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Designing an e-portfolio for assurance of learning focusing on adoptability and learning analytics

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The *Assurance of Learning for Graduate Employability* framework is a quality assurance model for curriculum enhancement for graduate employability, enabling graduates to achieve "the skills, understandings and personal attributes that make [them] more likely to secure employment and be successful in their chosen occupations to the benefit of themselves, the workforce, the community and the economy" (Yorke, 2006). Of particular note is the framework's dependence on three foundations, including easy access to integrated and accessible tools for staff and student self-management. In other words, this approach to curriculum quality depends on staff and student access to tools that enable them to self-manage their learning. This paper examines two aspects which informed the design of a student e-portfolio system, *iPortfolio*, intended for students' self-management of their learning, particularly recording evidence of their achievement of capabilities. The paper focuses on two particular considerations in the design of the *iPortfolio*: adoptability and learning analytics. Adoptability means the phase preceding adoption, whether students have the devices, platforms and technology skills to be able to use such an innovation. The *iPortfolio* also facilitates learning analytics: it has the capability to gather data related to learning indicators for course quality assurance purposes. Both adoptability and analytics are very dynamic fields: new devices, platforms and applications constantly spark changes in user habits, and policy changes mean institutions need to be able to provide new data, often at short notice. In the conclusion, the paper suggests how tools such as the *iPortfolio* can be designed for 'future proofing' and sustainability.

Introduction

The *Assurance of Learning for Graduate Employability* framework (Oliver 2010) is a quality assurance model for curriculum enhancement for graduate employability, enabling graduates to achieve "the skills, understandings and personal attributes that make [them] more likely to secure employment and be successful in their chosen occupations to the benefit of themselves, the workforce, the community and the economy" (Yorke, 2006). The framework, as depicted in Figure 1, suggests that the capabilities that count for early professional success are most effectively assured when curriculum leaders:

- determine the capabilities and standards required for graduates' early professional success;
- map the curriculum to ensure the capabilities are progressively developed and assessed, and enhanced through work integrated learning;
- evaluate evidence of achievement based on (1) portfolio approaches to teacher, self and peer summative and formative assessment; and (2) teaching and learning

quality indicators including stakeholder perceptions of graduates' demonstration of the capabilities; and
- benchmark for continuous improvement.

