An effective way to define a job is to precisely describe the tasks that expert workers perform

» All tasks, to be performed correctly, require certain knowledge, skills, tools, and worker behaviors.

Contacts

» Kevin Gleich – City of Columbus, Ohio (DACUM Panel Member)

» Don Dyar – City of Newark, Ohio (DACUM Panel Member)

» Don Friesthler – City of Piqua, Ohio (DACUM Panel Member)

» Ronald Fauls – City of Fostoria, Ohio (DACUM Panel Member)

» Tina Wagner – DACUM Facilitator & OSU consultant

» Laurie Dotson - Program Administrator, DACUM

» Cara Blevins – Program Administrator, DACUM

» John Moser – DACUM Coordinator

Objective

To become a certified DACUM facilitator to organise and plan a DACUM occupational analysis for identifying industry needs assessment/training needs assessment.

Outcomes

DACUM (Developing A Curriculum) is a quick, efficient and cost effective method to analyse a job to determine what people do in their jobs. It relies on the top performers in a job—working with a trained facilitator—to identify the duties and tasks they perform as well as the related general knowledge and skills, tools and equipment and worker behaviours. The resulting information is displayed in a graphic profile which then can be used as a basis for:

» Curriculum or training program development/revision

» Training needs assessment

» Tech-prep program development

» Job restructuring/management decision-making

» Job-specific performance appraisals

» Developing/updating job descriptions

» Competency test development

» Job certification.

The Fellow had first-hand experience of the DACUM job analysis facilitation process and learned how to:

» Identify key elements of the curriculum and instructional development process

» Identify duties and tasks that comprise a job

» Organise and plan a DACUM job or occupational analysis to fit the needs

» Identify the ways the DACUM process can be used

» Identify and select qualified panellists

» Facilitate the DACUM process

» Conduct an actual two-day DACUM workshop.

Image 2: The Fellow in front of a completed DACUM chart

Key lessons learned

» The gap between what is offered to learners in the classroom and what is need in the real world of work (industry) is termed as 'Curriculum What Errors' in DACUM language. DACUM process can be used to identify 'Curriculum What Errors'.

» In the DACUM process, a qualified facilitator work with a panel of experts who collectively and cooperatively describe the occupation in the language of the occupation by developing a job profile chart. The completed chart represents a graphic profile of the duties and tasks performed by successful workers in the occupation.

» DACUM occupational skill profile can be used for instructional program planning, curriculum development, training materials development, organizational restructuring, employee recruitment, training needs assessment, meeting ISO 9000 standards, career counseling, job descriptions, competency test development and other purposes.

» The quality of the product (the job profile) obtained from the DACUM process and the superior process used (panel of expert workers interacting) are the two most distinctive features of DACUM which make the process different from other process.

» Australian Industry and Skills Committee (AISC), Skills Service Organisations (SSOs) and Industry Reference Committees (IRCs) can use DACUM process to facilitate their consultation across industry and the vocational education and training sector.

» DACUM process can be a part of AISC's new arrangements for training package development to increasing the efficiency and responsiveness of the skills and training system.

» As the DACUM process captures the future trends and concerns likely to cause job/structural changes in the industry, the process can be used to identify jobs/industries experiencing structural or technological change and those which underpin growth and international competitiveness. The process can be used to identify retraining and structured workplace learning requirements due to industry restructuring.

» DACUM process can provide ample opportunity for a broad range of industry stakeholders to provide input into the review of national training packages as the process is based on the input from the real people who are involved in the profession.

4.2   Experience Two — DACUM International Training Center/DACUM International Institute/ DACUM Institute

The Fellow visited DACUM International Training Center of Ohio State University. Since 1976, the DACUM (Developing a Curriculum) International Training Center has been training education, business/industry, and government/military professionals in job analysis and competency-based instruction methodologies. To date, DACUM Institute has trained more than 5,000 DACUM facilitators in 51 countries and six continents. More than 100 of these trainees are repeat customers, who often turn to the institute for additional support with their job analysis and/or competency-based instruction projects.

The Fellow met Mr John Moser who is the program director of DACUM Institute. His past experiences as a human resources manager, employee relations manager, training and development director, and business owner provided him with knowledge and skills in needs analysis, program design and implementation, group processes and facilitation, analytics, leadership, interpersonal relationships, training, and communication. John uses his expertise and talents as CETE's associate program director for DACUM and Systematic Curriculum and Instructional Development (SCID). He holds several professional certifications and association memberships. A certified DACUM (Level 3) and SCID facilitator, he is also a member of the Society of Human Resource Professionals (SHRM) and the Central Ohio Chapter of the American Society for Training & Development (ASTD), both of which focus on workplace learning and performance.

