



**code\_reality**

# Essential skills for Augmented Reality developers in Industry – survey analysis

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# Structure of the survey

Part I. Contextual Information

Part II. Essential skills for AR specialists

Part III. Feedback

# Contextual Information

Size of organization

Industry group or type of public organization

Country

Position type of the person filling in the survey

Have you been actively involved or plan to be involved in the recruitment of an AR specialist?

Does your organization have AR specialists or does it consider hiring AR specialists?

# AR skills

1. AR/VR Development Skills
2. Platform-specific Development Skills
3. Specific Programming/Markup Language Skills
4. Advanced Computing Skills
5. Computer vision skills
6. Computer Graphics Skills
7. Data Analysis and AI Skills
8. Audio Engineering Skills
9. HCI Skills
10. Hardware and Hardware-related Skills

## AR/VR Development Skills

We are going to have increased demand for this skills in our organisation over the next 3-5 years:

- **AR SDKs** (ARcore, ARkit, HoloToolkit, ARtoolkit, etc.);
- **VR SDKs** (PSVR, Oculus, OpenVR, WebVR, etc.);
- **Unity**;
- **Unreal Engine**;
- **AR/VR game development** experience

\*

Please choose the appropriate response for each item:

	Strongly disagree	Tend to disagree	Neutral	Tend to agree	Strongly agree
1	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

[We really would appreciate if you could provide us with more detail for your answer. If you don't want to, just proceed to the next question.]

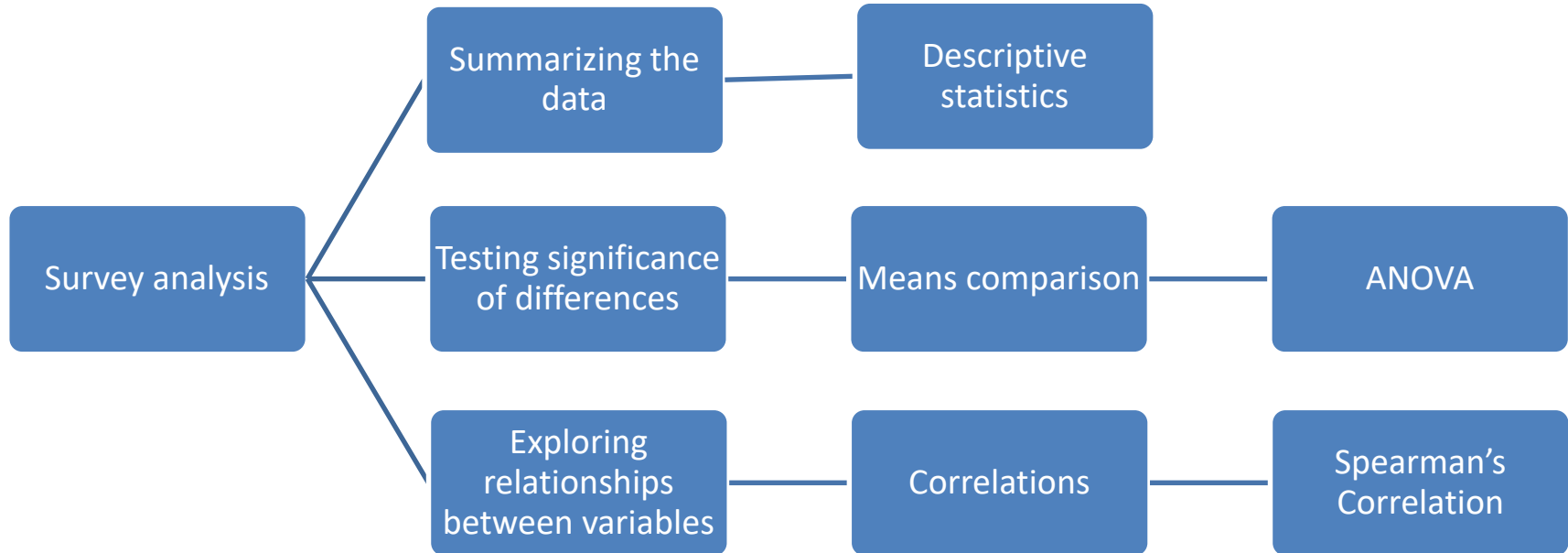
Only answer this question if the following conditions are met:

