Suggested Reference


Copyright

Items in ResearchSpace are protected by copyright, with all rights reserved, unless otherwise indicated. Previously published items are made available in accordance with the copyright policy of the publisher.

https://researchspace.auckland.ac.nz/docs/uoa-docs/rights.htm
Understanding undergraduate attributes: A pre-post test survey of student self-reports during academic year 2014

Gavin T L Brown
The University of Auckland
Presentation to the TUV group Umea University, September 2015
gt.brown@auckland.ac.nz
Generic competencies

- We expect more of university graduates than just professional skills
- OECD calls these extras, key competencies which
  - are instrumental for meeting important, complex demands in multiple areas of life;
  - contribute to highly valued outcomes at the individual and societal levels in terms of a successful life and a well-functioning society; and
  - are important to all individuals for coping successfully with complex challenges in multiple areas. (Rychen, 2003)
Attempts to define the goals

- OECD “Assessing Higher Education Learning Outcomes (AHELO),
  - the goal of establishing what students in higher education know and can do upon graduation, for example
    - critical thinking,
    - analytical reasoning,
    - problem-solving, and
    - written communication
  - Considered essential and common across disciplines
- But some issues need to be considered
The purposes of a university degree

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Social democratic values and action; civic engagement</td>
<td>Upon graduation taking an active role in society, service, and co-curricular activities, with active concern for civic concerns.</td>
</tr>
<tr>
<td>2. Family expectations/reasons</td>
<td>Fulfilling expectations and aspirations of one’s family</td>
</tr>
<tr>
<td>3. Graduate school education preparedness</td>
<td>Skills and knowledge required when entering graduate programs in a specific discipline.</td>
</tr>
<tr>
<td>4. Personal integrity</td>
<td>Becoming aware of dissonance and having the competence to make decisions in accordance with personal morality and values.</td>
</tr>
<tr>
<td>5. Personal life quality enhancement</td>
<td>Developing a personal sense of purpose and identity such that the quality of one’s own life is improved.</td>
</tr>
<tr>
<td>6. Vocational &amp; employment preparedness</td>
<td>Using degree education to gain a highly remunerative job and/or career or having the skills that permit entry into a desirable future career.</td>
</tr>
<tr>
<td>7. Interpersonal skills</td>
<td>Gaining competence around relationships with others, esp. in conditions of complex social diversity, exercising tolerance, curiosity, ingenuity, and imagination.</td>
</tr>
<tr>
<td>8. Advanced communication skills</td>
<td>Sophisticated abilities to communicate orally, in writing, and through ICT-supported media so as to effectively transmit information, persuade, argue, and so on.</td>
</tr>
<tr>
<td>9. Advanced intellectual skills</td>
<td>High-level cognitive and intellectual skills such as problem solving, analytic and critical thinking, and creativity.</td>
</tr>
</tbody>
</table>
Known cognitive & communicative effects of university education

• Pascarella & Terenzini (2005) found a bachelor degree causes large effect sizes
  – (i.e., English .77, Math .55, Science .62, Social sciences .74, Liberal arts .80, Critical thinking skills .50, reflective judgement thinking .90, and epistemological sophistication or maturity 2.00).

• BUT Arum & Roksa (2011) found that student cognitive and communicative skills on *Collegiate Learning Assessment* (CLA)
  – had little difference after two-years of attendance at many American universities, but
  – Gains were associated with previous preparation and challenging work
University Ambitions

• 1st degree students will have a range of skills upon graduation
  – Sometimes called attributes
• Usually approved by governing body
• But what are these?
  – Aspirations
  – Expectation (Assessable Targets)
  – Accountability Standards
• Does having a degree matter to self-reported dispositions?
Ignored Outcomes

• Spronken-Smith et al. (2012) showed that
  – graduate attribute descriptions exist in 7 NZ universities but
  – little in-depth institutional engagement with the outcomes, especially around student assessment and course evaluation.

