Pathways in Trades & Technology Education

Jim Galloway, Professor

Welding Trades & Technology Programs

ONCAT Student Pathways Conference – April 2014

CONESTOGA Connect Life and Learning

Jim Galloway

Weld TECHNOLOGY Conestoga College

Pathways in Trades & Technology Education

Introduction:

- Our goal has been to establish better pathways from apprenticeship/trades certificates to engineering technology
- Conestoga College has some experience with this over the past 10 years
- A pilot project enhanced these pathway opportunities in the Welding Technology programs launched in 2013

Pathways in Trades & Technology Education

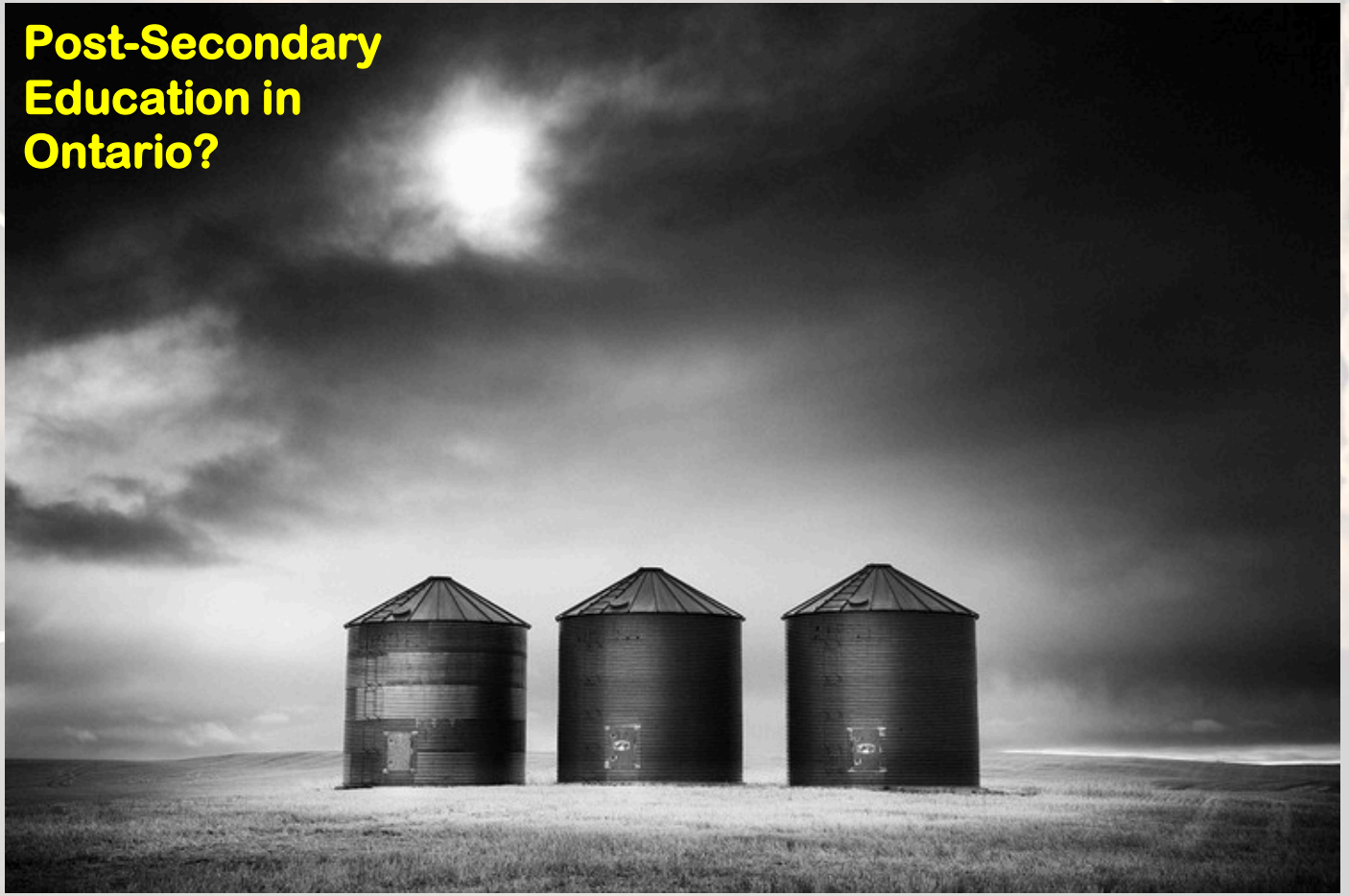
My Background & Personal Interest:

