Educating the Future
Parent Seminar 6 Sep 2016

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DAMiEN WALLER
DIGITAL DISRUPTION
TODAY

- About Me
- Disruption
- Our kids futures

ABOUT ME

- Parent at St Leonards
- Grew up on a farm in Bendigo
- Education B.Eng and Law
- Co-Founded iSelect over 15 years ago
- CEO, Chairman, NED Director
- Investor/Mentor with a number of companies
- Passionate about the digital economy
DISRUPTION
“Undermine their pompous authority, reject their moral standards, make anarchy and disorder your trademarks. Cause as much chaos and disruption as possible but don’t let them take you alive.

– SID Vicious

Disruption - Key Drivers

- Number of internet users, devices
- Speed of internet, chips, size of memory, quantum mechanics
- Artificial intelligence - driverless cars, speech recognition, more
- Robotics going mainstream - 3d printing, low cost manufacturing etc
Internet Users in the World

Human Beings vs, Internet Connected Devices (millions)

Source: Cisco Systems, LM Ericsson, Raymond James research.
Technology adoption

Years until used by one-quarter of American population

- Electricity (46) 1873
- Telephone (35) 1876
- Radio (31) 1897
- Television (26) 1926
- PC (18) 1975
- Mobile phone (13) 1983
- The web (7) 1991

First commercially available year

Source: Singularity.com
Further details: Economist.com/graphics

A gallery of disruptive technologies

Estimated potential economic impact of technologies across sized applications in 2025, $ trn, annual

1. Mobile Internet
2. Automation of knowledge work
3. Internet of Things
4. Cloud
5. Advanced robotics
6. Autonomous and near-autonomous vehicles
7. Next-generation genomics
8. Energy storage
9. 3-D printing
10. Advanced materials
11. Advanced oil and gas exploration and recovery
12. Renewable energy

SOURCE: McKinsey Global Institute
12 OF THE TOP 24 BRANDS ARE TECH

Interbrand Rankings

<table>
<thead>
<tr>
<th>Rank</th>
<th>Brand</th>
<th>Value Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Apple</td>
<td>+4% 702.78 Bn</td>
</tr>
<tr>
<td>2</td>
<td>Google</td>
<td>+12% 403.79 Bn</td>
</tr>
<tr>
<td>3</td>
<td>Coca-Cola</td>
<td>-4% 363.35 Bn</td>
</tr>
<tr>
<td>4</td>
<td>Microsoft</td>
<td>+15% 337.70 Bn</td>
</tr>
<tr>
<td>5</td>
<td>IBM</td>
<td>-9% 310.09 Bn</td>
</tr>
<tr>
<td>6</td>
<td>Toyota</td>
<td>-16% 295.00 Bn</td>
</tr>
<tr>
<td>7</td>
<td>Samsung</td>
<td>+8% 440.48 Bn</td>
</tr>
<tr>
<td>8</td>
<td>Sony</td>
<td>-3% 422.97 Bn</td>
</tr>
<tr>
<td>9</td>
<td>McDonald's</td>
<td>+6% 29.02 Bn</td>
</tr>
<tr>
<td>10</td>
<td>Amazon</td>
<td>+20% 27.14 Bn</td>
</tr>
<tr>
<td>11</td>
<td>BMW</td>
<td>+7% 27.19 Bn</td>
</tr>
<tr>
<td>12</td>
<td>Mercedes-Benz</td>
<td>+15% 26.24 Bn</td>
</tr>
<tr>
<td>13</td>
<td>Disney</td>
<td>+4% 26.45 Bn</td>
</tr>
<tr>
<td>14</td>
<td>Intel</td>
<td>-3% 26.05 Bn</td>
</tr>
<tr>
<td>15</td>
<td>Cisco</td>
<td>+5% 27.92 Bn</td>
</tr>
<tr>
<td>16</td>
<td>Oracle</td>
<td>-3% 27.98 Bn</td>
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<tr>
<td>17</td>
<td>Nike</td>
<td>+16% 25.00 Bn</td>
</tr>
<tr>
<td>18</td>
<td>Honda</td>
<td>-6% 22.37 Bn</td>
</tr>
<tr>
<td>19</td>
<td>Louis Vuitton</td>
<td>-9% 21.52 Bn</td>
</tr>
<tr>
<td>20</td>
<td>H&amp;M</td>
<td>+6% 22.02 Bn</td>
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<tr>
<td>21</td>
<td>Gillette</td>
<td>+6% 22.02 Bn</td>
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<tr>
<td>22</td>
<td>Facebook</td>
<td>+8% 22.05 Bn</td>
</tr>
<tr>
<td>23</td>
<td>Netflix</td>
<td>+13% 16.32 Bn</td>
</tr>
</tbody>
</table>

Next Frontier = Recognition in heavy background noise in far-field & across diverse speaker characteristics (accents, pitch...)

Words Recognized by Machine (per Google), 1970 – 2016

@ ~90% accuracy

@ ~70% accuracy
OUR KIDS FUTURES - LINKED TO EDUCATION, DECISIONS NOW AND FUTURE JOBS

- Phase 1 - Outsource of manufacture, call centres, administration - Labour 10-30% of AU.
- Phase 2 - Increasingly white collar, more complex jobs at risk via automation and outsource - Lawyers, doctors, engineers ...
- Phase 3 - Eventually labour intensive industries will be totally disrupted - taxi drivers via self driving cars, builders via robotic processes, call centres will be virtual agents...
Wages and prices cycle

Nominal wages at a record low
Wage price index annual change (%)

Nominal wages growth

Real wages growth (wages minus inflation)

SOURCE: ABS, AMP CAPITAL

FIGURE 7: AVERAGE EARNINGS IN THE HIGH TECHNOLOGY SECTOR COMPARED WITH ALL INDUSTRIES, BRITISH COLUMBIA

Average Weekly Earnings ($)

High Technology Sector

All Industries

ROBOTICS - BECOMING MAINSTREAM, CHEAP AND WILL REPLACE HUGE AMOUNTS OF LABOUR

Working for less
Average robot prices relative to labour compensation 1990=100

Source: International Federation of Robotics
ROBOTICS - MANY WORKERS THINK ROBOTS WILL TAKE THEIR JOBS...