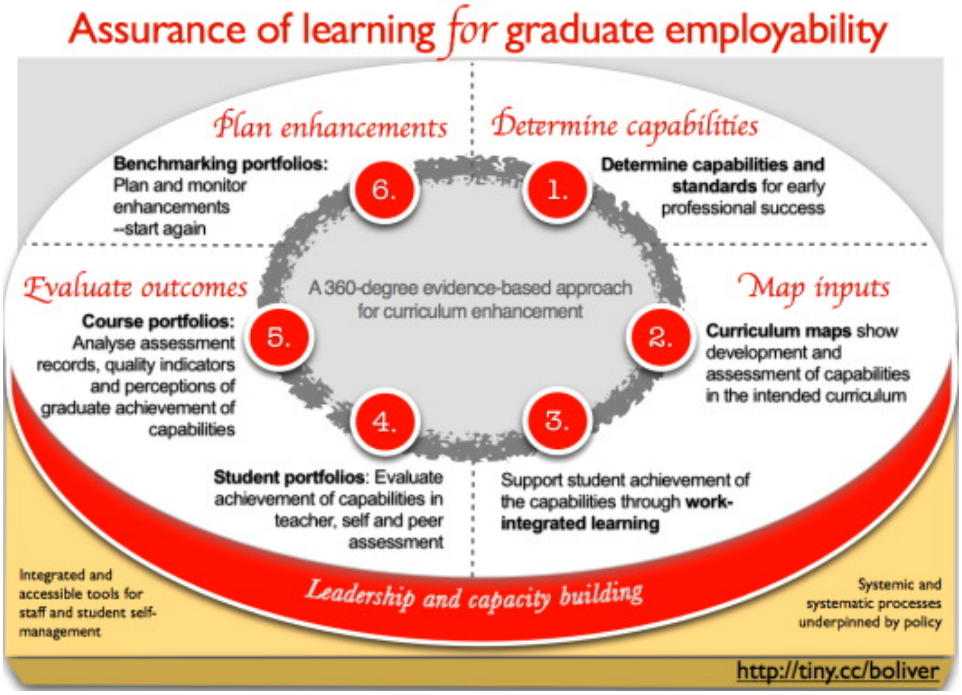

Figure 1: The *Assurance of Learning for Graduate Employability* framework

Of particular note is the framework's dependence on three foundations, including integrated and accessible tools for staff and student self-management. In other words, this approach to curriculum quality depends on staff and student access to tools that enable them to manage learning. The concept of the framework emerged as part of Curtin University's *Curriculum 2010* (C2010) project, a three-year curriculum renewal initiative. The project outcomes included innovative tools for staff (curriculum mapping and costing tools, and graduate employability surveys) and students (an eportfolio system called *iPortfolio*). The *iPortfolio* is newly implemented and appears to have been successful in terms of awards, user subscriptions and hit rates; however, this paper is not focused on the implementation or the uptake of the system (in depth analyses will be reported in a separate paper). Instead, this paper focuses on two particular considerations in the design of the *iPortfolio*: adoptability and learning analytics.

In this paper, adoptability means researching the phase preceding adoption: do students have the devices, platforms and technology skills to be able to use the innovation? This paper reports on the literature to date on this topic as well as research at the home institution that informed the design of the *iPortfolio*. Secondly, assurance of learning requires that systems have data capability for self-directed learning, and for institutional quality assurance purposes. This paper includes background information on the emerging field of learning analytics and how and why this has been factored

into the design of the *iPortfolio*. Finally, both adoptability and analytics are very dynamic: new devices, platforms and applications constantly spark changes in user habits, and policy changes mean institutions need to be able to provide new data, often at short notice. In the conclusion, the paper suggests how tools such as the *iPortfolio* can be to some degree 'future proofed' and sustainable.

Adoptability: If we build it, can they use it?

According to Rogers' diffusion of innovation theory (Rogers, 1995), five factors affect the rate of adoption of any innovation: we are more likely to adopt innovations (ideas, practices or objects) if they are better than what they supersede; compatible and consistent with our values, experiences, and needs; easy to use; trial-able and observable. More fundamental, however, is whether we have the tools and associated capabilities to even try to adopt the innovation. Information technology innovations can only be adopted if the users have ongoing access to the devices and platforms on which they function.

Since 2004, undergraduate students at US higher education institutions have been surveyed about their ownership and use of ICT on an annual basis (Kvavik, Caruso & Morgan, 2004; Kvavik & Caruso 2005; Salaway & Caruso, 2007; Smith, Salaway et al. 2009), and research has also been reported on Australian undergraduates (Oliver & Goerke, 2007; Kennedy, Judd et al. 2008; Gray, Chang et al. 2010). Many studies show, unsurprisingly, that student ownership of mobile devices and other forms of ICT have increased over recent years (Smith, Salaway et al. 2009), with most students reporting that they own a computer and/or a mobile phone (Caruso, 2004; Caruso & Salaway 2007; Kennedy, Judd et al. 2008). The technologies themselves have also changed over the years, with increasing ownership of laptop computers and smart phones, corresponding to decreasing ownership of desktop computer and simple mobile phones (Caruso & Salaway 2007; Smith, Salaway et al. 2009). Like broader populations, most students have access to the Internet, more often using broadband rather than dialup access (Caruso & Salaway 2007; Kennedy, Judd et al. 2008).

However, as there are differences in technology provisions between institutions (Caruso & Kvavik, 2005) and between countries (Wentzel, Lammeren et al. 2005), it is important to gather institutional level data, particularly given rapid deployment of new innovations. In the Western world, many have increased access to wireless networking (and Internet access via mobile handsets); social networking applications such as *FaceBook*, *MySpace* and *Twitter* have changed communication patterns, and the 'read-write' web has enabled far greater interactivity and user-driven content (Melville, Allan et al. 2009; Lenhart, Purcell et al. 2010).

For this reason, Curtin University has tracked student usage and ownership of devices and applications since 2007. The two recent surveys (2009 and 2010) sought information on student access to the Internet off campus, ownership and use of mobile devices, and perceptions as to how the learning experience might be enhanced with devices, network services and online tools. The results of the 2009 data gathering exercise have been reported elsewhere (Oliver & Nikoletatos, 2009). Those results are repeated for comparison with the 2010 results (the full text of the 2010 survey is given in the Appendix, and some details for the 2010 survey method are given below).