Answer was 'Strongly agree' or 'Tend to agree' or 'Neutral' or 'Tend to disagree' or 'Strongly disagree' at question '7 [P2Q1]' (AR/VR Development Skills We are going to have increased demand for this skills in our organisation over the next 3-5 years: AR SDKs (ARcore, ARkit, HoloToolkit, ARtoolkit, etc.); VR SDKs (PSVR, Oculus, OpenVR, WebVR, etc.); Unity; Unreal Engine; AR/VR game development experience (1))

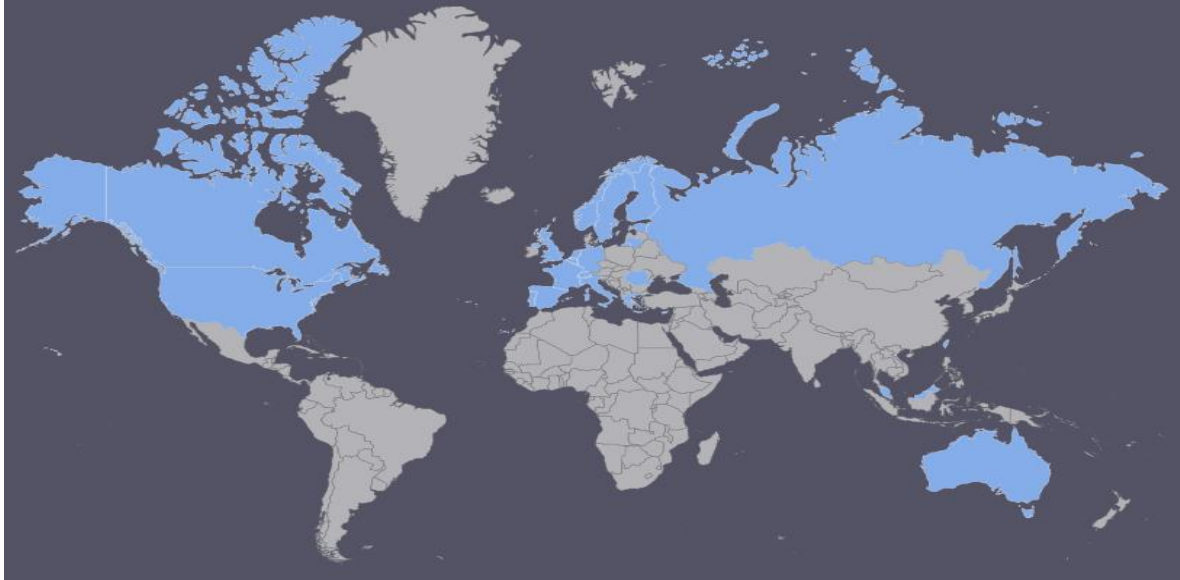
Please choose the appropriate response for each item:

	Strongly disagree	Tend to disagree	Neutral	Tend to agree	Strongly agree
AR SDKs (ARcore, ARkit, Vuforia, HoloToolkit, ARtoolkit, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
VR SDKs (PSVR, Oculus, OpenVR, WebVR, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unity dev. experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Unreal Engine dev. experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
AR/VR game dev experience	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

