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## Are STEM students ready for their 21<sup>st</sup> century employers?

### An Australian Study


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## Employability in discipline-based curricula?

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**TOP 10 EMPLOYABILITY SKILLS**

- Communication
- Collaboration
- Critical Thinking
- Cultural Competence
- Content Knowledge
- Commercial Know-How
- Effective Collaboration
- Problem Solving
- Teamwork
- Self-Management

**YOUNG PEOPLE OWNING IN LEARNING**

- 41%
- 14%
- 14%
- 3%
- 3%
- 3%
- 3%
- 3%
- 3%
- 3%

## Engaging STEM faculty through co-research

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**Background of STEM faculty in Macquarie University**  
Biological sciences, chemical and biomolecular sciences, engineering, computing, environmental sciences, earth and planetary sciences, maths, stats, physics, astronomy, chiropractic.

**How do we tailor career and employability learning to various STEM cohorts?**


Research question 1:  
Do STEM student cohorts differ in their career development focus?

Research question 2:  
Do STEM student cohorts differ from STEM employers in student career development focus?

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## UG STEM student respondents' characteristics

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RESPONSE RATE, SEX RATIO, AGE \*P < .05

	MSPA	ENG/COM	EN/VEPS	BIO/CBM	CHIR	STEM
<b>Responses (n)</b>	80	186	60	145	46	517
<b>Enrolment (N)</b>	110	350	190	448	78	1176
<b>Response rate</b>	73%	53%	32%	32%	59%	44%
<b>Sex ratio (M: F)</b>	60% : 38%	86:13%*	57% : 43%	48% : 51%*	67% : 30%	67% : 32%
<b>Age</b>						
19 or under	0%	1%	2%	0%	0%	0%
20-25	84%	85%	75%	77%	76%	81%
26-30	11%	8%	5%	14%	11%	10%
31-40	5%	4%	12%	6%	9%	6%
41+	0%	2%	7%	3%	4%	3%

Lin-Stephens, S., Manuvelu, M. and Wong, J. (forthcoming)

### UG STEM student respondents' characteristics

ACTIVITIES IN THE PAST 12 MONTHS \*P < .05




	MSPA	ENG/COM	ENV/EPS	BIO/CBM	CHIR*	STEM
Part time work	79%	62%	78%	89%	74%	75%
Job search	35%	53%	60%	59%	15%	49%
Student groups/societies	25%	24%	37%	30%	22%	28%
Unpaid work experience	18%	22%	43%	37%	7%	28%
Volunteer or community work	28%	22%	40%	45%	15%	30%
Project work involving external clients	34%	22%	47%	13%	3%	21%
Full-time work	10%	17%	13%	8%	2%	11%
Professional association involvement & networks	3%	9%	12%	11%	0%	8%
Overseas exchanges or studies	4%	7%	12%	4%	0%	6%
Part time work	79%	62%	78%	89%	74%	75%
Job search	35%	53%	60%	59%	15%	49%
Student groups/societies	25%	24%	37%	30%	22%	28%
Unpaid work experience	18%	22%	43%	37%	7%	28%
Volunteer or community work	28%	22%	40%	45%	15%	30%

Lin-Stephens, S., Mauguerra, M., and Uesi, J. (forthcoming)

### UG STEM student respondents' characteristics


WORK HISTORY, PLAN WITHIN 1 YEAR OF COMPLETING DEGREE \*P < .05



	MSPA	ENG/COM	ENV/EPS	BIO/CBM	CHIR	STEM
<b>Work History</b>						
Average total paid work history	4y	3y3m*	5y10m	5y3m*	3y5m	4y2m
Average total unpaid work history	9m	6m	11m	1y1m	6m	10m
<b>Plan within 1 year of completing degree</b>						
Work	76%	87%	67%	63%	54%	73%
Further study	33%	19%	38%	56%	57%	37%
Other	5%	9%	18%	14%	0%	10%

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### Employer respondents characteristics




n=62, N=80, response rate 78%

Organisation type	Frequency	Percentage
Large enterprise (200+)	28	45%
Small/Medium Enterprise (< 200)	25	40%
Government	5	8%
Not for profit	4	6%
Male	24	39%
Female	38	61%
Average experience in workforce	13y3m	
Average experience in hiring	7y5m	

Lin-Stephens, S., Mauguerra, M., and Uesi, J. (forthcoming)

### Ordinal regression results


(LIN-STEPHENS, MAUGUERRA, AND UESI, FORTHCOMING)



- Do students differ from each other in their CIL focus? Not really.**  
 Student cohorts share similar career information literacy learning focus, except the Maths/Stats/Physics/Astronomy (MSPA) cohort  
 The MSPA cohort's CIL focus are significantly lower than their STEM peers
- Do STEM students differ from their employer in CIL focus? Yes.**  
 All student cohorts different from employers in their CIL focus

Lin-Stephens, S., Mauguerra, M., and Uesi, J. (forthcoming)



### Key findings and implications



Students	Employers
Value students' self-understanding	
Motivation and ability to contribute to any work in a meaningful way	
Over-reliance on degrees?	Not emphasizing discipline-based learning
Potential conflict of interests?	Not as concerned with students' knowledge of broad career options
	Not as concerned with students' knowledge of specific work opportunities and industry requirements related to degrees
	Not as concerned with students ability to evaluate their career choices

Lin-Stephens, S., Manuagers, M., and Dow, J. (forthcoming)

### Q&A

Thank you for your interests and inputs in this presentation.

Contact [serene.lin-stephens@mq.edu.au](mailto:serene.lin-stephens@mq.edu.au) for any further questions or opportunities to collaborate.