- 2-yr Engineering Technician College Diploma Graduate (1982)
- Upgrading to Certified Eng. Technologist (part-time - 1998)
- 18 years of industrial experience in technology leading to engineering/manufacturing management
- Upgrading to a B.A.Sc. through continuing education (2004)
- Trade qualification (Welder CofQ – 2006)
- Participated College to College Apprenticeship-Diploma System Transfer Pathways project (2012)

Pathways in Trades & Technology Education

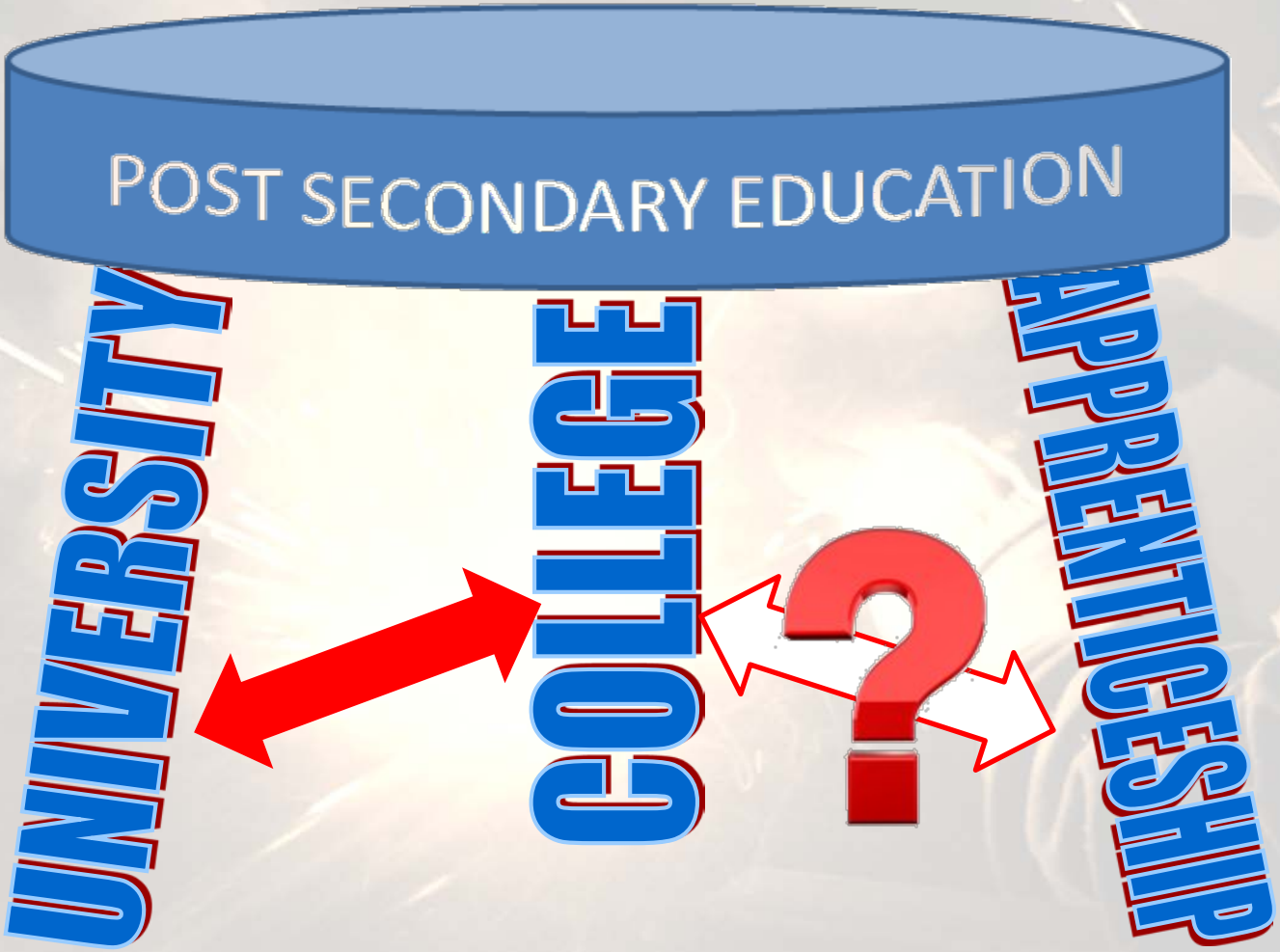
Ontario's Post-Secondary Education System? =

Pathways in Trades & Technology Education



Three Silos under a foggy sky
Olivier Du Tre

Pathways in Trades & Technology Education



Pathways in Trades & Technology Education

APPRENTICESHIP

CONESTOGA
Connect Life and Learning

Jim Galloway

Weld TECHNOLOGY
Conestoga College

Pathways in Trades & Technology Education

Apprenticeship:

- Apprenticeship is trade focused knowledge and skills through on-the-job training and formal instruction
- ~80% of the learning occurs on-the-job
- The remainder is formal instruction at a college or other training establishment

Pathways in Trades & Technology Education

Apprenticeship:

- **Welder** is a 3-yr program with 720hrs of formal in-school instruction
- **Metal Fabricator (Fitter)** is a 3-yr program with 720hrs of formal in-school instruction
- These two trades share a common Level One curriculum

Pathways in Trades & Technology Education

College

CONESTOGA
Connect Life and Learning

Jim Galloway

Weld TECHNOLOGY
Conestoga College

Pathways in Trades & Technology Education

College Welding Certificate Programs:

- Programs less than 1 year
  - *e.g., Welding Techniques* – 30wks
- Basic pre-apprenticeship or pre-employment training
- Generally based upon the *Welding Apprenticeship* curriculum (e.g., Level 1)

Pathways in Trades & Technology Education

College Technician Programs:

- 2-yr programs (60wks), e.g.,
  - *Welding Technician*
  - *Welding & Fabrication Technician*

- These programs tend to be based mostly upon the Level 1 & 2 of the *Metal Fabricator (Fitter)* apprenticeship trade

Pathways in Trades & Technology Education

College to Apprenticeship:

- Techniques & Technician program graduates may be able to challenge "exemption tests" from the MTCU from the in-school portion of their apprenticeship program

- With proven work experience and skills competencies they can challenge the trade 'Certificate of Qualification' (CofQ) exam

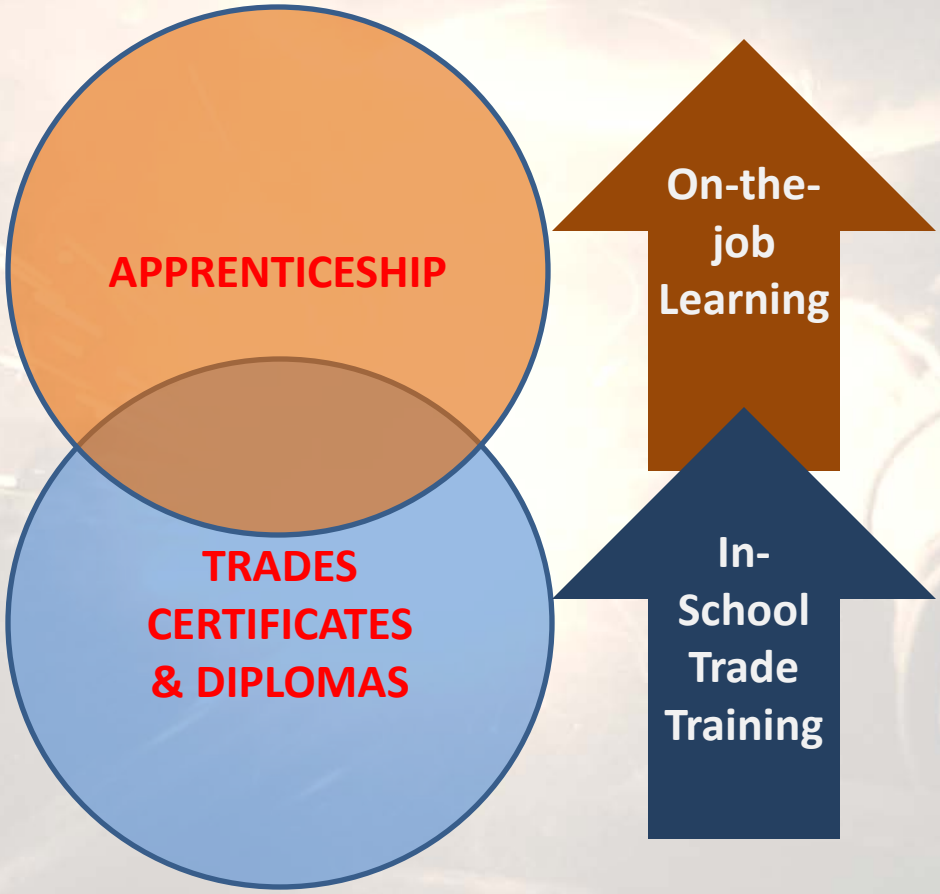
Pathways in Trades & Technology Education

Technicians vs. Engineering Technician:

- 'Engineering Technician' programs seem to be in decline
  - *These programs are often common with the first two years of a 3-yr 'Engineering Technology' program*
- 'Technician' programs seem to be on the rise
  - *Many of these programs are 'trades-based'*

Pathways in Trades & Technology Education

Learning Outcome Overlaps:



Pathways in Trades & Technology Education

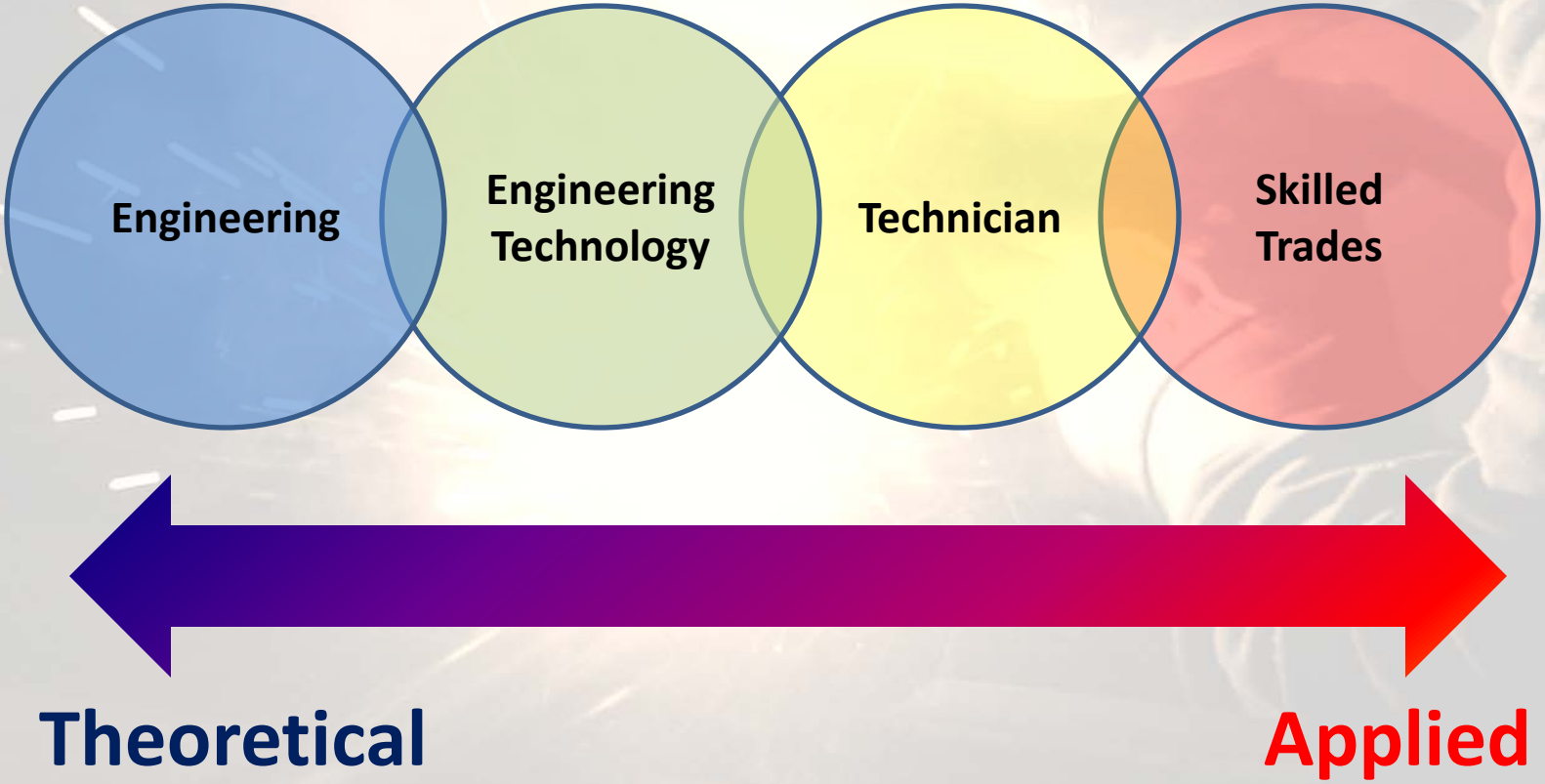
College Welding Technology Programs:

- 3-yr programs (90wks), e.g.,
  - *Welding Engineering Technologist*
  - *Manufacturing Eng. Technologist – Welding & Robotics*

- These are 'engineering' technology programs
  - *Co-op options are available*

Pathways in Trades & Technology Education

Engineering Technology:



Pathways in Trades & Technology Education

Welding Engineering Technologists

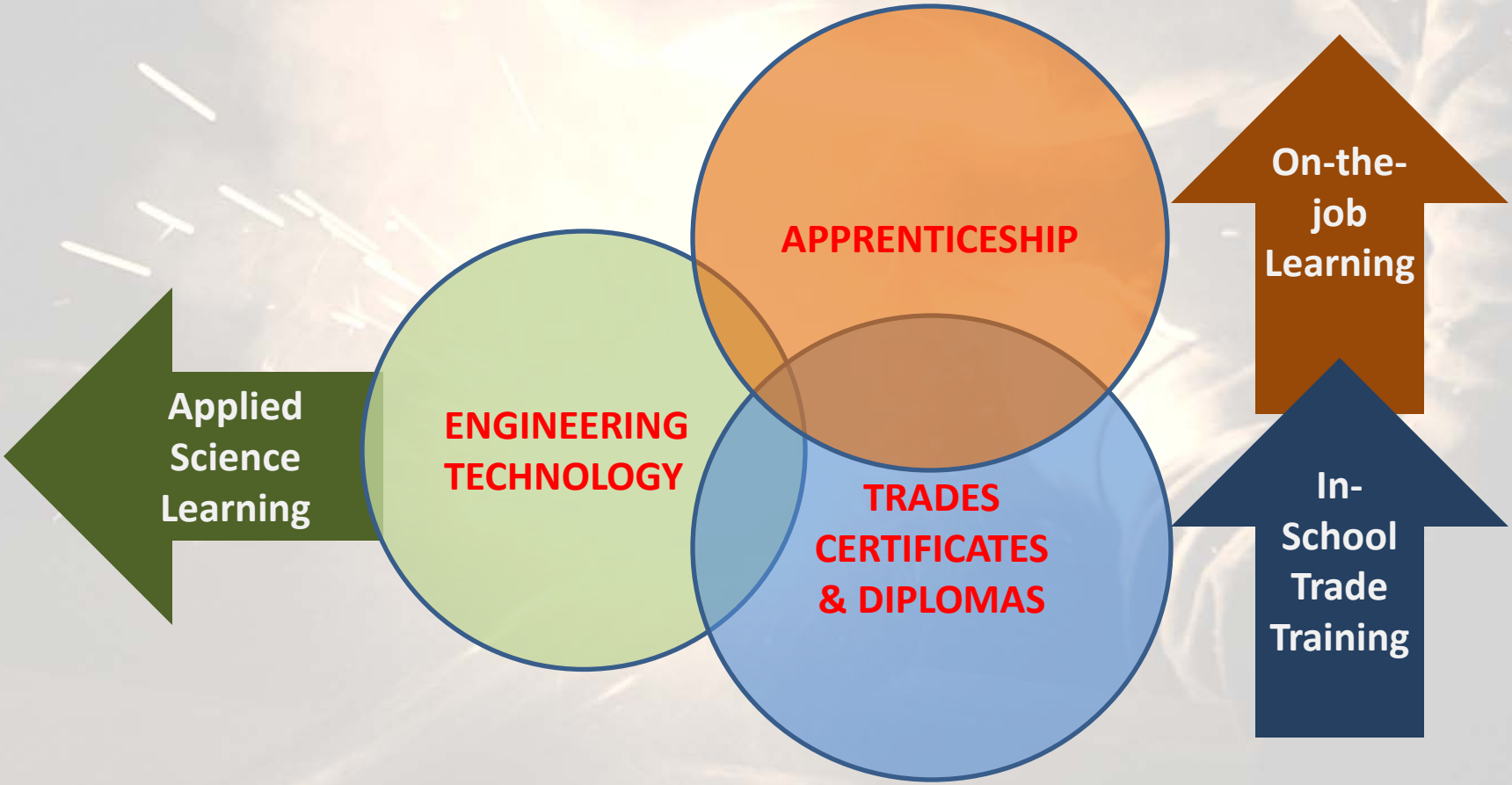
CONESTOGA
Connect Life and Learning

