Overview

- Setting the Scene
- What is happening in Academic Libraries?
- Should we and by when?
- Skills Development & Staffing
- What does the future library look like?

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Setting the Scene: Should we be afraid?

Setting the Scene: Maybe….but…

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Setting the Scene: Worldwide Figures

International Federation of Robotics (IFR) – Sept 2020

Professional Service Robots

IFR International Federation of Robotics

Value of Sales:

2019: USD 11.2bn, +32%

2020: USD 13.9bn, +24%

2023: USD 27.7bn, +26% (CAGR)

Unit Sales:

2019: 173,000 units, +32%

2020: 240,000 units, +38%

2023: 537,000 units, +31% (CAGR)

Every 5th service robot supplier is a start-up

IFR International Federation of Robotics
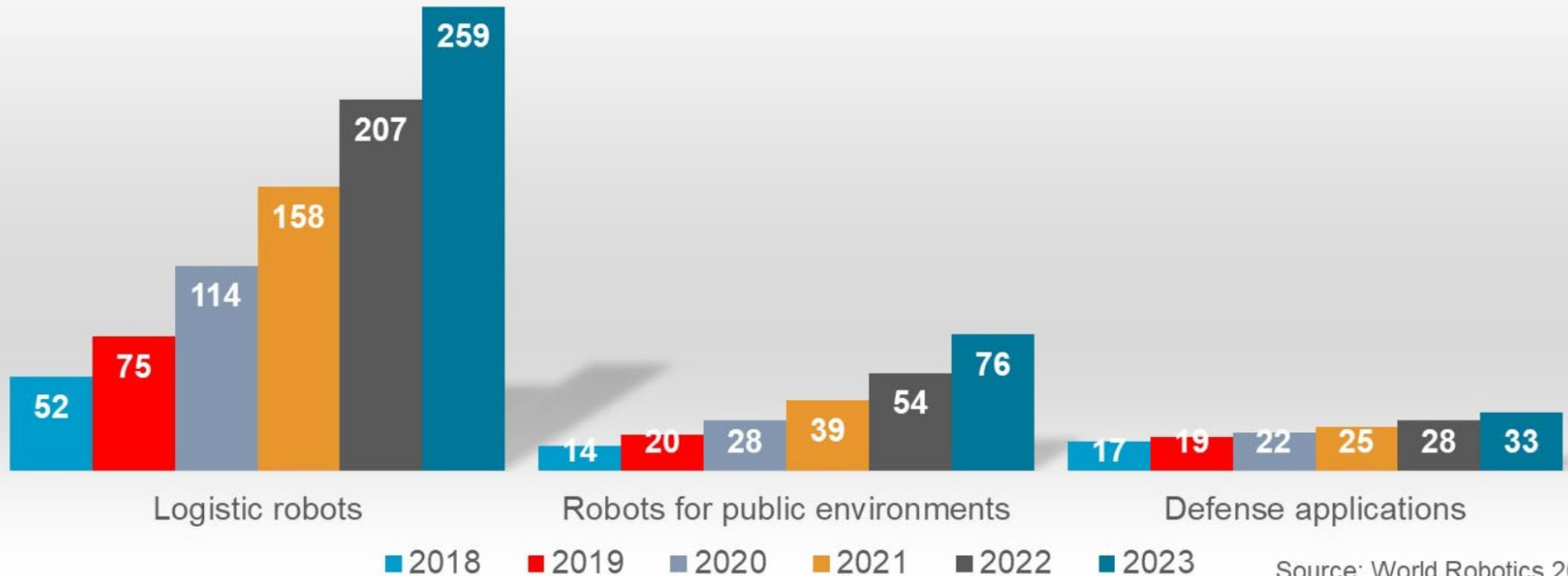
- 889 **service robot** suppliers
- 183 start-ups (est. 2015 or later)

- 728 **professional service robot** suppliers
- 155 start-ups

- 237 **personal/domestic service robot** suppliers
- 39 start-ups

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Setting the Scene: Worldwide Figures Cont.