Image 3: Mr. John Moser, DACUM Program Director at his office

Image 4: Participants at the DACUM International Training Center

Contact(s)

» Judy Dietrich – Illinois Central College (DACUM Workshop Participant)

» Shaun Engstrom – Oregon Employment Department (DACUM Workshop Participant)

» Gail Moore-Swaby – Building Industry Consulting Service International (DACUM Workshop Participant)

» Janee Nard – OSU Human Resources (DACUM Workshop Participant)

» Ronda Thomas – Building Industry Consulting Service International (DACUM Workshop Participant)

» George Thorning – University of New Mexico (DACUM Workshop Participant)

» Lesley Zimmerman – Illinois Central College (DACUM Workshop Participant)

» John Moser – Program Director, DACUM International Training Center

Objectives

» To identify how the governments (state and federal) are supporting academics and industry to conduct industry needs assessments

» To determine emerging challenges in the DACUM and SCID processes

Outcomes

The Fellow had the opportunity to discuss the following items with the program director and DACUM workshop participants:

» The main benefits of DACUM Job Analysis

» The key stakeholders involved in conducting DACUM Job Analysis

» The challenges of conducting DACUM Job Analysis

» The key benefits of SCID

» The key stakeholders involved in SCID

» The challenges of developing SCID

» Integration of DACUM Job Analysis with SCID

» The stakeholders in this integrated process and the roles of these stakeholders

» The challenges in this integration process.

Key lessons learned

» DACUM is a quick, cost-effective method for the portrayal of a job profile.

» DACUM can be used internationally.

» Industry advisory committees, panel of experts and DACUM facilitators are the key stakeholders who need to work closely to obtain a successful DACUM outcome.

» Bringing a panel of experts who are top performers in their industry is one of key challenges for successful facilitation of a DACUM workshop.

» A DACUM workshop produces a more tangible product than those produced by other job analysis methods such as marinating employees' job diary and conducting job inventories by mail.

» See the Appendix for a sample DACUM Job Profile.

4.3 Experience Three – Systematic Curriculum and Instructional Development (SCID)

The Fellow attended a 'Systematic Curriculum and Instructional Development' briefing at Ohio State University. The participant worked in a controlled environment with the support and coordination of the facilitator. Systematic Curriculum and Instructional Development (SCID) is a successful model for curriculum development customised to complement the needs of career and technical educators as well as business and industry trainers. SCID has five phases: design, development, implementation, evaluation, and 22 comprehensive components. SCID was devised to use information populated from DACUM to establish a systematic and rational process for developing competency-based instructional materials.

Image 5: The Fellow is facilitating an industry needs assessment workshop

SCID is complementary to the DACUM workshop. DACUM is a quick, effective, relatively low-cost method of analysing jobs and occupations. DACUM has been used worldwide for more than 40 years. SCID is a systematic process model used to develop curriculum and instructional materials required to train tomorrow's workforce.

During a SCID process, a diverse assortment of techniques is used to provide opportunities to enhance a working knowledge, skill set, and behavioural process of the SCID method of instructional design. Participants can efficiently learn the skills necessary to be successful on the job. SCID materials are suitable for secondary and postsecondary career and technical education, business and industry training, as well as local, state, and federal government training programs.

The five phases of SCID include curriculum analysis, curriculum design, instructional development, implementation and evaluation. Several key elements involve under each phase.

Phase I: CURRICULUM ANALYSIS

» Conduct needs analysis

» Conduct task verification

» Select tasks for training

» Conduct standard task analysis

» Develop a competency profile

Phase II: CURRICULUM DESIGN

» Determine the training approach

» Develop learning objectives

» Develop performance measures

» Develop a training program plan

Phase III: INSTRUCTIONAL DEVELOPMENT

» Develop learning guides/modules

» Develop learning/job aids

» Develop supportive media

» Pilot-test revise instructional materials

» Implement training plan

Phase IV: IMPLEMENTATION

» Advantages of learning guides/aids

» Potential implementation barriers

» Strategies for successful implementation

Phase V: EVALUATION

» Purpose, benefits, procedures

» Kirkpatrick's model, ROI evaluation

Contacts

» Cathy Summerfield – Program Administrator

» Cara North – Program Administrator

» Dona Smith – SCID Resource Centre

» John Moser – SCID Coordinator

Objective

To acquire knowledge and skills to develop high quality competency profiles, learning guides, learning aids, job aids and modules/ to learn how to develop high quality, learner-centred instructional materials.