• Lumina Foundation (2012)
  – most colleges and universities in the United States provide very little data on what students learn
  – less information on what students should attain as they progress through the college years

• Grays & Brown (2015) showed that
  – Senior managers generally treated attributes as aspirational
University of Auckland

- Large ($N \approx 42,000$), publically-funded, research-intensive university, in the largest metropolitan region of the country. (32.4% of national population)
- Selective entry (25% higher minimum than other NZ universities on NCEA)
- General Education = 2 introductory courses outside home faculty
University of Auckland—
Graduate Profile

• Approved by Senate—by the end of undergraduate degree the student will acquire

• 3 major qualities
  – I Specialist knowledge

• Strong reputation that UoA graduates acquire this knowledge through research-based teaching within faculties and disciplines
University of Auckland—Graduate Profile

• **II General intellectual skills and capacities**

  2.1 critical, conceptual and reflective thinking;
  2.2 *intellectual openness and curiosity*;
  2.3 creativity and originality;
  2.4 Intellectual integrity;
  2.5 recognise, use, and evaluate information; organise and communicate knowledge;
  2.6 undertake numerical calculations and understand quantitative information;
  2.7 use of advanced information and communication technologies

• **Presumably covered in assessing the discipline knowledge**
III Personal qualities

3.1 Love and enjoyment of ideas, discovery and learning;
3.2 Work independently and in collaboration with others;
3.3 Self-discipline and an ability to plan and achieve personal and professional goals;
3.4 Lead in the community, and a willingness to engage in constructive public discourse and to accept social and civic responsibilities;
3.5 Respect for the values of other individuals and groups, and an appreciation of human and cultural diversity;
3.6 Personal and professional integrity and an awareness of the requirements of ethical behaviour
Method

• Repeated Measures Survey
• Factor analytic approach
  – Multiple items for each construct
  – CFA of pre-existing models
  – EFA for new models, with CFA validation
  – Time 1 vs. Time 2 invariance testing
  – Mean score comparison
Design

How do cohorts compare on the attributes?

How do students change on the attributes?
## Participants

### Early 2014, n=339

<table>
<thead>
<tr>
<th>Year</th>
<th>Bachelor’s n=241</th>
<th>GradDip n=98</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>196</td>
<td>81.3</td>
</tr>
<tr>
<td>Male</td>
<td>37</td>
<td>15.4</td>
</tr>
<tr>
<td>No response</td>
<td>8</td>
<td>3.3</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>35</td>
<td>14.5</td>
</tr>
<tr>
<td>European</td>
<td>98</td>
<td>40.7</td>
</tr>
<tr>
<td>Maori</td>
<td>23</td>
<td>9.5</td>
</tr>
<tr>
<td>Middle Eastern/Latin American/African</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pacific</td>
<td>37</td>
<td>15.4</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>2.9</td>
</tr>
<tr>
<td>More than 1 ethnicity</td>
<td>34</td>
<td>14.1</td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>1.2</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>119</td>
<td>49.4</td>
</tr>
<tr>
<td>Final</td>
<td>107</td>
<td>44.4</td>
</tr>
<tr>
<td>Other/unknown</td>
<td>15</td>
<td>6.2</td>
</tr>
</tbody>
</table>

### Late 2014, n=165

<table>
<thead>
<tr>
<th>Year</th>
<th>Bachelor’s n=124</th>
<th>GradDip n=41</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>103</td>
<td>83.1</td>
</tr>
<tr>
<td>Male</td>
<td>20</td>
<td>16.1</td>
</tr>
<tr>
<td>No response</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian</td>
<td>18</td>
<td>14.5</td>
</tr>
<tr>
<td>European</td>
<td>63</td>
<td>50.8</td>
</tr>
<tr>
<td>Maori</td>
<td>9</td>
<td>7.3</td>
</tr>
<tr>
<td>Middle Eastern/Latin American/African</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pacific</td>
<td>11</td>
<td>8.9</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>More than 1 ethnicity</td>
<td>17</td>
<td>13.7</td>
</tr>
<tr>
<td>Unknown</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First</td>
<td>79</td>
<td>63.7</td>
</tr>
<tr>
<td>Final</td>
<td>38</td>
<td>30.6</td>
</tr>
<tr>
<td>Other/unknown</td>
<td>7</td>
<td>5.6</td>
</tr>
</tbody>
</table>
Measures

• A 50-item online Graduate Profile Survey

• **Attribute 2.2** An intellectual openness and curiosity.