How to deal with the threat of disruption

- Tick - They are already digital natives...
- The future is digital and tech across every industry.
- Encourage our kids to be a disruptor (or work for one).
ONE LAST THING - SINGULARITY WILL OCCUR WHEN OUR KIDS ARE LESS THAN 40 YEARS OLD
Phil Galloway
0413 640 120

Examples of completed projects, include:
• Kings Canyon Solar/Diesel Hybrid
• Midfield Meats Geothermal and RO
• Sebel resort geothermal system
• Central Meats gas project
• Shark Lake co-gen facility
• Solar PV Designs:
  General Data Centers, Embedded Networks, Irrigation

R&D Projects
• C&I Scale Battery Solutions (Potential Vic Govt. Grant)
• Semi closed green-houses with heat-pumps and Solar PV

Utility Scale
Bannerton Solar Park #1 (50 MW)
Bannerton Solar Park #2 (25 MW)
Bannerton Solar Park #3 (200 MW)
Queensland Project #1
Queensland Project #2 and #3
1. Jobs threatened by globalization greatly overlap jobs threatened by computers

2. ‘Rules based solutions’ no longer exist:

Fragmented ownership of everything ➔ Acquire information, explain and persuade

Global Crises ➔ Global Solutions
Fragmented ownership of everything ➔ Acquire information, explain and persuade

Monopoly Rent

Global Crises = Global Solutions
- Reduce cost
- Improved resilience of energy supply
- Greener society
- Empowering communities
- Great jobs

Vision for Digi STEM

Artisan & Local ➔ "Jobs in the middle" ➔ World’s Best

Fragmented ownership of everything ➔ Acquire information, explain and persuade
Global Crises ➔ Global Solutions
75 per cent of the fastest growing occupations now require STEM skills.

PricewaterhouseCoopers, A smart move: future proofing Australia’s workforce by growing skills in science, technology, engineering and maths (STEM), 2015

“all students to complete Year 12 will require successful completion of an English or humanities subject and a maths or science subject as a prerequisite for acquisition of an Australian Tertiary Admission Rank (ATAR).”

What is St Leonard’s College doing now?
21st century skills

• collaboration
• problem solving
• critical thinking
• creative thinking
• general ICT capability

Yr 7-12 2016 courses

• Year 8 STEM elective
• Year 10 Programming elective
• VCE Unit 3&4 Software development

• Comprehensive Mathematics and Science courses
• Cocurricular activities
  • Year 8 STEM club
  • Year 3/4 Robotics club
What is St Leonard’s College missing?

DigiSTEM

- New subjects
- A new faculty area
- Digital Technologies curriculum from VCAA and ACARA
- STEM, elements of the Design Technologies curriculum
Integration P-4

• DigiSTEM staff to work with P-4 teachers to embed key skills and/or develop DigiSTEM projects.

Yr 5-12 2016 courses

• Year 8 STEM elective
• Year 10 Programming elective
• VCE Unit 3&4 Software development
2017 courses

- Year 5 DigiSTEM core
- Year 6 DigiSTEM core
- Year 7 DigiSTEM core
- Year 8 STEM elective
- Year 8 DigiTech elective
- Year 9 STEM elective
- Year 9 Game Creation elective
- Year 10 Software Engineering elective
- VCE Unit 1&2 Computing
- VCE Unit 3&4 Software development

What will they do?

- Curriculum to be based around the new Digital Technologies curriculum from ACARA underpinned by computational thinking.
- A key focus on the design process to enable students to decompose problems and prototype solutions. (Therefore elements of the Design Technologies curriculum).
- Competitions
• Can you program a robot to do …… ?
• How do you create a prothetic hand for …… ?
• Program this Sphero to navigate the …… ?
• Using your understanding of binary and wired networks can you …… ?
• Design, Develop and Market a solution to …… ?
• How could you use this drone to deliver …… ?
• Design and Build a robot together in an effort to … ?
• As a team can you coordinate an automated system to …… ?

What will they use?

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Pathways

P-4  DigiSTEM integrated with core skills

5-7  DigiSTEM as a subject

8-9  DigiTech and/or STEM

10-12 DigiTech and/or Sciences and/or Maths

2018 courses ???

• Year 5,6,7 DigiSTEM core
• Year 8 STEM elective
• Year 8 DigiTech elective
• Year 9 STEM elective
• Year 9 Game Creation elective
• Year 10 Software Engineering elective
• **IB Computer Science**
• VCE Unit 1&2 Computing
• **VCE Unit 1&2 and/or 3&4 Systems Engineering**
• **VCE Unit 3&4 Informatics**
• VCE Unit 3&4 Software development
STEM Centre

STEM Centre
Staffing

2016
• Vaughan Anderson (Digital Technologies Coordinator)
• Di Gilbert (STEM Coordinator)
• Chris Hyde (STEM Teacher)

Questions?