Jim Galloway

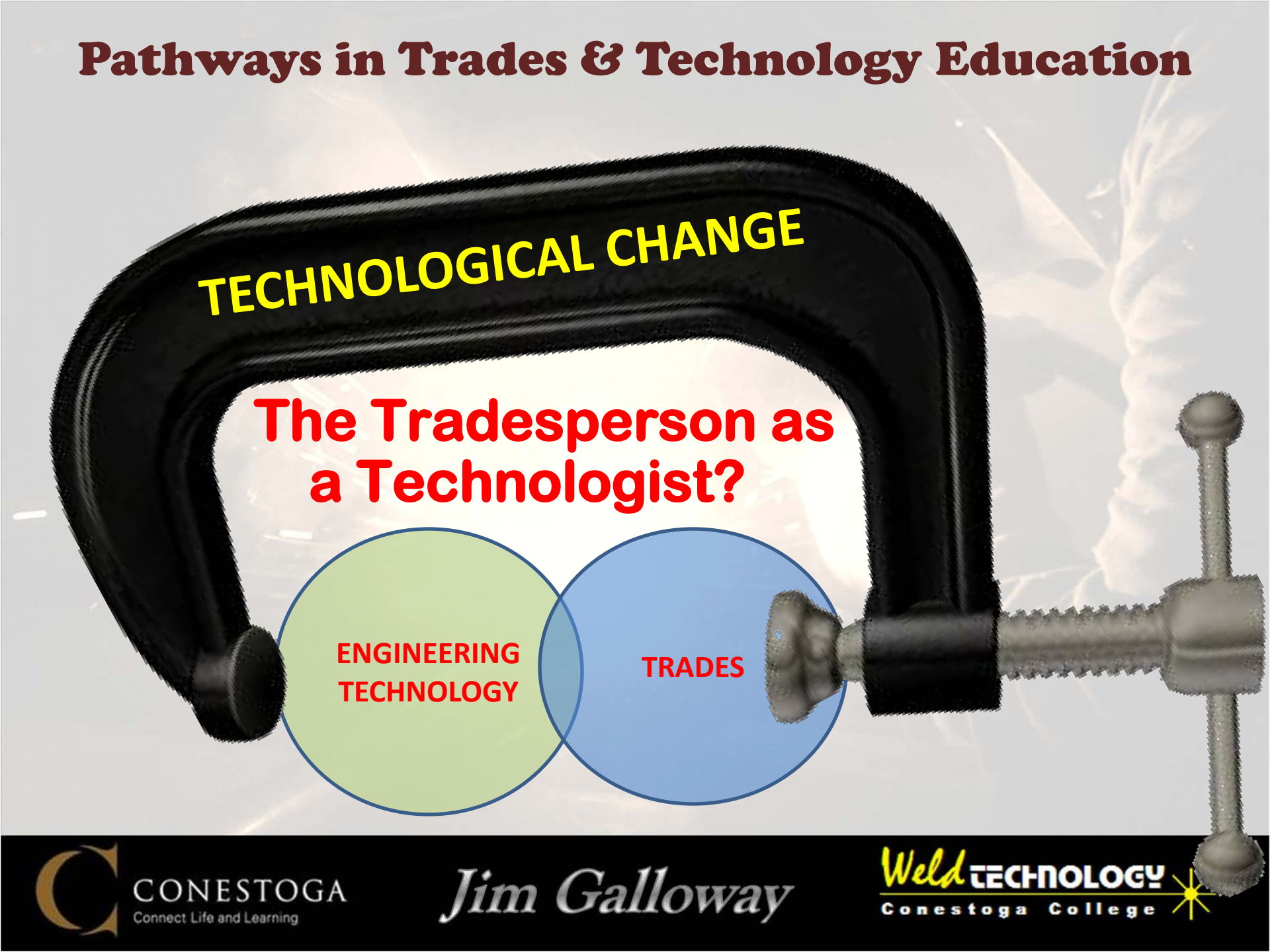
Weld TECHNOLOGY
Conestoga College

Pathways in Trades & Technology Education

Learning Outcome Overlaps:



Pathways in Trades & Technology Education



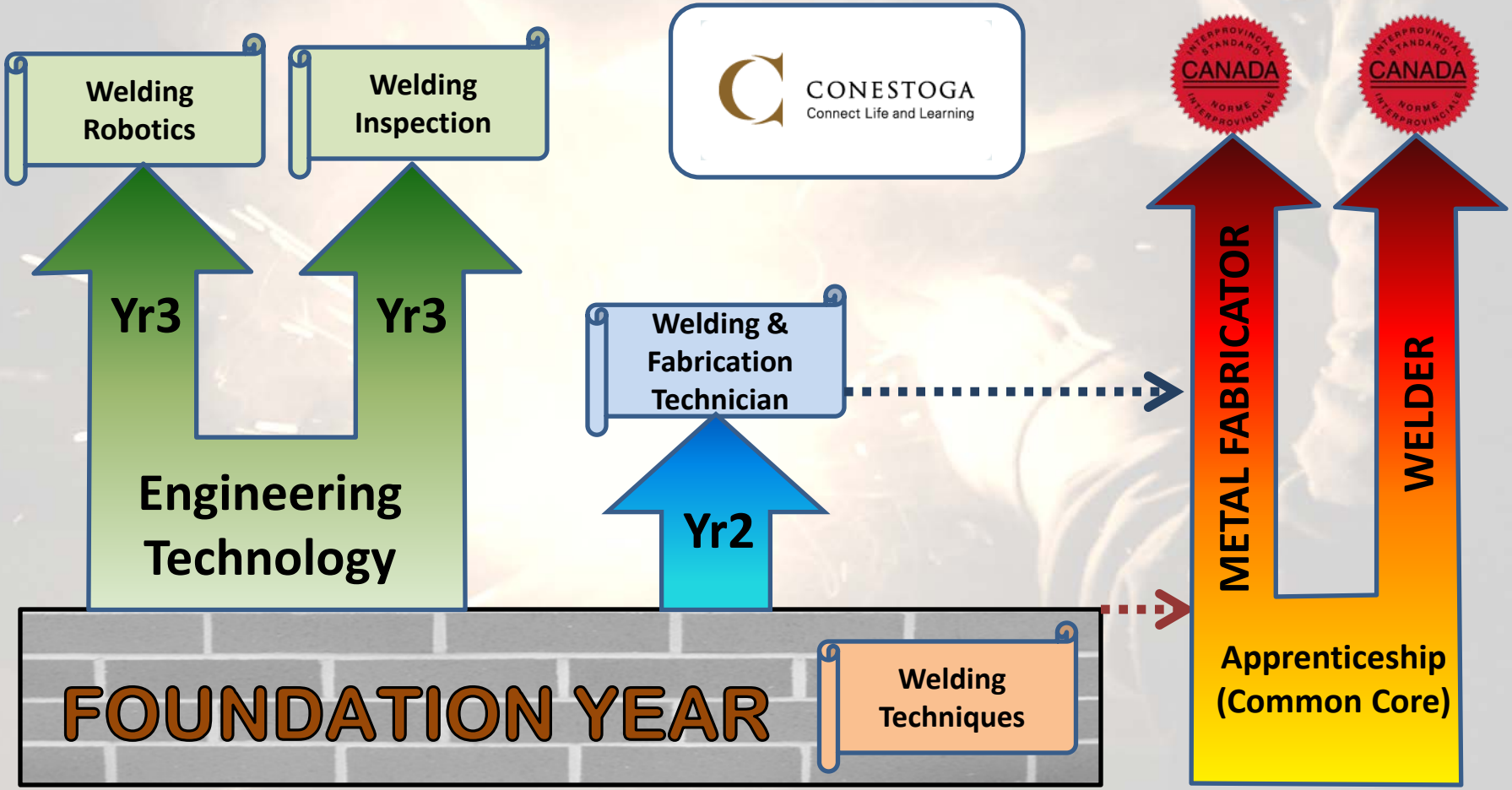
CONESTOGA
Connect Life and Learning

Jim Galloway

Weld TECHNOLOGY
Conestoga College

Pathways in Trades & Technology Education

Conestoga College Welding Pathways



CONESTOGA Connect Life and Learning

Jim Galloway

Weld TECHNOLOGY Conestoga College

Pathways in Trades & Technology Education

Program Changes:

Year	Traditional Engineering Technology Delivery		Revised Engineering Technology Delivery
1	~70% theory ~30% applied Heavy focus on a math & applied science foundation		~70% applied ~30% theory Basic math & applied science Trade fundamentals
2	Technology specialization Labs & projects		Technical math & applied science Technology specialization Labs
3	Technology specialization & capstone project		Technology specialization & capstone project

Pathways in Trades & Technology Education

Specific Program Changes:

- The most abstract technical mathematics concepts were moved to from Yr1 to Yr2
- Materials science and metallurgy was moved from Yr1 to Yr2
- Electrical technology was move from Yr1 to Yr2
- Much of the hands-on lab content and all skills training was moved from Yr2 to Yr1
- Common courses for all program streams for Yr1 theory and lab/shop were created based upon the apprenticeship in-school content

Pathways in Trades & Technology Education

Why Consider This?

- The foundation year appeals to students seeking primarily an applied education
- These students are exposed to and provided a pathway to Eng. Technology
- Students enrolled in Eng. Technology have a fall-back exit pathway to ‘Techniques’
- Experienced and qualified tradespersons have an established pathway to Eng. Technology

Pathways in Trades & Technology Education

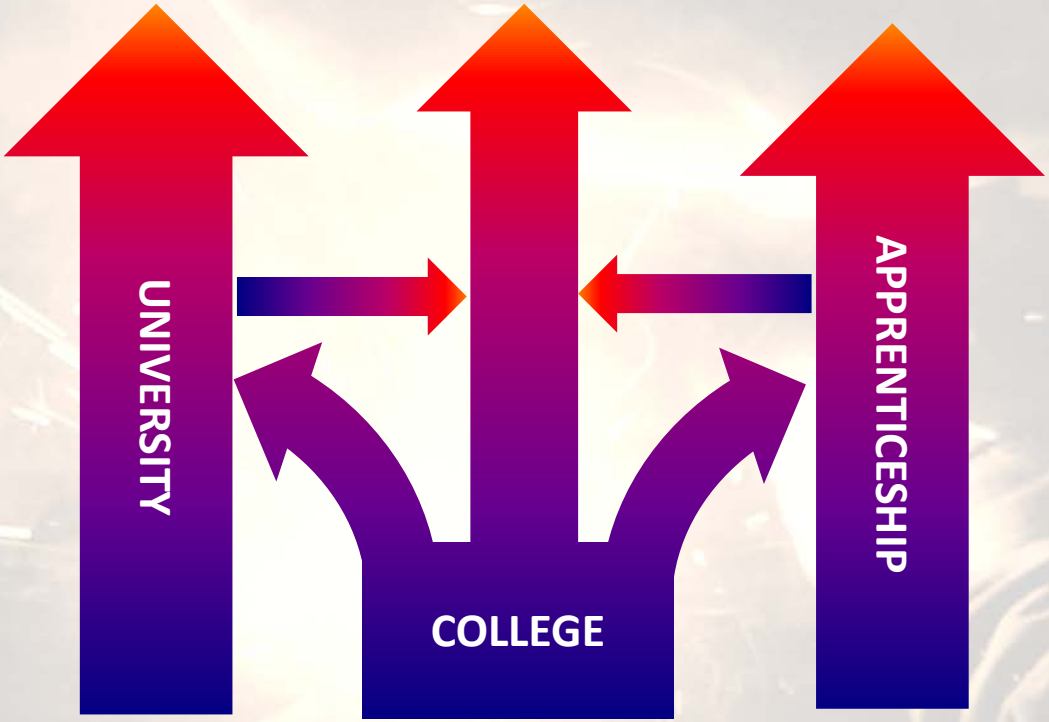
Mature Students Pathways

- Trades practitioners moving into management or business ownership
- Second Careers (e.g., technological displacement)
- Trades practitioners who become physically unable to continue ‘on the tools’ (e.g., due to injuries)

Other Trades/Technology Areas

- This sort of curriculum realignment should work in other program areas, such as…
  - *Mechanical Maintenance/Machining to Mechanical Engineering Technology*
  - *Electrical Techniques/Electrician to Electrical Engineering Technology*
  - *Construction Techniques to Civil or Construction Engineering Technology*

Pathways in Trades & Technology Education



The Future of Trades & Technology Education in Ontario?

Pathways in Trades & Technology Education

Trades to Degrees (Alberta):

- NAIT in Edmonton has recently launched a "Trades to Degrees" program
- This pathway designed to admit journeypersons directly into the third year of their Bachelor of Business Administration (BBA) program.
- This is a response to workforce demand for tradespeople with managerial, leadership and entrepreneurial skills

Pathways in Trades & Technology Education

Profiles of Success: 'Gerry'

- Welding – Fitter Certificate (Conestoga)
- Welder Trade Qualification (B.C.) and several years work experience in Western Canada as a Welder Journey-Person
- Returned to Conestoga and received 1yr of advanced standing in Welding Engineering Technology (now graduated)
- Currently employed as a Welding Inspector in the nuclear power industry

Pathways in Trades & Technology Education

Profiles of Success: 'Linda'

- Graduate from an Ontario university (B.A. English)
- Welding Techniques Certificate (Conestoga)
- Several years work experience as a production Welder
- Returned to Conestoga and received 1yr of advanced standing in Welding Engineering Technology (now graduated)
- Currently employed as an Engineering Technologist in the pressure vessel industry (welding R&D and training)

Pathways in Trades & Technology Education

Profiles of Success: 'Cheryl'

- Welding-Fitter Certificate (Conestoga)
- Returned to Conestoga and received 1yr of advanced standing in Welding Engineering Technology (now graduated)
- Currently employed as an Engineering Technologist in the aerospace industry (programming robotic Laser Welding Systems)

Pathways in Trades & Technology Education

Profiles of Success: 'Evan'

- Welding Techniques Certificate (Conestoga)
- Returned to Conestoga and received 1yr of advanced standing in Welding Engineering Technology (now graduated)
- Currently enrolled at Lakehead University with advanced standing into Mechanical Engineering

Lakehead UNIVERSITY

Pathways in Trades & Technology Education

Summary

- There is a need in the system to provide better pathways from skilled trades to engineering technology
- Conestoga has piloted program changes to enhance these pathway opportunities
  - *Many of our top Engineering Technology graduates have come from a skilled trades background!*
- Future directions need to consider pathways from skilled trades or engineering technology to applied degrees

Questions?

Jim Galloway, *B.A.Sc, C.E.T., I.W.T.*

Professor

Welding Program Coordinator

Conestoga College – Cambridge Campus

850 Fountain Str. South, Cambridge, ON

(519) 748-5220 ext. 4515

jgalloway@conestogac.on.ca