# The methodology

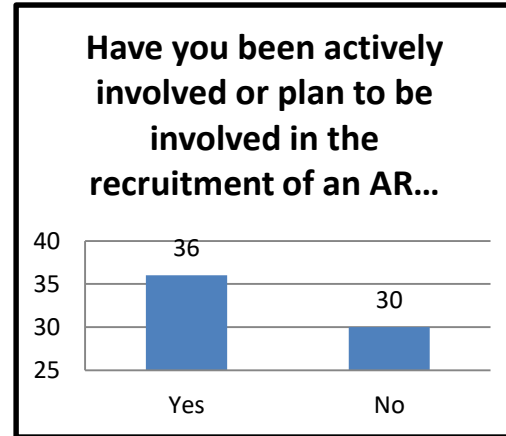


# Country



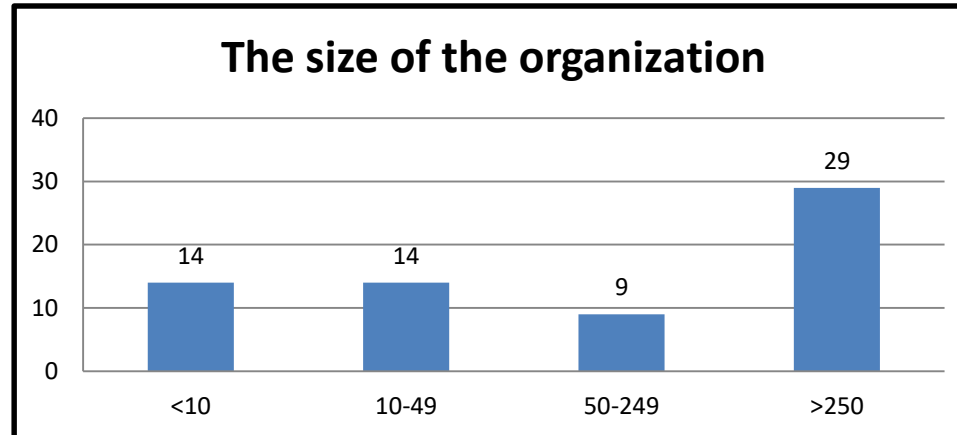
Sixty six participants answered the survey. They represent 24 countries: Australia, Canada, Malaysia, Russian Federation, Taiwan, United States and 18 European countries.

# Recruiting and hiring AR specialists



80 % of the respondents stated that their organization have AR specialists or it consider hiring AR specialists. 55% of respondents were involved in the process of recruitment of AR specialist.

# The size of the organization



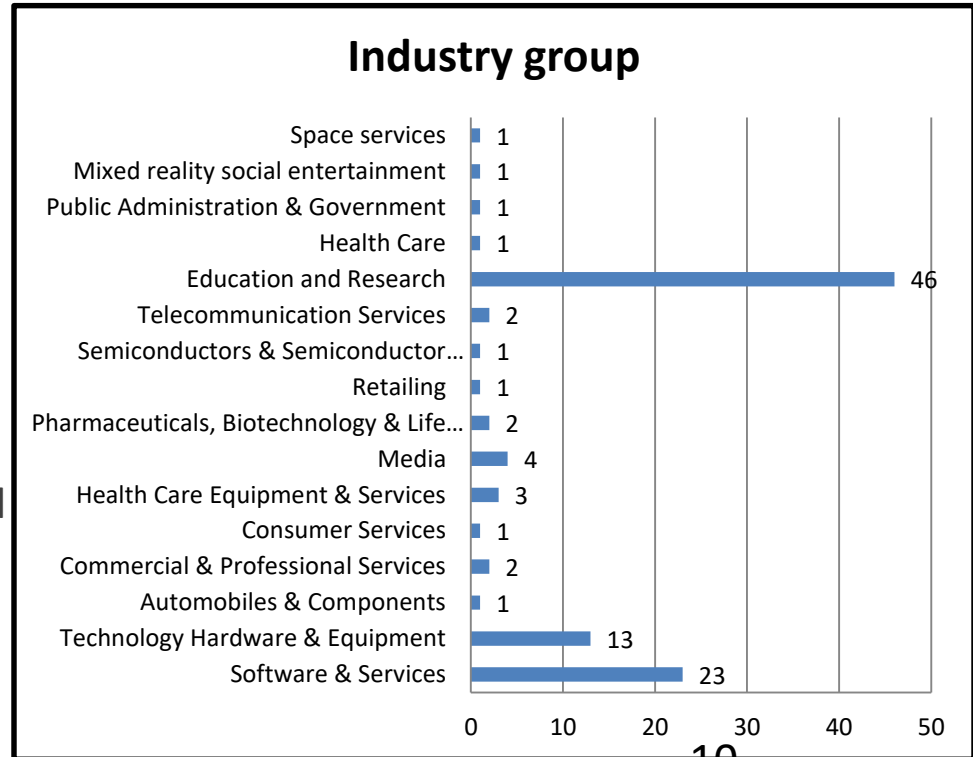
44 % respondents work in a big organisation (250 or more employees)