International Federation of Robotics (IFR) – Sept 2020

Service robots for professional use. Top 3 applications
Unit sales 2018 and 2019, potential development 2020-2023
'000 of units

Logistic robots: 52, 75, 114, 158, 207, 259
Robots for public environments: 14, 20, 28, 39, 54, 76
Defense applications: 17, 19, 22, 25, 28, 33

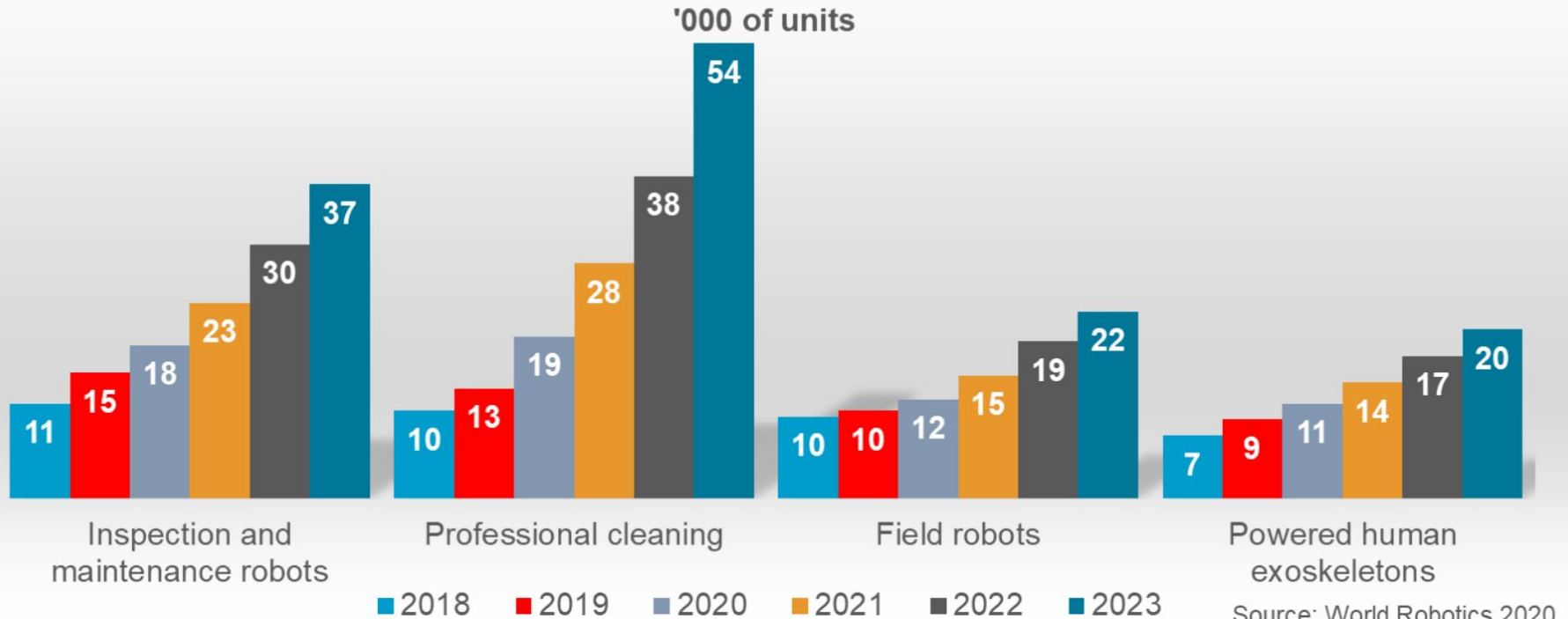■ 2018 ■ 2019 ■ 2020 ■ 2021 ■ 2022 ■ 2023

Source: World Robotics 2020

Setting the Scene: Worldwide Figures Cont.

