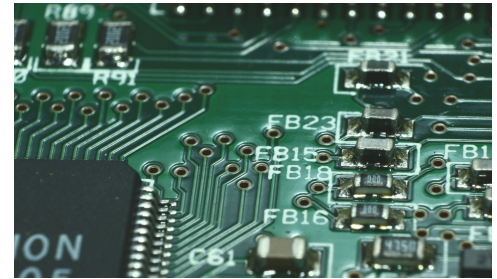


STEM Beyond Retirement: Lifelong Learning For A Resilient Future

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Definition

*“Lifelong learning is based on the principle that **learning is a continuous process** that occurs from the cradle to the grave (...)*

*Lifelong learning (...) stimulates and **empowers individuals** to acquire and apply skills and abilities required to **realize their full potential.**”*

University of South Africa,
Lifelong Learning ABT2611, Tutorial Letter 501/35/2015

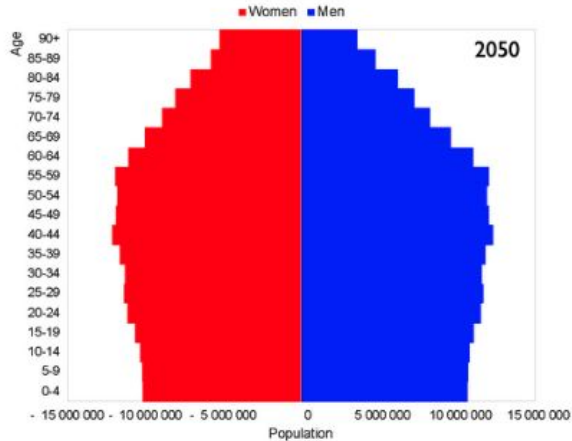
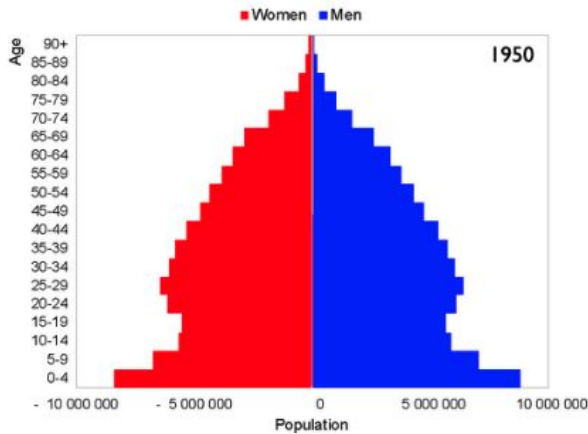
Demographic Change

Older population increases and younger population decreases → Increasing median age

Reasons: Shrinking mortality, increasing life expectancy, decreasing fertility level

Potential Implications:

- Shortage in labor supply
- Decline in economic growth
- Fewer people to pay for, e.g., retirement costs
- Increased healthcare costs
- Lack of adequate welfare systems



Projected population structure in the U.S. by gender, 1950 & 2050
(Source: United Nations 2017)



Economic Benefits Of Older Workers

Longevity and growing financial insecurities push individuals to need/want work longer

Trends:

- Later retirement
- Increased labor force participation and volunteerism of older adults
- Increasing educational levels of older adults

Older workers can help counterbalance labor shortage



Economic Benefits Of Older Workers

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Older workers can help counterbalance labor shortage

Makes lifelong learning & continuous training a necessity!



NOT
too old

Cognitive Abilities Of Older Adults

Cognitive abilities & learning potentials change with increasing age
→ subject to inter-individual differences

Short-term memory: Subject to age-related decline, decreasing capacity, reduced processing speed

Long-term memory: Stays relatively stable in old age

Influenced by: Health, educational background, social class, nutrition, motivation, condition of sensory systems

Positive impact: Exercise, food rich in nutrients, emotional well-being, restorative sleep, cognitive training

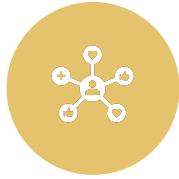
Although learning speed declines, learning gains still possible!

(Sources: Jonker et al. 2000; Helmchen & Reischies 1998; Cullum et al. 2000; Smith & Baltes 1996; Houx 1991)

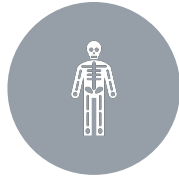
Health/Well-Being Benefits Of Lifelong Learning



Keeps the brain active



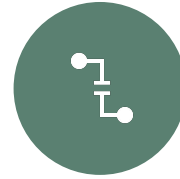
Helps adapt to change & stay up to date



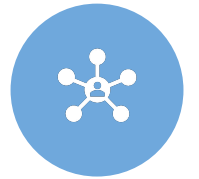
Has positive impact on health, well-being, independence



Has positive impact on self-esteem, social attitudes



Can prevent isolation through social integration



Social group membership can positively influence health

Lifelong Learning Providers (Examples)

Universities/Colleges, e.g.,
◦ OLLIs/Lifelong Learning Institutes
◦ Guest-auditing Programs

OASIS

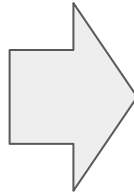
Museums & Theatres

Faith-based institutions

Adult schools

Health providers

Senior & community centers



Challenges

Typical participants: Primarily women (varies by subject), age 65-80, advanced educational backgrounds, healthy and mobile, tech savvy

Lack diversity

Typical subjects: Mostly personal enrichment in arts and humanities

STEM only rarely offered

Lifelong learning in old age under-researched area

Benefits Of Increasing STEM Education For Older Adults

Studies show older adults score lower on science knowledge tests than younger generations

Benefits for older learner:

- Train cognitive functions, e.g., reduce risk of dementia
- Can help keep up-to-date with technological & scientific advancements
- Make up for something that the individual could not learn when they were younger

Benefits for society:

- Increase overall educational level of U.S. population
→ Leading to, e.g., more informed voters (older adults are more likely to vote)
- Less misinformation spread
- Improve public health level
- Lower demand on retirement systems
- Reduce labor shortage

Learning in (Older) Adulthood

Learners often have some form of professional background
→ New knowledge is typically created based on previous experiences

Learning occurs through the interaction with others

Previous learning styles influence current learning

Compared to traditional college students:

- High school or initial college experiences can be a long time ago
- Their prior school/college experience in terms of learning style and instructional modes can be different to young students
- Typically more outspoken: incorporate past career/life experiences; ask related questions



Suggestions

Increase STEM lifelong learning research efforts to understand effective implementation

Expand existing educational programs for older adults with more STEM topics

Enhance STEM literacy levels by ensuring widespread access to learning opportunities for older adults, incl. those with limited prior education (e.g., by making it part of typical outreach efforts)

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