# Industry group or type of your public organization

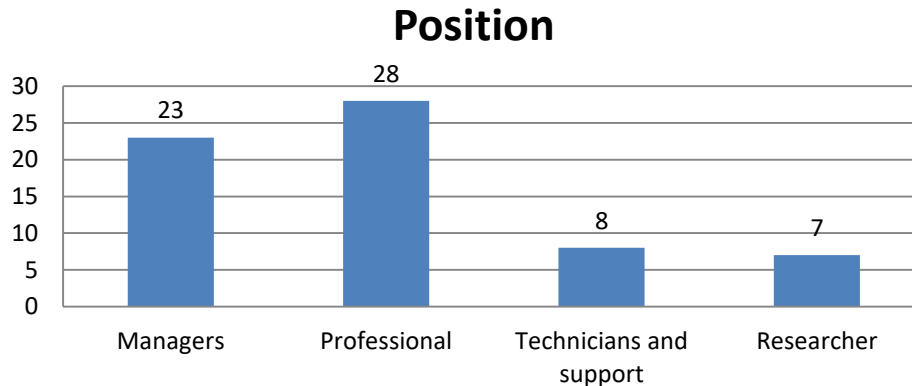
The biggest representation of respondents comes from Education and Research.

Another big group works in software and services.

Smaller, but still noticeable group works in the domain of technology hardware and equipment



# Position type of the person filling in the survey



Participants of the survey are working as professionals (42%), managers (35%), technicians (12%) and researchers (11%)

# Example: Correlations in the contextual information

			Correlations					
			recruitment of an AR specialist?	hiring AR specialists?	size of your organization:	Country	Position	
rho Spearmana	recruitment of an AR specialist	Correlation	1,000					
		Significance						
		N	66					
	hiring AR specialists	Correlation	0,160	1,000				
		Significance	0,199					
		N	66	66				
	size of your organization:	Correlation	0,092	-0,246	1,000			
		Significance	0,462	0,040				
		N	66	66	66			
	Country	Correlation	-0,102	-0,018	0,042	1,000		
		Istotność (dwustronna)	0,415	0,887	0,736			
		N	66	66	66	66		
	Position	Correlation	0,143	-0,069	0,055	-0,213	1,000	
		Significance	0,253	0,583	0,662	0,085		
		N	66	66	66	66	66	

The bigger organisation - more often has (or consider hiring) AR specialists.

# Correlations between contextual information and groups of skills

Correlations		
Does your organization have AR specialists or does it consider hiring AR specialists?	AR/VR Development Skills	0,372**
	Advanced Computing Skills	0,378**
	Computer vision skills	0,258*
	Computer Graphics Skills	0,266*
	HCI Skills	0,259*
Have you been involved in the recruitment of an AR specialist?	Computer vision skills	0,318**

		N	mean
Specific Programming/Markup Language Skills	1	23	4,09
	2	28	3,93
	Total	51	4,00
Advanced Computing Skills	1	23	4,09
	2	28	3,75
	Total	51	3,90
Platform-specific Development Skills	1	23	4,39
	2	28	3,96
	Total	51	4,16
Computer vision skills	1	23	4,30
	2	28	4,00
	Total	51	4,14
Computer Graphics Skills	1	23	4,26
	2	28	3,86
	Total	51	4,04
Data Analysis and AI Skills	1	23	4,52
	2	28	4,04
	Total	51	4,25
Audio Engineering Skills	1	23	3,43
	2	28	3,11
	Total	51	3,25
HCI Skills	1	23	4,13
	2	28	4,11
	Total	51	4,12
Hardware and Hardware-related Skills	1	23	4,43
	2	28	3,86
	Total	51	4,12