International Federation of Robotics (IFR) – Sept 2020

Service robots for professional use. Top 4-7 applications
Unit sales 2018 and 2019, potential development 2020-2023

'000 of units

Inspection and maintenance robots: 11, 15, 18, 23, 30, 37
Professional cleaning: 10, 13, 19, 28, 38, 54
Field robots: 10, 10, 12, 15, 19, 22
Powered human exoskeletons: 7, 9, 11, 14, 17, 20

■2018 ■2019 ■2020 ■2021 ■2022 ■2023

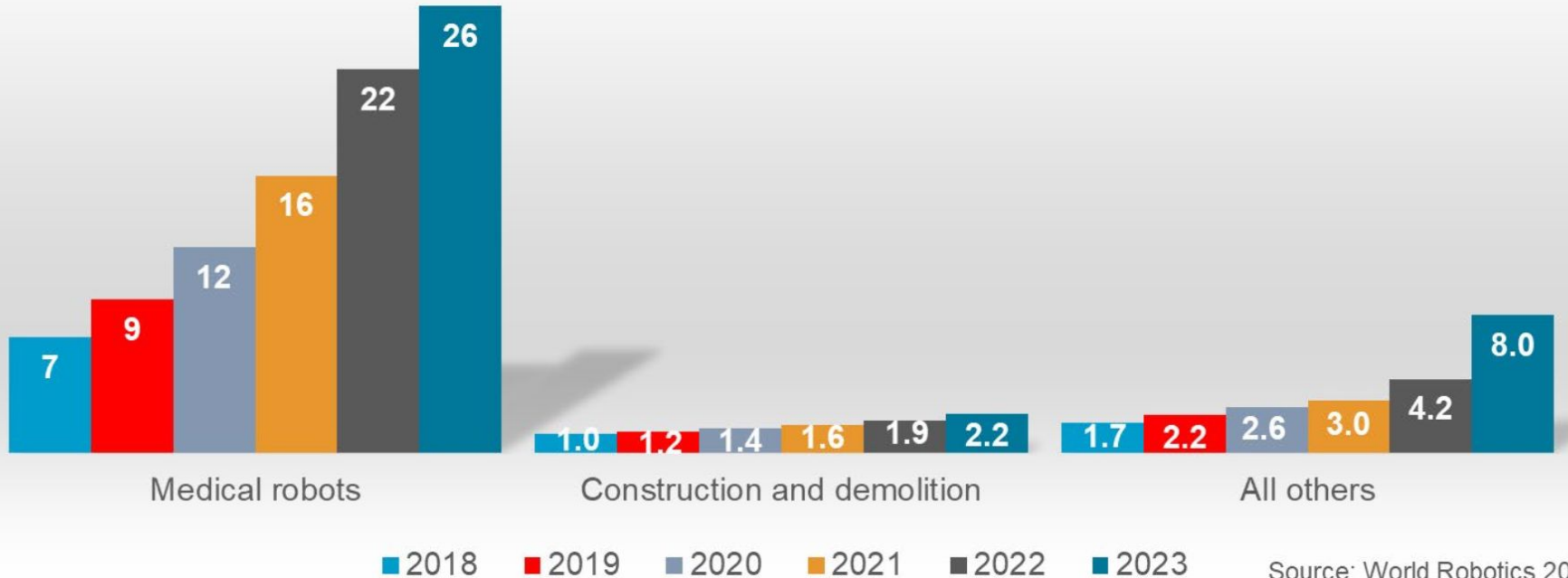Source: World Robotics 2020

Setting the Scene: Worldwide Figures Cont.

International Federation of Robotics (IFR) – Sept 2020

Service robots for professional use. Top 8-10 applications
Unit sales 2018 and 2019, potential development 2020-2023

'000 of units

Medical robots: 7, 9, 12, 16, 22, 26
Construction and demolition: 1.0, 1.2, 1.4, 1.6, 1.9, 2.2
All others: 1.7, 2.2, 2.6, 3.0, 4.2, 8.0