Outcomes

As a participant, the Fellow acquired knowledge, skills, and behaviours through small group hands-on experiences. These will enable him to develop competency-based instructional materials such as competency profiles, learning guides, learning aids, job aids, modules, curriculum guides, and lesson plans. These materials will be useful for post-secondary career and technical education, business-industry training, as well as for government agencies' training programs. In particular, the Fellow obtained information about the following key items of the SCID process:

» Procedures for training needs assessment

» Specific procedures for task verification

» Specific procedures for standard task analysis

» Factors to consider in designing instructional programs

» Guidelines for developing learning objectives

» Guidelines for develop instructional media

» Procedures for developing learning objectives

» Procedures for developing performance measures

» Key components of a training program plan

» Procedures for developing learning guides/aids

» Procedures for identifying existing materials

» Specific procedures for conducting field tests and field critiques

» Procedures for formative and summative program evaluation.

Key lessons learned

» SCID process can be used to minimise 'Curriculum What Errors' identified in the DACUM process.

» Key stakeholders for successful implementation of SCID are subject matter experts, instructional designer and learners.

» A high-quality education and training program can develop a skilled workforce capable of meeting present and future changes. SCID can be used as an effective curriculum development tool in this quality education and training program.

» SCID can be used to develop competency profile and standard for a vocational education and training qualification.

» SCID can be used for curriculum development for training modules and units of competency for both face-to-face learning and flexible delivery.

» SCID can be used for learning pathway specification, job pathway program design, training plan development for work-based learning/training programs for both secondary and post-secondary students.

» SCID can facilitate contextualisation of industry or enterprise specific information in the curriculum development process and accommodate customisation to individual requirements and needs.

» SCID is based on the summary of the sorts of skills and knowledge current and future employees will receive through a Vocational Education and Training (VET) qualification.

4.4 Experience Four — Center on Education and Training for Employment

The Fellow visited Center on Education and Training for Employment of Ohio State University. Center on Education and Training for Employment (CETE) bridges research and practice through work in standards, curriculum, assessment, and evaluation. We have added capacity in teacher preparation, professional development, information management, communication technologies, resource development, and technical assistance.

Capitalising on added experience with systems change, strategic planning, training, and computer-networking methods and technologies, CETE's mission expands to address all levels of education — from early childhood to adult and from special needs to career-technical education. The addition of a community-engagement focus and an established workforce-development commitment completes the stakeholder trifecta.

CETE is committed to translating research into innovative and customized solutions that meet our clients' current and future needs. Merging centers is the first step in maintaining our commitment, enhancing our entrepreneurial spirit, and valuing our excellence within The Ohio State University. CETE continues to lead by example in the pursuit of lifelong learning.

Figure 3: Logo of centre on education and training for employment (source: https://cete.osu.edu/expertise)

CETE has more than 50 years of experience as a leader within the distinguished communities of lifelong education and training, public policy, employer enhancement, community outreach, and the workforce. Our dedicated staff members pride themselves on anticipating changing conditions while sustaining a focus on education, community, and workforce development. CETE's five main areas of expertise are assessment, community collaborative problem solving, educational resources, evaluation, and standards.

The Fellow met Mr Robert Mahlman who is the current director of CETE and has worked for CETE since 1995. Mr Mahlman is responsible for projects involving assessment, program evaluation, educational resource materials, and standards development as well as job analysis and professional development offerings. His work focuses on the areas of occupational knowledge and skills assessment for technical and vocational education and training, occupational certification, and personnel selection and placement testing for business, industry, and government agencies. His other projects centre on the creation of technical skill standards and educational program evaluations.

Mr Mahlman previously served as an evaluation specialist and technical preparation program coordinator at a community college and as director of Assessment and Evaluation Services at CETE. Using his skills in organisational leadership, project planning and project management, program accreditation, research design, data analysis, psychometrics, and statistical analysis, he has directed assessment, evaluation, and standards development projects for various U.S. state departments of education, state and municipal government agencies, private industry, and various credentialing or certification agencies.
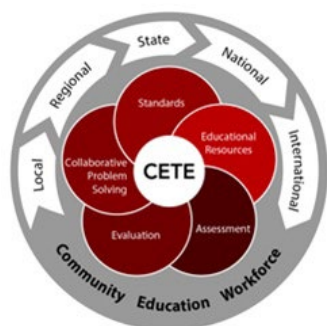
Image 6: Mr. Robert Mahlman, Director of CETE at his office

Contacts

» Robert Mahlman – Director of CETE

Objective

To identify how Centre on Training and Training for Employment engages with industry and government to ensure the training it delivers is relevant and meets current and future needs.