## Comparison of the skills valuation depending on position in the company

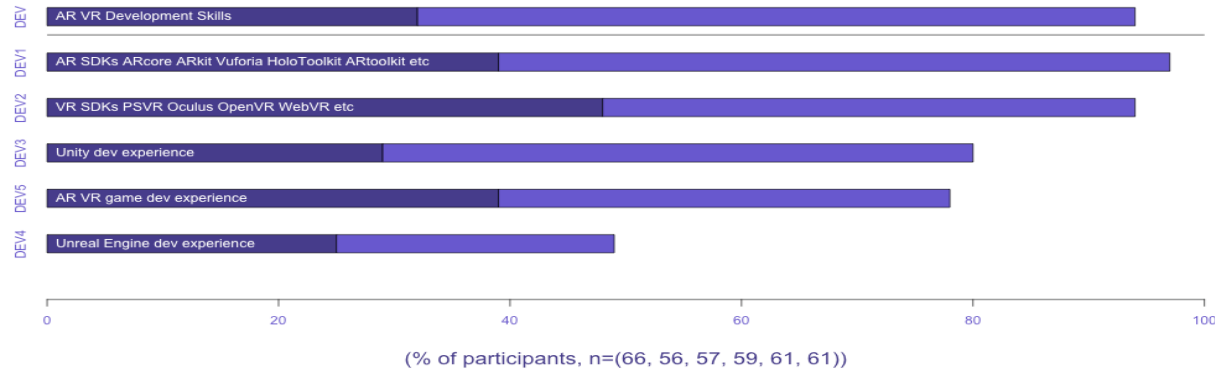
1 = managers

2 = professionals

Managers value all the skills higher than professionals

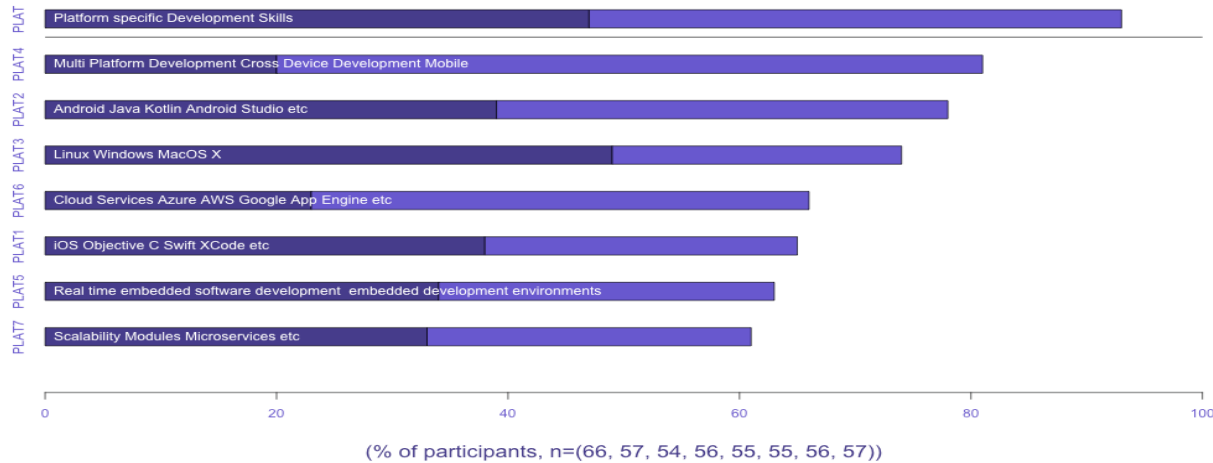
# 1. AR/VR Development Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



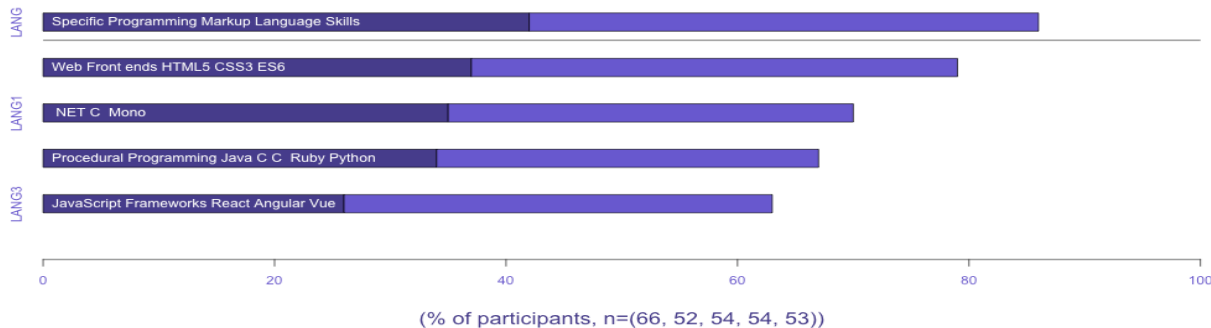
# 2. Platform-specific Development Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