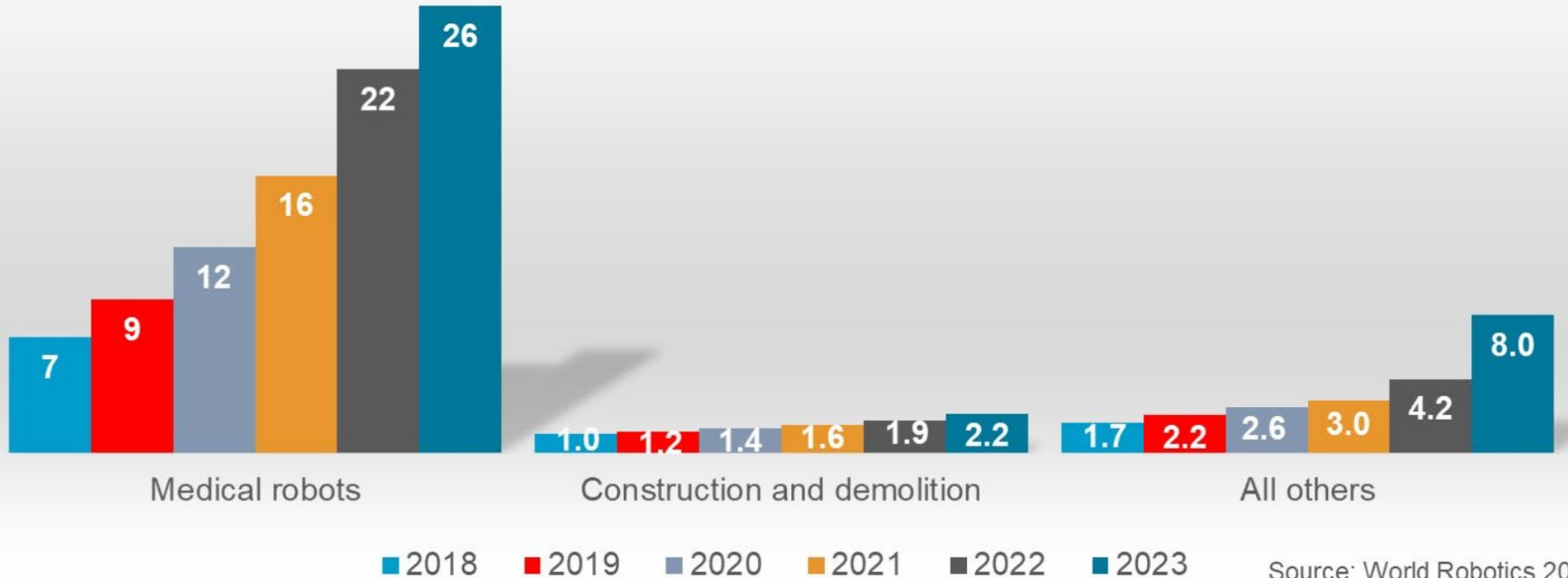2018 2019 2020 2021 2022 2023

Source: World Robotics 2020

Setting the Scene:

International Federation of Robotics (IFR) – Sept 2020

**Service robots for professional use. Top 8-10 applications
Unit sales 2018 and 2019, potential development 2020-2023**

'000 of units

	Medical robots	Construction and demolition	All others
2018	7	1.0	1.7
2019	9	1.2	2.2
2020	12	1.4	2.6
2021	16	1.6	3.0
2022	22	1.9	4.2
2023	26	2.2	8.0

Source: World Robotics 2020

Setting the Scene: Robots' vs Bots

Robots – Have a Body	Bots – Do not have a body
Android – Human Like Features	Code Bots – Assist with code writing
Cyborg – Fusion of Man and Machine	Chat Bots – Synthesize text / speech
Industrial / Service Machines	Spyder – Crawls the web gathering content
Created to automate, assist, take over, or augment human based tasks	Created to automate, assist, take over, or augment human based tasks
Task Specific	Task Specific

What is happening in Academic Libraries?