• **Attribute 3.1** A love and enjoyment of ideas, discovery and learning.
  – 20 items (combined),

• **Attribute 3.5** Respect for the values of other individuals and groups, and an appreciation of human and cultural diversity.
  – 30 items for attribute 3.5

Results: Attributes
2.2 + 3.1

<table>
<thead>
<tr>
<th>Curiosity</th>
<th>Love of learning</th>
<th>Answer-seeking</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 items</td>
<td>6 items</td>
<td>4 items</td>
</tr>
<tr>
<td>2. I am intrigued by many different topics.</td>
<td>5. I find learning to be interesting and exciting.</td>
<td>1. I like to enquire about things I do not understand.</td>
</tr>
<tr>
<td>6. I am curious about things.</td>
<td>9. I love to learn.</td>
<td>3. I like trying to solve problems that puzzle me.</td>
</tr>
<tr>
<td>8. Many things interest me.</td>
<td>11. I look forward to learning new things.</td>
<td>7. I enjoy searching for answers.</td>
</tr>
<tr>
<td>12. I am inquisitive.</td>
<td>15. The prospect of learning new things excites me.</td>
<td>14. I like finding answers to questions.</td>
</tr>
<tr>
<td>13. I enjoy thinking about things.</td>
<td>16. I want to know more about things.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>19. Learning more in my field of study pleases me.</td>
<td></td>
</tr>
</tbody>
</table>
Results: Attributes

2.2 + 3.1

Standardised pattern coefficients and error variances of the 15-item, three-factor model in Late 2014; Early 2014 estimates superscripted
## Results: Attribute 3.5

<table>
<thead>
<tr>
<th>Perspectives/ideas</th>
<th>Cultures/groups</th>
<th>Backgrounds/individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. I like to consider how other people’s perspectives might differ from mine.</td>
<td>6. I read about customs and cultural practices of other groups.</td>
<td>4. I like getting to know people of a race or nationality other than my own.</td>
</tr>
<tr>
<td>15. I try to do things that will broaden my perspective.</td>
<td>7. I enjoy going places where people speak a different language.</td>
<td>13. I like thinking about how people are shaped by their experiences.</td>
</tr>
<tr>
<td>18. I enjoy being introduced to new ideas and ways of thinking.</td>
<td>11. I am interested in visiting sites that have special significance in another culture.</td>
<td>21. I enjoy conversations with people about their backgrounds.</td>
</tr>
<tr>
<td>28. I have discussions with people about their ideas.</td>
<td>30. I want to know more about another ethnic group.</td>
<td>24. I attempt to learn about people’s upbringing and life experiences.</td>
</tr>
</tbody>
</table>
Results: Attribute 3.5

Standardised pattern coefficients and error variances of the 15-item, three-factor model in Late 2014; Early 2014 estimates superscripted.
## Invariance T1-T2

**Model** | $\chi^2$ | $df$ | $\chi^2/df$ | RMSEA | CFI | SRMR | AIC | $\hat{\gamma}$
--- | --- | --- | --- | --- | --- | --- | --- | ---
**Att 2.2; 3.1**
Early 2014 | 225.67 | 87 | 2.59 | .07 | .96 | .03 | 8886.34 | .94
Late 2014 | 177.56 | 87 | 2.04 | .08 | .94 | .05 | 4191.89 | .93
Configural | 403.23 | 174 | 2.32 | .08 | .96 | .04 | 13078.23 | .94
Metric | 423.71 | 189 | 2.24 | .07 | .95 | .11 | 13068.72 | .94
Scalar | 437.27 | 204 | 2.14 | .07 | .95 | .13 | 13052.27 | .94