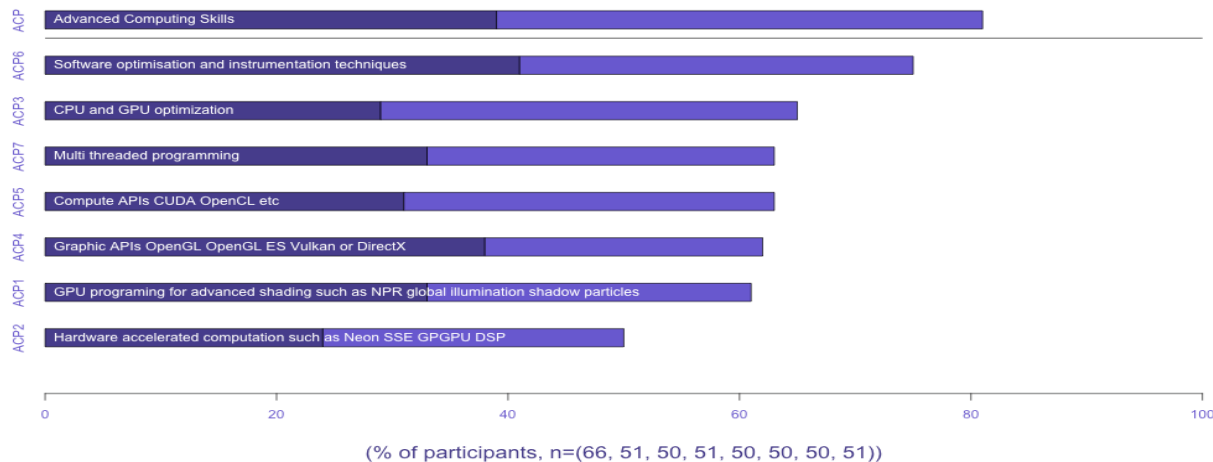
# 3. Specific Programming / Markup Language Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



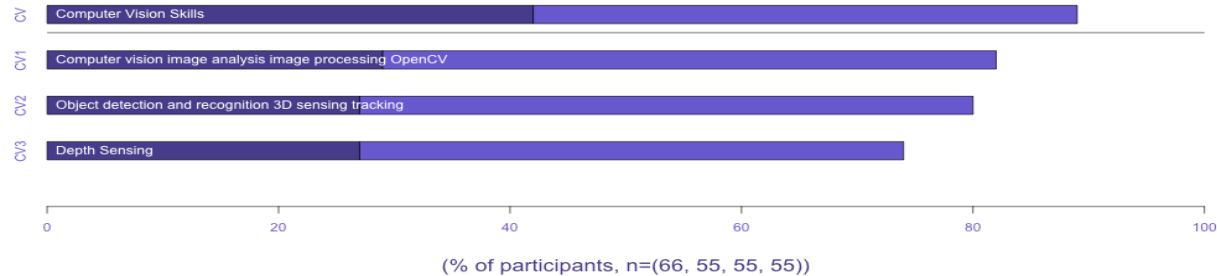
# 4. Advanced Computing Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



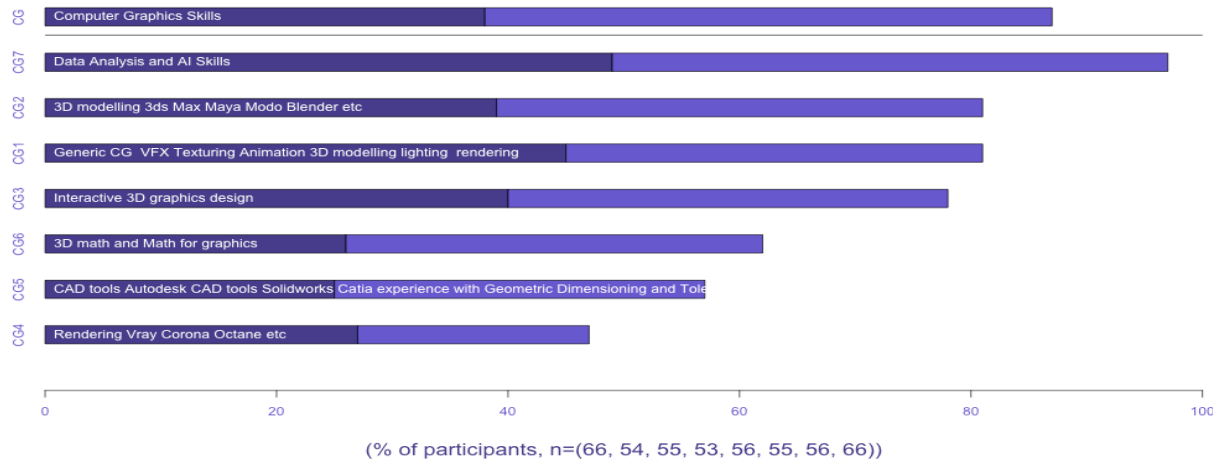
# 5. Computer vision skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