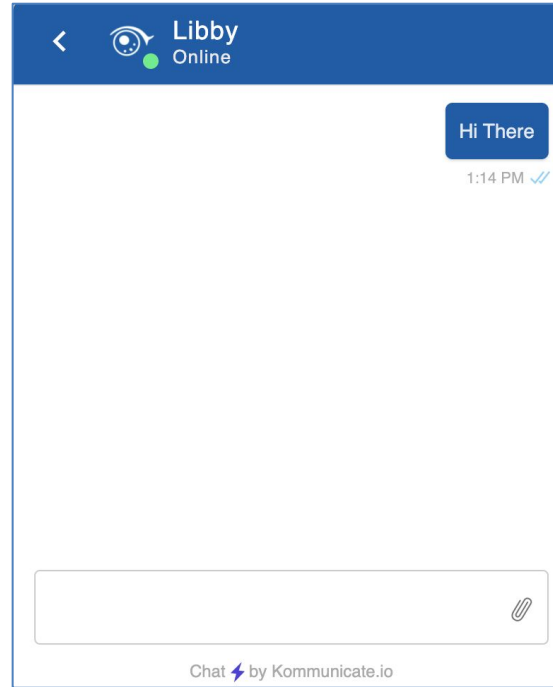Self Check-out Machines

Client Service Robots

Automated Book Retrieval

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What is happening in Academic Libraries? Cont.

RFID Robots

Chatbots

Automated Circulation

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What is happening in Academic Libraries? Cont.

Book drop Robots
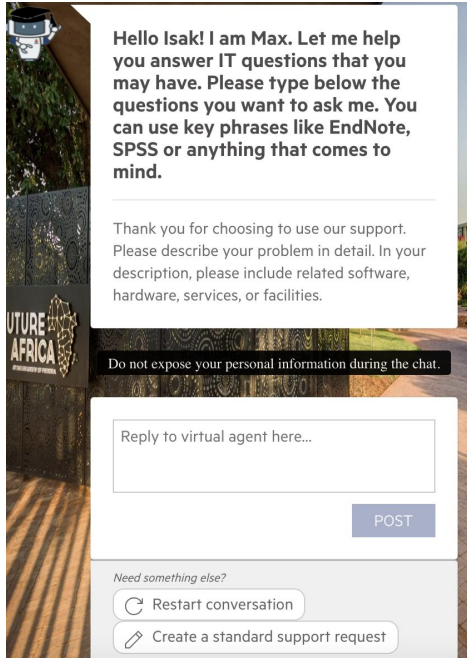
Service Chatbots

Maintenance Robots

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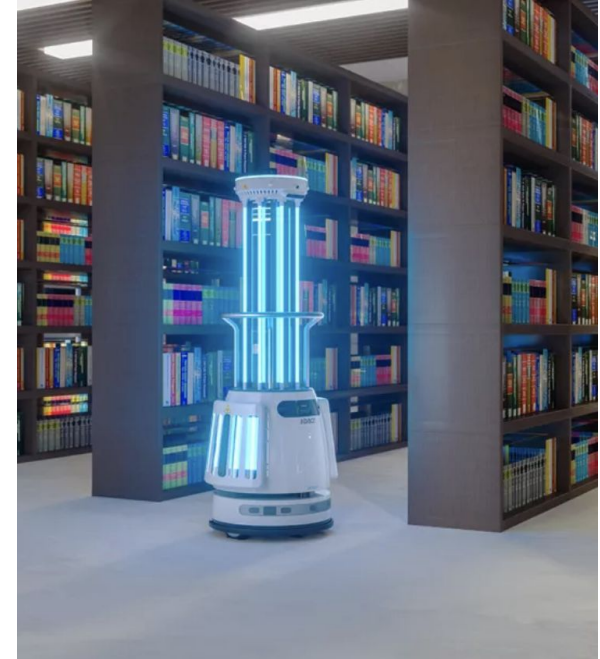
2017 Prediction of Technologies to look out for – Horizon Report

Consumer Technologies
> Drones
> Real-Time Communication Tools
> Robotics
> Wearable Technology

Digital Strategies
> Location Intelligence
> Makerspaces
> Preservation & Conservation Technologies

Internet Technologies
> Blockchain
> Digital Scholarship Technologies
> The Internet of Things
> Library Services Platforms
> Syndication Tools

Learning Technologies
> Adaptive Learning Technologies
> Microlearning Technologies
> Mobile Learning
> Next-Generation LMS
> Virtual & Remote Labs

Social Media Technologies
> Crowdsourcing
> Online Identity
> Social Networks
> Virtual Worlds