**Att 3.5**
Early 2014 | 143.98 | 51 | 2.82 | .08 | .96 | .04 | 8059.99 | .95
Late 2014 | 103.92 | 51 | 2.04 | .08 | .95 | .04 | 3692.06 | .94
Configural | 247.90 | 102 | 2.43 | .08 | .95 | .04 | 11752.04 | .95
Metric | 256.13 | 114 | 2.25 | .08 | .95 | .09 | 11736.27 | .95
Scalar | 275.64 | 126 | 2.19 | .07 | .95 | .11 | 11731.79 | .95

**Standards:** $\chi^2/df<3.00$; RMSEA<.08; CFI + $\hat{\gamma}$>.90; SRMR<.08; ΔCFI<.01
### Factor Inter-Correlations

<table>
<thead>
<tr>
<th></th>
<th>Early 2014</th>
<th></th>
<th></th>
<th></th>
<th>α</th>
<th></th>
<th></th>
<th>Late 2014</th>
<th></th>
<th></th>
<th></th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Curiosity</td>
<td>--</td>
<td>.89</td>
<td></td>
<td></td>
<td>.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Love of learning</td>
<td>.81</td>
<td>--</td>
<td>.93</td>
<td>.78</td>
<td>.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Answer-seeking</td>
<td>.82</td>
<td>.78</td>
<td>--</td>
<td>.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Perspectives/ideas</td>
<td>.52</td>
<td>.53.49</td>
<td>--</td>
<td>.82</td>
<td>.86</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Cultures/groups</td>
<td>.43</td>
<td>.44.44</td>
<td>.67</td>
<td>--</td>
<td>.80</td>
<td>.52</td>
<td>.37.43</td>
<td>.65</td>
<td>--</td>
<td>.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Backgrounds/individuals</td>
<td>.45</td>
<td>.45.43</td>
<td>.78.67</td>
<td>.82</td>
<td></td>
<td>.53</td>
<td>.41.41</td>
<td>.79.74</td>
<td>.77</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Factors are stable across times so comparison of means is valid.
Curiosity T1-T2

CURIOSITY

First-year undergraduate  |  Final-year undergraduate  |  Graduate Diploma

Early 2014  
4.86  |  4.87  |  5.18

Late 2014  
4.96  |  5.18  |  5.32

$\text{d} = .53$

$\text{d} = .44$

$\text{d} = .40$

$\text{p} < .05$

$\text{p} < .01$

$\text{p} < .05$
Love of Learning
T1-T2

LOVE OF LEARNING

First-year undergraduate
Final-year undergraduate
Graduate Diploma

Early 2014
Late 2014

d = .41

4.97
5.28

4.84
5.04

5.28
5.28

5.41

d = .56

p < .001

p < .01

p < .05
Answer Seeking
T1-T2

Answer-Seeking

First-year undergraduate
Final-year undergraduate
Graduate Diploma

Early 2014: 4.70, 4.74, 5.01
Late 2014: 4.87, 4.86, 5.16

$d = .42$
$d = .35$
$p < .05$
$p < .01$
Openness Cultures/Groups T1-T2

CULTURES/GROUPS

- First-year undergraduate
- Final-year undergraduate
- Graduate Diploma

Early 2014
- 4.46
- 4.45
- 4.75

Late 2014
- 4.61
- 4.51
- 5.05

$d = .49$

$p < .05$

$d = .60$

$p < .05$
Openness Perspectives/ Ideas

T1-T2

**PERSPECTIVES/IDEAS**

- First-year undergraduate
- Final-year undergraduate
- Graduate Diploma

<table>
<thead>
<tr>
<th></th>
<th>Early 2014</th>
<th>Late 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-year</td>
<td>5.08</td>
<td>5.24</td>
</tr>
<tr>
<td>Final-year</td>
<td>4.95</td>
<td>5.13</td>
</tr>
<tr>
<td>Graduate Diploma</td>
<td>5.13</td>
<td>5.04</td>
</tr>
</tbody>
</table>
Openness Backgrounds/Individuals T1-T2