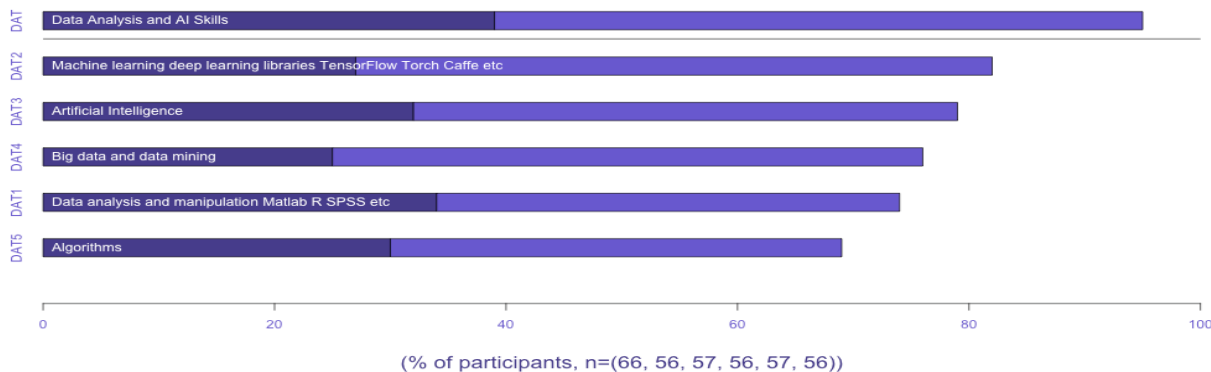
# 6. Computer Graphics Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



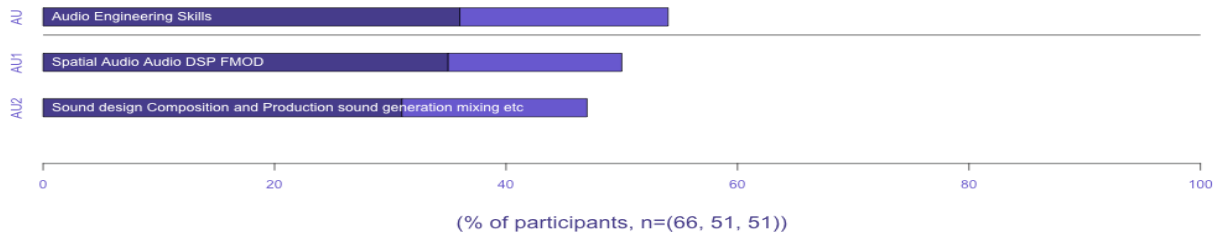
# 7. Data Analysis and AI Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



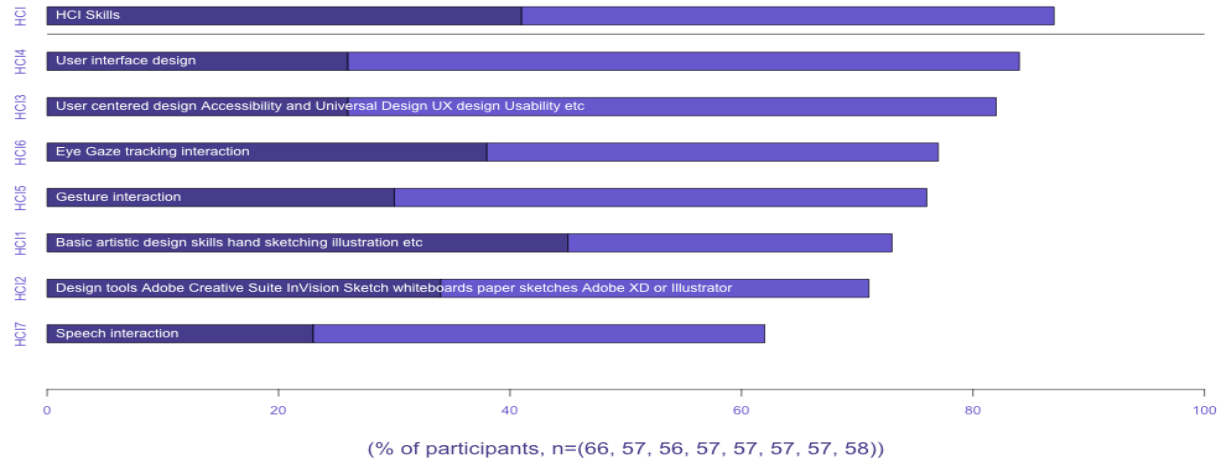
# 8. Audio Engineering Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