Outcomes

The Fellow had the opportunity to discuss the following items with the centre director:

» The key stakeholders (such as the role of government, existing workforce, educators and trainers, new entrants etc.) in the occupational knowledge and skills assessment process for technical and vocational education and training

» The benefits of conducting the occupational knowledge and skills assessment for technical and vocational education and training

» The training institutes in Ohio engage with industry to ensure the training it delivers is relevant and meeting current and future industry needs

» The challenges (both existing and emerging) in conducting the occupational knowledge and skills assessment for technical and vocational education and training

» The possible solutions for the challenges associated with the occupational knowledge and skills assessment

» The government interact with the industry/the industry interacts with the government to ensure occupational knowledge and skills assessment for training

» The initiatives of the USA government/Ohio state government to support occupational knowledge and skills assessment

» Worldwide network for technical and vocational education and training.

Key lessons learned

» Training providers/training package developers need to work closely with industry to ensure that current training packages are relevant and meet and the needs of the industry.

» Vocational training provides can work with international organisations such as IVETA to keep pace with international benchmark.

» Government support is crucial to ensure industry-education linkage.

» Technical skills level attainment needs to be monitored both regional, state and commonwealth level to understand further training needs requirement.

» A combined effort of subject matter experts, training program develops and industry bodies can contribute to a successful vocation education and training program.

5. Considerations and Recommendations

Industry

» In the DACUM process, a qualified facilitator work with a panel of experts who collectively and cooperatively describe the occupation in the language of the occupation by developing a job profile chart. The completed chart represents a graphic profile of the duties and tasks performed by successful workers in the industry. Australian industries can use DACUM profile to portray the job profile of current and emerging workers/technicians.

» DACUM occupational skill profile can be used for organizational restructuring, employee recruitment, training needs assessment, meeting ISO 9000 standards, career counseling, development of job descriptions and competency test development.

» As the DACUM process captures the future trends and concerns likely to cause job/structural changes in the industry, the process can be used to identify jobs/industries experiencing structural or technological change and those which underpin growth and international competitiveness.

» DACUM process can provide ample opportunity for a broad range of industry stakeholders to provide input into the review of national training packages as the process is based on the input from the real people who are involved in the profession.

» Industry needs to work closely with training providers/training package developers to ensure that current training packages are relevant and meet and the needs of the industry.

» Australian Industry and Skills Committee (AISC), Skills Service Organisations (SSOs) and Industry Reference Committees (IRCs) can use DACUM process to facilitate their consultation across industry and the vocational education and training sector.

» DACUM process can be a part of AISC's new arrangements for training package development to increasing the efficiency and responsiveness of the skills and training system.

Education

» The gap between what is offered to learners in the classroom and what is need in the real world of work (industry) is termed as 'Curriculum What Errors' in DACUM language. Vocational education providers can use DACUM process to identify 'Curriculum What Errors'.

» Vocational education providers can use DACUM occupational skill profile for instructional program planning, curriculum development and development of training materials.

» DACUM is a quick, cost-effective method for the portrayal of a job profile. As DACUM analysis can be used internationally, training providers can use this analysis to benchmark their programs with other national/international providers.

» A DACUM workshop produces a more tangible product than those produced by other job analysis methods such as marinating employees' job diary and conducting job inventories by mail. The quality of the product (the job profile) obtained from the DACUM process and the superior process used (panel of expert workers interacting) are the two most distinctive features of DACUM which make the process different from other process. Training providers can

use the DACUM process to get insight about the current industry requirements.

» SCID can be used to develop competency profile and standard for a vocational education and training qualification.

» Vocational education providers can SCID process to develop curriculum which minimise 'Curriculum What Errors' identified in the DACUM process.

» SCID can be used for learning pathway specification, job pathway program design, training plan development for work-based learning/training programs for both secondary and post-secondary students.

» SCID can facilitate contextualisation of industry or enterprise specific information in the curriculum development process and accommodate customisation to individual requirements and needs.

» A high-quality education and training program can develop a skilled workforce capable of meeting present and future changes. SCID can be used as an effective curriculum development tool in this quality education and training program.

Government

» State and national governments can take initiatives by:

  » Supporting industry-education linkage to meet the educational challenges of developing global workforce

  » Facilitating a coordinated effort of subject matter experts, training program develops and industry bodies for a successful vocation education and training program

  » Monitoring technical skills level attainment needs at regional, state and commonwealth levels to understand further training needs requirements

  » Linking vocational training providers with international organisations such as IVETA to keep pace with international benchmark.

The Victorian State Government can become pioneer by undertaking strategic initiatives for aligning training programs with industry needs through the Department of Education and Training and Victorian Skills Commissioner.

6. Knowledge Transfer, Application and Dissemination

The Fellow will undertake several activities to disseminate the outcomes and recommendations of this Fellowship report:

» Present the outcomes to the relevant stakeholders who include vocation education and training providers, professional organisations and federal/state government departments

» Work with industry reference committees

» Send the report to the relevant organisations and work with them, if necessary, to support their process of tailoring a program to meet their specific needs.

Presentations/Workshops/Seminars

» Melbourne Polytechnic Staff, School of Engineering, Design and Construction, April 2016

» The 25th National Vocational Education and Training Research Conference, CQUniversity, Rockhampton, Queensland, 4 - 6 July 2016

» The 27th Annual Conference of the Australasian Association for Engineering Education (AAEE 2016), Southern Cross University, Coffs Harbour 4-7 December 2016

» Victorian Skills Commissioner (forthcoming)

» Victorian Department of Education and Training (forthcoming)

» VET Development Centre (forthcoming)

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8. Acknowledgements

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Awarding Body — International Specialised Skills Institute (ISS Institute)

The ISS Institute exists to foster an aspirational, skilled and smart Australia by cultivating the mastery and knowledge of talented Australians through international research Fellowships.

The International Specialised Skills Institute (ISS Institute) is proud of its heritage. The organisation was founded over 25 years ago by Sir James Gobbo AC CVO QC, former Governor of Victoria, to encourage investment in the development of Australia's specialised skills. Its international Fellowship program supports many Australians and international leaders across a broad cross-section of industries to undertake applied research that will benefit economic development through vocational training, industry innovation and advancement. To date, over 350 Australian and international Fellows have undertaken Fellowships facilitated through ISS Institute. The program encourages mutual and shared learning, leadership and communities of practice.

At the heart of the ISS Institute are our individual Fellows. Under the International Applied Research Fellowship Program the Fellows travel overseas and upon their return, they are required to pass on what they have learnt by:

» Preparing a detailed report for distribution to government departments, industry and educational institutions

» Recommending improvements to accredited educational courses

» Delivering training activities including workshops, conferences and forums.

The organisation plays a pivotal role in creating value and opportunity, encouraging new thinking and early adoption of ideas and practice. By working with others, ISS Institute invests in individuals who wish to create an aspirational, skilled and smart Australia through innovation, mastery and knowledge cultivation.

For further information on ISS Institute Fellows, refer to www.issinstitute.org.au

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Fellowship Sponsor – The Department of Education and Training (Victoria) Higher Education and Skills Group

The Victorian Government, through the Higher Education and Skills Group (HESG) of the Department of Education and Training, is responsible for the administration and the coordination of programs for the provision of training and further education, adult education and the employment services in Victoria and is a valued sponsor of the ISS Institute. The Fellow would like to thank them for providing funding support for this Fellowship.

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» Dr. Charlotte Brack – Ex-Associate Professor, Learning and Teaching HE

» Rodger Carroll – Manager, Professional Practice

» Dr. Sashi Sivathasan - Head of School, School of Engineering, Design and Construction

» Frances Coppolillo – Deputy CEO and Head of Programs

» Robert Wood – CEO.

Organisations Impacted by the Fellowship

Government

» Federal, State and Territory Government

» Building and Plumbing Commissions (each state and territory)

» Department of Industry, Innovation, Science, Research and Tertiary Education

» Australian Building and Construction Commissions

» Victorian Department of Education and Training

» Victorian Skills Commissioner

» NSW Department of Education and Communities

Industry

» Construction and Property Services Industry Skills Council

» Victorian Building Authority

» Australian Building and Construction Commission

Professional Associations

» Engineers Australia

» Association of Consulting Structural Engineers

» Australasian Association for Engineering Education

Education and Training

» Former Industry Skills Councils (e.g. CPSISC, IBSA, MSA, SkillsDMC, SSA)

» Vocational Education and Training (VET)

» Registered Training Organisations (RTOs, private training providers and TAFEs)

» State and territory training authorities (e.g. Higher Education and Skills Group, Department of Education and Communities, NSW)

» Universities

» VET Development Centre

» National Centre of Vocational Education Research (NCVER)

International Specialised Skills Institute