Visualization Technologies
> 3D Printing
> Information Visualization
> Mixed Reality
> Virtual Reality

Enabling Technologies
> Affective Computing
> Artificial Intelligence
> Big Data
> Electrovibration
> Flexible Displays
> Mesh Networks
> Mobile Broadband
> Natural User Interfaces
> Near Field Communication
> Next-Generation Batteries
> Open Hardware
> Speech-to-Speech Translation
> Virtual Assistants
> Wireless Power

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Trend Adoption – 2019

Time For Adoption	Description	Year for Implementation
1 Year or less	Mobile Learning	2020
	Analytics Technologies	2020
2 - 3 Years	Mixed Reality	2020 - 2021
	Artificial Intelligence	2020 - 2021
4-5 Years	Blockchain	2022 - 2023
	Virtual Assistants	2022 - 2023

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Latest Trends – 2020

Description
Adaptive Learning
AI / Machine Learning
Analytics for Student Success
Elevation of Instructional Design, Learning Engineering and UX Design
Open Educational Resources
XR (AR, VR, MR Haptic) Technologies

Latest Trends – 2021

Description
Artificial Intelligence
Blended and Hybrid Course Models
Learning Analytics
Micro credentialing
Open Educational Resources
Quality Online Learning

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When will AI become mainstream

A.T. Kearny – 2018

Forrester - 2020   Gartner - 2020

KDNuggets – 2020   Bank of America – 2020

Markets and Markets Research - 2020

BCC Research – 2024   Accenture – 2035
Tractica Research – 2025

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Skills Development Categories

Programmer / Developer / Engineer	Operator	User
Skilled in programming languages and software integration. Could also include mechanics.	Operates the robot / bot on a daily basis to ensure that it is working and available.	Individual that uses the robot / bot on request.
Skills set is advanced and difficult to source or upskill.	Skills set is basic to intermediate and easy to source and upskill.	Skills set required is basic and should be easy to upskill.
Long-term skills development.	Short to medium term skills development.	Short-term skills development.

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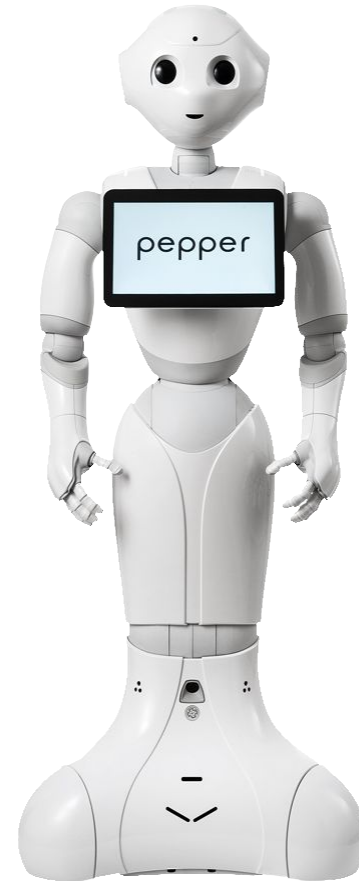YUNIBESITHI YA PRETORIA

Future Essentials

- Data Analysis and Processing.
- Data Visualisation.
- Artificial Intelligence / Machine Learning.
- User Experience and User Interface Design.
- Programming (e.g., Python).

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Notes on Staffing

- Change Control!
- Avoid duplication of service points (don't have a robot and human doing the same thing).
- Skills might reside in a different department.
- Relieve responsibilities to assign new responsibilities.
- Automation opens new possibilities for staff.
- ROI and product / service redundancy to determine areas of automation.

The New Librarian ?

- Knows your loan history, patterns, can make recommendations and guide you to relevant resources.

- Can book your training venue.

- Can help you check-out a book.

- Train you on how to *[insert topic here].*

- Remember all your previous visits and knows what you are studying and your academic performance.

- Answer general library questions.

- Can be accessed in the library on via your phone (on a Sunday evening at 9PM).

- Can leave you a book at a predetermined location.

- 99% Accuracy on inventory control.

- Is available 24/7.

- Drop a book anywhere on campus.

pepper

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Thank You

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