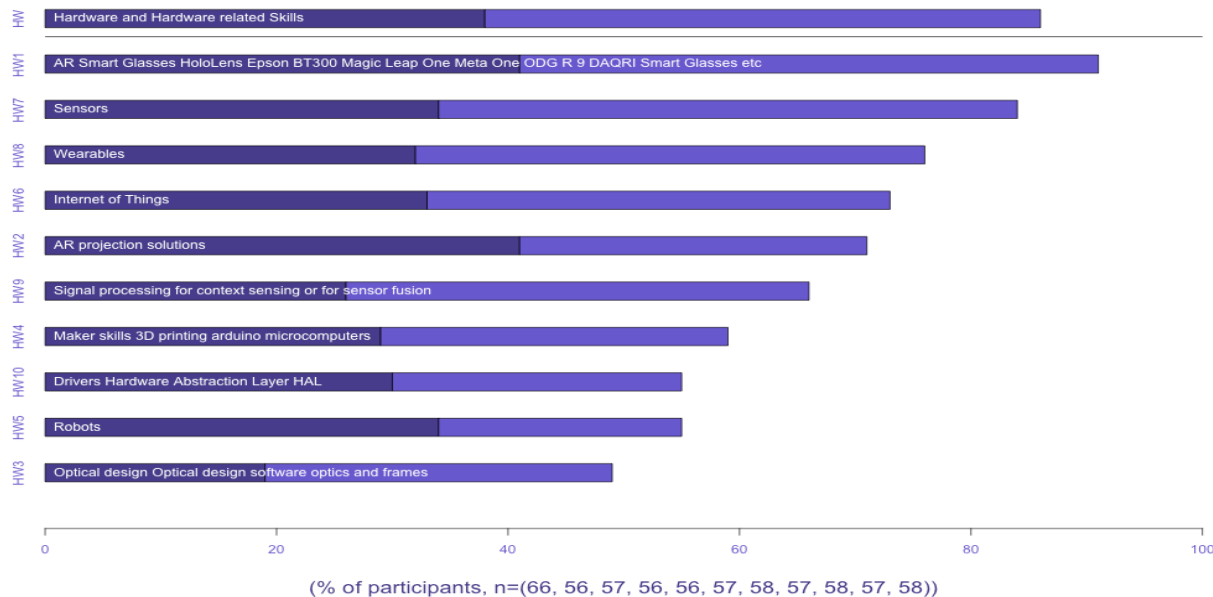
# 9. HCI Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



# 10. Hardware and Hardware-related Skills

**We are going to have increased demand for this skill  
in our organisation over the next 3-5 years**



# Conclusions

The bigger organisation - more often has (or consider hiring) AR specialists.

If the organisation has or is hiring AR specialists, they also think that there will be increased demand for AR/VR Development Skills, Advanced Computing Skills, Computer vision skills, Computer Graphics Skills and HCI Skills

Managers value all the skills higher than professionals

# Recommendations for AR teaching

- AR SDKs more important than VR SDKs skills, Unity more important than Unreal
- Multi-platform development skills
- Front ends programming skills
- Software optimisation and instrumentation techniques
- Computer vision, image analysis/processing and object detection/recognition equally important
- 3 D modeling, generic CG and interactive 3D graphic design
- Machine learning and artificial intelligence important
- Audio engineering is not seen as very important
- User-centered and user interface design
- Smart glasses, sensors and wearables



THANK YOU

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