Method: 2010 survey

The 2010 survey contained several small differences from the 2009 survey (Oliver & Nikoletatos, 2009). The 2009 survey asked students about music devices (e.g. *iPods*), but with the convergence of such devices into mobile phones, this was not asked in 2010. In 2009, students were asked about ownership of netbooks, understood by the researchers to be smaller size laptops running cut down versions of basic software. Responses showed that the term was not well understood by students in 2009. In 2010, the more global term 'portable computer' seemed more appropriate.

For two weeks in April 2010 a web survey was available to students through Curtin's student portal, similar to the survey conducted in 2009. It sought information on students' access to the internet off campus, their ownership and use of mobile devices and their perceptions as to how their learning experience at Curtin might be enhanced with devices, network services and online tools. The preface for the 2010 survey was:

> Curtin is interested in the mobile devices you own and how you use them, so we can meet your connectivity needs. By completing this survey you will be entered into a prize draw to win one of nineteen available $20 book vouchers for the Curtin Bookshop. Your student ID will be recorded for the purposes of entering you in the draw (and to ensure each student completes the survey only once); however your ID will not be recorded with your survey responses. The results of this survey may be published in research but your identity will not be revealed in any way. Submission of this survey assumes you give your consent to your anonymous feedback being included in results and reporting.

Table 1: Comparison of the respondent groups in 2009 and 2010

		2009 (%) n = 1536	2010 (%) n = 537	Difference χ^2
Gender	Male	43.2	50.1	0.006
	Female	56.8	49.9	
First language	English	79.9	78.8	0.582
	Other	20.1	21.2	
Age	Under 20	41.9	32.6	0.002
	20-25	40.2	45.4	
	26-35	11.9	15.1	
	Over 35	6.0	6.9	
Faculty	Business	28.4	25	0.250
	Health	28.8	27.4	
	Humanities	16.3	17.9	
	Science and Engineering	26.6	29.8	
Level	Postgraduate	12.2	14.3	0.210
	Undergraduate	87.8	85.7	
Enrolment	Full time	88.9	87.2	0.266
	Part time	11.1	12.8	
Progress	None, I am commencing	43.5	37.8	0.125
	Up to about half	34.6	37.1	
	About three quarters	11.6	13.8	
	Most, completing soon	10.3	11.4	

Findings

The results of both the 2009 and 2010 surveys are reported here to indicate change. At the close of the survey period, the results were gathered in an *Excel* spreadsheet. Quantitative results were reported as percentage agreement with each item, and qualitative comments were analysed to identify major trends and themes.

In 2009 there were 1536 responses, and far fewer in 2010 (537 responses) possibly due to the proximity of the surveys. The number of students who answered both surveys is unknown. Nevertheless, the two respondent groups are roughly comparable (see Table 1) except in sex and age (higher proportion of males and those 20 years or older in the 2010 respondents, $p < .05$). In both years, the majority of students were full time, 25 years or younger, had English as their first language, and were up to half way through their undergraduate studies in a similar spread of disciplines at the main urban campus.

In both years, the vast majority of students (93%) reported having Internet access off campus; in 2010, nearly 90% reported having broadband, and 42.3% had wireless. Each year, students were asked whether they owned a laptop or similar portable device, and their intentions to upgrade in the next 12 months. Table 2 shows ownership of laptops and similar devices was increased in 2010 as was the intention to upgrade. Students provided a variety of reasons for upgrading: functionality, usability and compatibility, brand attractiveness, availability and price.

Table 2: Ownership of laptops and similar devices

	2009	2010	$\chi 2$
Portable computer (laptop, netbook, or similar)*	77.7%	86%	0.000
Planning to upgrade in the next year	29%	42%	0.000

* The percentage of students owning a portable computer in 2009 was gathered from collating those who owned a laptop and/or a netbook.

Mobile phone ownership and intention to upgrade are similar: nearly all respondents owned a mobile phone (98.2% in 2009; 99.6% in 2010, $p > .05$). About a third each year signalled their intention to upgrade (30.3% in 2009; 38.6% in 2010, $p > .05$). In terms of brand and platform, about a quarter of students in 2009 were unsure what they would buy; in 2010, only 4% were undecided ($p < .05$): about a quarter planned to purchase *Nokia*, and about 45% planned to buy an *iPhone* (up from 20% the previous year, $p < .05$). Table 3 shows respondents' use of their phones: students frequently used their phones to access web pages, connect wirelessly (more so in 2010), take photos and use SMS texting, and less often to make videos, record audio and listen to music, MMS and video conferencing.

In relation to their use of social networking, Table 4 shows that usage of all the sites had increased (except *MySpace*), though some were from low starting points. There was very high and increased use of *Facebook* in 2010 (at least three-quarters were frequent users), and about a third of students used *Twitter* occasionally. *Second Life* usage was very low. When asked what devices and applications would improve their learning experience, students commented on laptops (some mentioned newer devices such as *iPads*, *iPod Touches* or *iPhones*); easy and reliable access to wireless; better access to computers, printers and photocopiers on campus; more access to streamed lectures; and more power points to charge devices.

Table 3: Student use of mobile phone functions

		2009	2010	χ^2
Access web pages	No, phone can't	15.3	11.9	0.000
	No, phone can but I don't	48.7	28.5	
	Yes, occasionally	23.4	22.5	
	Yes, frequently	12.7	37.2	
Access wireless (wi-fi)	No, phone can't	38.9	29.6	0.000
	No, phone can but I don't	38.7	23.9	
	Yes, occasionally	13.2	17.3	
	Yes, frequently	9.1	29.2	
Listen to music/audio	No, phone can't	10.3	7.2	0.009
	No, phone can but I don't	29.6	32.4	
	Yes, occasionally	38.0	32.8	
	Yes, frequently	22.2	27.7	
Watch movies	No, phone can't	32.5	23.4	0.002
	No, phone can but I don't	45.5	50.0	
	Yes, occasionally	16.2	18.4	
	Yes, frequently	5.8	8.2	
Take photos	No, phone can't	5.7	4.0	0.108
	No, phone can but I don't	8.5	11.0	
	Yes, occasionally	52.0	55.2	
	Yes, frequently	33.8	29.8	
Make videos	No, phone can't	13.2	9.7	0.000
	No, phone can but I don't	31.3	42.0	
	Yes, occasionally	41.5	36.3	
	Yes, frequently	14.0	12.0	
Record audio	No, phone can't	9.8	6.7	0.001
	No, phone can but I don't	44.5	54.7	
	Yes, I do occasionally	36.6	29.9	
	Yes, I do frequently	9.0	8.8	
Video conference (e.g. *Skype*)	No, phone can't	45.0	35.3	0.002
	No, phone can but I don't	46.6	53.4	
	Yes, I do occasionally	4.4	6.4	
	Yes, I do frequently	4.0	5.0	
Send and receive SMS	No, phone can't	0.5	0.4	0.699
	No, phone can but I don't	1.5	1.3	
	Yes, I do occasionally	9.0	10.8	
	Yes, I do frequently	89.0	87.5	
Send and receive MMS	No, phone can't	9.5	5.7	0.031
	No, phone can but I don't	32.6	30.2	
	Yes, I do occasionally	32.7	36.3	
	Yes, I do frequently	25.2	27.9	

Table 4: Do you use any of the following social networking sites?
(tick as many as apply)

Site	2009 %	2010 %	χ^2	Frequency of use (2010 only)		
				Frequently	Occasionally	Rarely
Facebook	79	90.4	0.000	78.8	16.2	5
MySpace	35	27.8	0.000	6.4	19.1	74.5
Friendster	11	10.7	0.000	1.9	22.2	75.9
Other	6	14.8	0.000	43.1	40	16.9
Flickr	6	15.6	0.000	8.9	44.3	46.8
Twitter	4	23.9	0.000	22.3	35.6	42.1
LinkedIn	1	10.6	0.000	7.4	38.9	53.7
Second Life	1	3.2	0.000	6.25	6.25	87.5

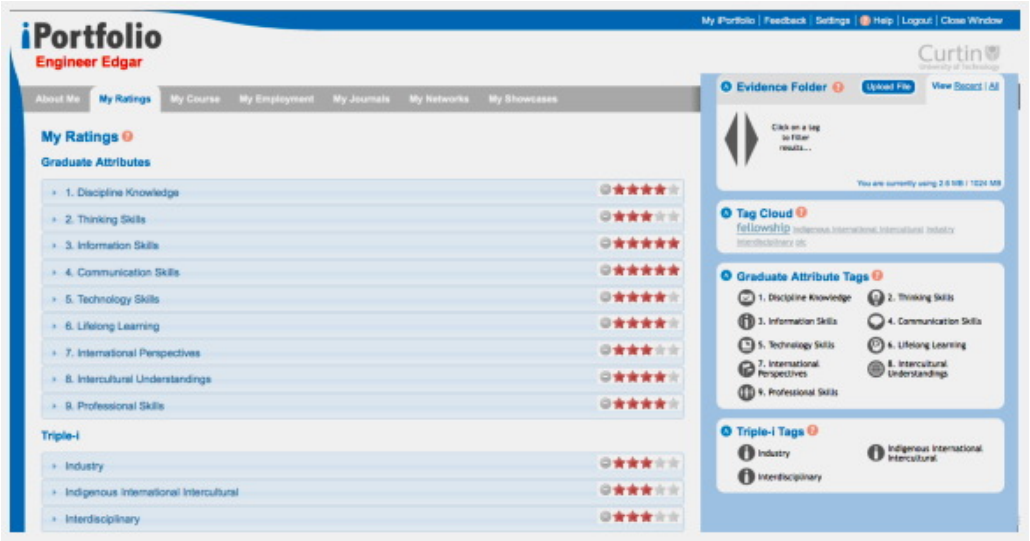

Figure 2: Screenshot of the *iPortfolio* showing the *My Ratings* and other tabs, and the tag cloud

The results of these surveys at Curtin and beyond provide evidence in relation to adoptability: the *iPortfolio* was designed on the premise that the majority of intended adopters were likely to have broadband (often wireless) access to the Internet off campus, and access using mobile devices; a newer laptop or similar device as well as a newer phone; familiarity with *iTunes* and *iPhone* apps (due to a high ownership of *iPhones*); the ability to access wireless, take photos, send text (and some have the ability record video and audio, and video conference on a mobile device); the ability to use Web 2.0 applications to create accounts, connect with others, communicate in web spaces, indicate 'liking' and rating; little interest in virtual worlds; and infrastructure needs on campus, such as easy and reliable access to wireless and power to charge their devices.

The *iPortfolio* (see Figure 2) is an online space with tabs where users can collaborate on, create, share, and manage information such as:

- *About Me:* profile picture, introduction, biography and goals;
- *My Courses:* tasks related to assessment and professional competencies;

- *My Employment:* resume, work-related skills, experiences and professional development;
- *My Journals:* reflective journals;
- *My Networks:* those who are invited to view, provide feedback or collaborate
- *My Showcases:* publish showcases through *iTunes U*.

Users can create screens and share them with selected others, and add content on screen. All uploaded evidence can be tagged according to Curtin's graduate attributes (and user-created tags), and an evidence panel shows a tag cloud to the *iPortfolio* owner (not invited others). An accompanying *iPhone* app enables users to collect and upload tagged photos, video and audio, as shown in Figure 3.

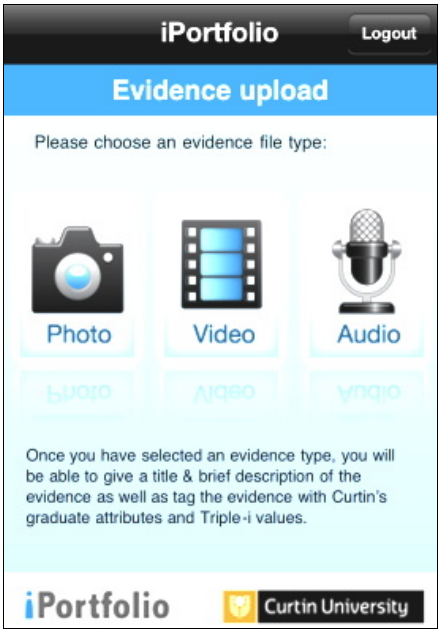

Figure 3: The *iPortfolio Mobile* app enables users to upload tagged photos, video and audio

Learning analytics

Australian higher education, like its Western counterparts, is increasingly focused on articulating and measuring quality standards, particularly in relation to generic and employability skills (Tertiary Education Quality and Standards Agency, 2011), partly to allay a loss of confidence that post-secondary education is producing graduates with appropriate capabilities (Precision Consulting, 2007; Arum, Roksa et al. 2011; Business Council of Australia, 2011). Western governments are moving rapidly towards publicising datasets based on quantitative measures of broad national surveys and institutional statements. The UK Higher Education Funding Council for England (HEFCE), for example, plans to publish indicators of student satisfaction as well institutional statements about employability (Higher Education Funding Council for England, 2010). In the US, the *Voluntary System of Accountability* (VSA) enables public universities to publish *College Portraits* which include measures of learning outcomes

drawn from the results of standardised testing (*Voluntary System of Accountability*, 2008). The Australian Government's *Advancing Quality in Higher Education* includes the *My University* website which will include measures such as student satisfaction, graduate skills and teaching quality (Department of Education Employment and Workplace Relations 2011). These national trends create a culture of quantitative assessment (Hrabowski, Suess et al. 2011) which enables institutions to focus each student's plan and progress in achieving essential learning outcomes, and use the results for continuous improvement (Hrabowski, Suess et al. 2011).

This data-driven policy shift coincides with the affordances of Web 2.0 tools which businesses increasingly use to identify consumer patterns for strategic marketing and deployment of resources (Coates, 2010). Similarly, educational institutions are adopting learning analytics, likely to be mainstream in four to five years (Johnson, Smith et al. 2011) to gather, aggregate and report learner information. These data tools for learning analytics — also known as academic analytics (Siemens & Long 2011) — have become a selling point for learning management systems (Kolowich, 2010). While some institutions use data tools for marketing, recruitment and retention, the potential for growth is in learner-centric and co-curricular analytics that empower learners to take greater responsibility for their personal and professional success (Norris, Baer et al. 2008). Many agree that current available data indicators — such as grades and completion rates — do not provide useable evidence in terms of learning achievements and employability (Goldstein, 2005; Norris, Baer et al. 2008). In Australian universities, there has been increased focus on building in-house analytics systems drawing on internal and national data sets (Scott, 2010; Towers, Alderman et al. 2010). Australian institutions have also designed and implemented their own employability surveys, in the absence of national data sets, to inform quality reviews of degree programs (Walker, 2009; Oliver, Hunt et al. 2010).

Measuring learning tends to produce quantitative data (Yorke, 2008) which is easily used in analytics systems and dashboards. Qualitative evidence of learning is traditionally housed in student portfolio systems, uptake of which has been increasing in recent years (Hallam, Harper et al. 2008; Joint Information Systems Committee, 2008; Hallam, Harper et al. 2009; Chen & Light, 2010; Hallam, Harper et al. 2010; Oliver, 2010). Emerging e-portfolio systems (or sometimes systems which incorporate e-portfolios) include mechanisms for self-management of learning that can feed into institutional learning analytics:

> The future world of action analytics will be highly learner-centric. Learners at all stages will have a greater array of information, choices, and value propositions available to them. ... . Learners will have greater opportunities to shape their learning experiences and share responsibility for their readiness and success. ... Moreover, learners will need to be more assertive in taking responsibility for building their capacity to succeed. In the evolving workforce environment of the future, higher education transcripts seem totally inadequate for meeting the needs of learners, teachers, parents, and employers. Eventually, portable, transportable, and fungible portfolios for learners will deploy action analytics at a personal level (Norris, Baer et al. 2008).

Course quality review at Curtin includes manually synthesising evidence from internal and national data sources to inform strengths and areas for improvement (Jones & Oliver 2008; Oliver, 2010). One of the few Australian indicators of graduate skills is the *Course Experience Questionnaire Generic Skills Scale*. It asks new graduates to indicate their level of agreement with the extent to which their course enabled them to enhance a limited range of generic skills (Coates, 2010). No such measure exists for Curtin

students as their course progresses. For this reason, and to encourage students to reflect on and assess their own achievement of learning, the *iPortfolio* incorporates a self-rating tool based on the graduate attributes (see Figure 2). The *My Ratings* tab enables self-assessment of attainment of the graduate attributes, enabling the owner to collate evidence and reflections and assign themselves an overall star-rating based on Dreyfus and Dreyfus' *Five-Stage Model of Adult Skill Acquisition* (Dreyfus, 2004). The dynamic and aggregated results are available to the user: as shown in Figure 4, the student can see a radar graph showing their self-rating in comparison with the aggregated ratings of their invited assessors (these could include peers, mentors, industry contacts, and so on).

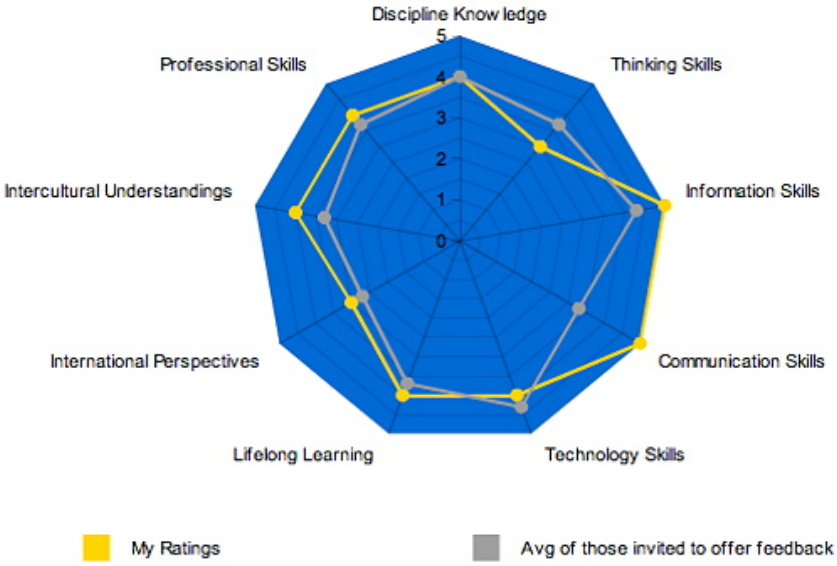

Figure 4: The *iPortfolio My Ratings* tab shows a radar graph comparing students' self-rating with aggregated ratings of invited others

Harvesting these data at course level provides a snapshot of students' views of their learning to date and this in turn can inform course quality review.

Conclusion: Opportunities and challenges

Designing and building tools in rapidly changing environments is fraught with challenges. In relation to the *iPortfolio*, user surveys suggest parameters which are quickly out of date: the 2010 survey did not canvass information about student use of tablets, or devices using platforms such as *Android* which are now increasing rapidly. Therefore, in spite of due diligence at the time, the adoptability of the tool is always subject to updates and checks, and this requires ongoing resources. The potential for analytics, as yet rudimentary, needs ongoing refinement and enhancement. Moreover, forthcoming research on the adoption and user feedback on the *iPortfolio* is required to inform improvements. The *Assurance of Learning for Graduate Employability* framework suggests an evidence-based approach to assuring graduate capabilities. The model can also suggest directions for enhancing the *iPortfolio* to become a potentially engaging employability environment for students.

Figure 5: Current and potential aspects of the *iPortfolio* overlayed on the *Assurance of Learning for Graduate Employability* framework

Figure 5 shows potential and implemented features of the *iPortfolio*, overlayed on the *Assurance of Learning for Graduate Employability* framework. They seek to capitalise on known drivers such as student motivation to gain employment (Oliver 2008), students' ICT behaviours as an indicator of adoptability, and the potential for analytics, as described in this paper. The figure shows the potential for integration with other curriculum tools in development at Curtin; their addition have the potential to contribute to enhancing the *iPortfolio* as a self-managed learning environment:

- At Point 2: With the incorporation of a dynamic curriculum mapping tool, students would be able to see where capabilities are specifically developed and assessed in their course;
- At Point 3: Students can use the *iPortfolio* mobile *iPhone* app to collect evidence of learning within and beyond the classroom, and tag the evidence with Curtin's graduate attributes. In addition, connection to a dynamic source of data offering work experience opportunities, such as the Australian Collaborative Education Network's WIL Portal (Australian Collaborative Education Network);
- At Point 4: Students use the *iPortfolio* to create, collaborate on and collect evidence of learning, as well as self and peer-assess their capabilities within the My Ratings tab. This could be enhanced by including statements of standards, and designing analytics to report on standards achieved;
- At Point 5: Data from the Graduate Employability Indicators (Oliver, Hunt et al. 2010), surveys that gather the perceptions of graduates of up to five years, employers and teaching staff on the capabilities that count for early professional

success, could be added to self and peer ratings to indicate to students views from other stakeholders.

Curtin University has focused on graduate employability as a key driver of teaching and learning improvement in recent years, and *iPortfolio* has been a major investment. This paper describes the underpinning employability framework, research informing adoptability, and learning analytics that are designed to enhance the system.

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Appendix: Survey of student ownership and use of technology, Curtin University, 2010

A. About you

Items	Response categories
1. What is your sex?	Male; Female
2. What is your first language?	English, African languages, Cantonese, French, German, Hindi, Italian, Indonesian, Japanese, Malay, Mandarin, Other
3. What is your age group?	Under 20; 20-25; 26-35; Over 35
4. What campus are you mainly studying at?	Bentley; Curtin Sarawak; Curtin Singapore; Curtin Sydney; Graduate Business School Perth; Regional WA
5. Which faculty are you enrolled in?	Curtin Business School; Health Sciences; Humanities/Centre for Aboriginal Studies; Science and Engineering
6. Your Course: are you	Undergraduate; Postgraduate course work; Postgraduate research (PhD or Masters by Thesis)
7. Are you currently enrolled?	Full Time; Part Time
8. Do you usually study	In face to face classes on campus; In online mode
9. How much of your course have you completed so far?	None, I am commencing; Up to about half; About three quarters; Most, completing soon

B. Your off-campus access to the Internet

Items	Response categories
10. Do you have access to the Internet outside University?	No; Yes
11. If yes, who is your Internet Service Provider (ISP)?	3; AAPT; iiNet; Optus; Telstra; Virgin; Vodafone; Westnet; Other:
12. If yes, is your Internet access mainly	Dial up; Broadband cable; Broadband wireless; Broadband modem (mobile device with USB plugin); Other

C. Your portable computers: Portable computers come in many shapes and sizes these days: they include laptops (similar power to a desktop and able to run full versions of most software), netbooks (smaller devices with wireless access, often run cut-down versions of software), tablets (similar to laptops and netbooks, but usually touchscreen) and so on.

Items	Response categories
13. Do you have a portable computer (that is, a laptop, netbook, tablet or similar)?	No; Yes
14. If yes, what brand is it?	Acer; Apple Mac; Asus; Compaq; Dell; HP; IBM; LG; NEC; Samsung; Sony; Toshiba; Unknown or Other
15. If yes, do you bring it to campus?	Frequently; Occasionally; Rarely; Never
16. If you bring your device to campus do you normally wish or need to: use wireless on the device; recharge your device	Yes; No
17. Regardless of what you have now, do you plan to buy or upgrade a portable computer (laptop, netbook, tablet or similar) in the next 12 months?	No; Yes
18. If yes, what brand do you plan to buy?	Acer; Apple Mac; Asus; Compaq; Dell; HP; IBM; LG; NEC; Samsung; Sony; Toshiba; Unknown or Other

D. Your mobile phone

Items	Response categories
19. Do you have a mobile phone?	No; Yes
20. If yes, is it a:	iPhone; BlackBerry; HTC; LG; Motorola; Nokia; Samsung; Siemens; Sony Ericsson; Unknown or Other
21. If yes, do you use it to: Access webpages; Access wireless; Listen to music and audio files; Watch movies; Take photos; Make videos; Record audio; Video conference (eg Skype video); Send and receive SMS; Send and receive MMS; Send and receive instant messages (Messenger, Yahoo etc)	No, my phone can't do this; No, my phone does this but I don't use it; Yes, occasionally; Yes, frequently
22. Who is your mobile phone provider?	Telstra; Optus; Vodafone; Virgin; 3; Other:
23. Do you plan to buy or upgrade your mobile phone within the next year?	No; Yes
24. If yes, do you intend to purchase	iPhone, BlackBerry; HTC; LG; Motorola; Nokia; Samsung; Siemens; Sony Ericsson; Other

E. Your use of social networking

25. Do you use following social networking sites: Facebook; Twitter; MySpace; LinkedIn; Second Life; Flickr; Friendster; Other	Never; Rarely; Occasionally; Frequently

F. What else?

26. What devices or online tools (if any) would enable you to have a richer student learning experience at Curtin?	[free text]
27. What improvements (if any) to Curtin's internet and network services can you suggest that would enhance your learning experience?	[free text]
28. Would you like to make any further comments?	[free text]

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