**Backgrounds/Individuals**
- First-year undergraduate
- Final-year undergraduate
- Graduate Diploma

<table>
<thead>
<tr>
<th></th>
<th>Early 2014</th>
<th>Late 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>First-year</td>
<td>5.21</td>
<td>5.20</td>
</tr>
<tr>
<td>Final-year</td>
<td>5.10</td>
<td>5.38</td>
</tr>
<tr>
<td>Graduate Diploma</td>
<td>5.28</td>
<td>5.29</td>
</tr>
</tbody>
</table>
### Effects: Matched Cases

<table>
<thead>
<tr>
<th>Scale</th>
<th>First-years $(n=39)$</th>
<th>Final-years $(n=34)$</th>
<th>Grad Dips $(n=40)$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r$</td>
<td>$d$</td>
<td>$r$</td>
</tr>
<tr>
<td>Curiosity</td>
<td>.55</td>
<td>-0.14</td>
<td>.58</td>
</tr>
<tr>
<td>Love of learning</td>
<td>.65</td>
<td>-0.30</td>
<td>.69</td>
</tr>
<tr>
<td>Answer-seeking</td>
<td>.75</td>
<td>-0.19</td>
<td>.64</td>
</tr>
<tr>
<td>Openness to diverse perspectives/ideas</td>
<td>.70</td>
<td>-0.29</td>
<td>.71</td>
</tr>
<tr>
<td>Openness to diverse cultures/groups</td>
<td>.73</td>
<td>0.22</td>
<td>.75</td>
</tr>
<tr>
<td>Openness to diverse backgrounds/individuals</td>
<td>.59</td>
<td>-0.10</td>
<td>.72</td>
</tr>
<tr>
<td>Average effect</td>
<td>-0.13</td>
<td>0.06</td>
<td></td>
</tr>
</tbody>
</table>
Result Summary

• no stat. sig. differences in mean between first- and final-year undergraduates at any time

• GradDip students had stat. sig. higher means
  – (medium effect) than first-years on four scales;
  – (small-to-large effect) than final-year undergraduates on four scales
Result Summary

• Mean effect time 1 to time 2 matched cases
  – negative effects for first years,
  – slightly above zero for final year students, and
  – moderately positive gains for Grad Dip

• Perhaps first years over-rated at the beginning of the year and become more modest and circumspect about themselves.

• small positive changes in final years is not encouraging

• reasonably robust gains for Grad Dips
Conclusion

• Having a first degree seems to contribute to the acquisition of these desired attributes.

• Final-year students became more like GradDip students, and less like first-year students by the end of 2014 than at the start of the year.

• Unlike first-year students, the final-year and GradDip cohorts increased on love of learning and openness to diverse cultures/groups,
  – possibility that degree completion near or attained produces greater possession of the University’s desired attributes.
  – BUT not observed on the other four scales.
Limitations

• Relatively small samples
• Variation in enrolment of cohorts within the population
  – larger samples and multiple cohorts are required
• GradDip students may differ because their undergraduate education was not in Faculty of Education or from a different university.
Limitations

• GradDip programme curricular emphases on preparing teachers for diversity

• Students choosing teaching as a profession are biased toward positive views of diversity and openness to others as a prerequisite for being a teacher.
  – lower means in other disciplines that do not prioritise these attributes?

• Self-report espousal not = behaviour
Conclusion

• Having a degree seems to make a difference at least in Teacher preparation at our university

• So university could claim association with attribute acquisition but probably not causation of attributes
Preferred citation: