

The background features a dark blue gradient with various technical and scientific graphics. These include several circular gauges or dials with numerical scales (e.g., 40, 150, 170, 180, 200, 210, 220, 230, 240, 250, 260) and arrows. There are also faint circular patterns and lines, suggesting a complex data visualization or a technical diagram. The overall aesthetic is clean and professional, typical of a research or academic presentation.

COLLABORATION AND COGNITIVE SKILLS IN THE WORKPLACE: RESULTS FROM THE PIAAC SURVEY

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TEAMWORK AND LEARNING ... WORKS?

- What we know about collaboration at work and it's connections to learning and development is mixed
 - Teamwork leads to higher levels of learning, but this may be due to confirmation bias
 - Team dynamics may inhibit learning
- Collaborative learning leads to increased critical thinking – but is related to education

LEARNING INTENSITY OF JOBS

Characteristics and features of jobs that foster a high degree of learning (Skule, 2014; Billett, 2004):

- Task characteristics of jobs (Kim, et al, 2015, Marsick & Watkins, 2014; Rausch, 2013);
- Knowledge characteristics of jobs (Yang, Marsick and Watkins, 1998; Rausch, 2013);
- **Social characteristics of jobs** (Marsick & Watkins, 2014; Rausch, 2013; Skeul, 2014; Yang, Marsick, & Watkins, 1998);
- Contextual characteristics of jobs (Kim et al, 2015, Marsick & Watkins, 2014; Skule, 2014;).

Social Characteristics of Jobs

Team learning, spirit of collaboration and collaborative skills (Yang, et al, 1998)
Assistance in performing tasks (feedback, etc.) (Rausch, 2013)

D_Q13a: how often do you learn from peers and supervisor
F_Q02b: Teaching others

High degree of exposure to the demands of others (Skeul, 2014)
Inquiry and dialogue (Yang, et al, 1998)
Openness and accessibility of people (Marsick & Watkins, 2014)

F_Q01b: percent of time working cooperatively with others
F_Q02a: Sharing information

Work across boundaries (Marsick & Watkins, 2014)
Extensive professional contacts (Skeul, 2014)

F_Q02c,d: how often make speeches/presentations, sell products/service
F_Q04b: negotiate with people in and out of firm
G_Q05h: participate in discussions on the internet

Informal/tacit communications (Marsick & Watkins, 2014)
Tacit communication with supervisor (Kim, et al, 2015)
Tacit communication with co-workers (Kim, et al, 2015)

G_Q05h: participate in discussions on internet

A CLEARER PICTURE THROUGH PIAAC?

- Our Central Questions:
 - What is the relationship between collaboration/cooperation at work and information-sharing and Literacy, Numeracy, and PS-TRE?
 - What is the relationship between skills use at work and Literacy, Numeracy, and PS-TRE?
- Focused on eight U.S. sectors adding new jobs in the next 10 years

THE SECTORS – LARGEST EMPLOYMENT GROWTH

- Accommodation & Food Service
- Administrative & Support service
- Construction
- Education
- Financial & Insurance
- Human Health & Social Work
- Public Administration & Defense
- Wholesale & Retail Trade

OUR MODELS

$$PIAAC/Skills = \mu + \beta_1 ED + \beta_2 COLL + \beta_3 INFO + \beta_4 GENDER$$

- PIAAC = Three PIAAC Scores – Literacy, Numeracy, PS-TRE
- Skills = Skills at work: Read, Numeracy, Write, ICT
- ED = Education level
- COLL = Frequency of collaboration at work
- INFO = extent that one shared work-related information
- GENDER = Binary (Male, Female)

Significant Linear Regression Coefficients between PIAAC Skills and Cooperation/Collaboration and Information Sharing

Industry	Acronym used	Literacy			Numeracy		PS-TRE			
		Time Cooperating/ Collaborating		Sharing Work- related information	Time Cooperating/ Collaborating ^a	Sharing Work- related information	Time Cooperating/ Collaborating		Sharing Work- related information	
		More than			More than					
		1/2 the time	All the time	Once a week or more	Once a week or more	All the time	1/2 the time	All the time	Once a week or more	
All Industries ¹			-16.12*	13.19*	-19.15*	12.16*		-13.53*	9.65*	
Accommodation and food service	AFS	23.42*					23.68*			
Administrative and support service	AdSupp		-25.91*							
Construction	Construction			22.41*			20.73*			
All Industries ²			-18.53*	17.62*	-21.44*	16.42*		-13.88*	10.28*	
Education	Education		-15.10*					-16.50*		
Financial and insurance	FI									
Human health and social work	HHS		-13.44*	27.20*			26.38*			
Public administration and defense; compulsory social security	PubAdmin							-14.57*	10.19*	
All Industries ³			-17.94*	13.96*	-21.23*	13.03*		-15.20*	10.18*	
Wholesale and retail trade; repair of motor vehicles and motorcycles	WRT		-22.84*	23.34*					-22.68*	16.47*

Summary of Significant Linear Regression Coefficients between Skills Use at Work and Cooperation/Collaboration and Information

Statistically significant but there doesn't appear to be a practical difference.

Industry	Acronym used	Reading Skill Use		Writing Skill Use		Numeracy Skill Use		ICT Skill Use		
		All the time	Once a week or more	Once a week or more	More than 1/2 of the time	All the time	Once a week or more	More than 1/2 of the time	All the time	Once a week or more
All Industries ¹			0.39*	0.44*			0.25*		-0.21*	0.38*
Accommodation and food service	AFS		0.37*							
Administrative and support service	AdSupp		0.38*							
Construction	Construction							0.81*	0.57*	
All Industries ²			0.45*	0.46*			0.26*		-0.21*	0.39*
Education	Education						-0.10*			
Financial and insurance	FI									
Human health and social work	HHS	0.26*	0.50*	0.64*			0.52*			
Public administration and defense; compulsory social security	PubAdmin		0.39*							
All Industries ³			0.40*	0.45*			0.26*		-0.24*	0.40*
Wholesale and retail trade; repair of motor vehicles and motorcycles	WRT	0.26*	0.35*	0.31*	0.29*		0.39*			

FINDINGS: RESEARCH QUESTION 1

- Negative correlation to all three PIAAC measures of competencies for those who cooperate all the time as compared to those who cooperate sometimes.
- Those who shared information once a week or more had a positive association with PIAAC competencies with varying degrees across industries and particular competencies

FINDINGS: RESEARCH QUESTION 2

- Cooperation/collaboration at work and sharing work-related information were largely positively related to various skills use, although the extent of the relationship varied by industry.
- Sharing work-related information was positively related to the use of specified skills across industries while collaborating at work was only related to skills use in four of eight industries – Construction, Education, HHS, and WRT.
- Education level was positively correlated to many of the measures of skills use

CONCLUSIONS

- Collaboration does not foster literacy, numeracy, and problem-solving – it may impede development; or people who develop themselves don't collaborate in comparison
- Education, not work structures or conditions, are key determinants of cognitive skills as measured by PIAAC
- Teams have been viewed as development opportunities when the opposite seems to be supported by this study

IMPLICATIONS

- More strategic and deeper consideration of the links between social interactions (Teams) and collaboration as a development tool for cognitive skills
- Consideration of the work teams do
 - Don't assume such work leads to cognitive skills development

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