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## Personalised learning: an overview

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*A discussion paper prepared for  
Professor Joanne Wright, Deputy Vice-  
Chancellor (Academic)  
for the Vice-Chancellor's Retreat  
March 23<sup>rd</sup> & 24<sup>th</sup>, 2015*

March 16<sup>th</sup>, 2015

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## Executive Summary

- Personalised learning empowers students to become co-authors of their learning pathway and tailor their learning activities to meet their needs, abilities and interests.
- Key benefits include: (a) for students, improved learning outcomes and learning experience and (b) for institutions, an enhanced reputation as an institution that values and supports individual student's learning.
- Developing and embedding a personalised learning approach has significant implications on: (a) the design of curricula, pedagogy and assessment; (b) the development of staff as teachers and students as learners; and (c) the development of institutional cultures and infrastructure.
- A personalised learning approach must: (a) serve the moral purpose of meeting the learning requirements of each and every student; (b) be feasible to ensure this can happen on a large scale; and (c) produce educational outcomes that are valuable to the student, institution and society.
- Learning analytics map, guide, evaluate and enhance formal and informal learning experiences.
- New technologies can be utilised to support more personalised, active approaches to teaching and learning at scale and in a sustainable and cost effective way.

### 1. What is personalised learning?

Personalised learning is 'putting the learner at the heart of the education system' (Leadbetter, 2008). This philosophy resonated in Professor Peter Hoj's 2015 welcome message to new students: *'For our part, we'll work hard every day to make sure students are at the heart of everything we do and that your education and campus experience at one of the world's top universities are world class'*. Personalised learning involves extending the educational concepts of differentiation (teaching tailored to the learning preferences of different learners) and individualisation (teaching paced to the learning needs of different learners) to connect to the learner's interest and experiences and meet the needs, abilities and interests of every student through tailoring curriculum and learning activities to the individual. The ultimate aim of a personalised learning environment is to create an educational system that responds directly to the diverse needs of individuals rather than imposing a 'one size fits all' model on students (Bates, 2014; Williams, 2013).

Personalised learning shifts the role of students from being simply a 'consumer' of education to a 'co-producer and collaborator' of their learning pathway (Bates, 2014). For a student, personalised learning actively engages students in the process of learning, leading to improved learning outcomes and learning experiences. For institutions, it enhances their reputation as one that values and supports individual student's learning (Bentley & Miller, 2004).

Driving the shift towards 'personalisation of learning' in the higher education sector are the broadened experiences and increased expectations of students, affordances of technology and the blurring of physical and temporal campus boundaries (Bates, 2014; Leadbetter, 2008).

## 2. What does a personalised learning environment look like?

In practical terms, what does 'personalisation of learning' mean and how can it be enabled? Williams (2013) synthesised a body of work associated with a personalised learning approach to identify six key themes that were essential for an effective learning environment:

1. **Locus of control:** A learner-centred approach will not succeed without a committed shift towards sharing the ownership of learning with students.
2. **Knowing students as learners:** A personalised learning approach requires educators to know the attainment and progress of each student. Learning analytics can be used to make this scalable for large student populations (Buckingham Shum, 2014; Deakin Crick, Goldspink & Foster, 2013).
3. **Student engagement:** Connecting student's learning to their lives and aspirations through authentic activities will provide them with purpose and motivation to gain new knowledge and skills.
4. **Collaboration:** Personalised learning environments foster a culture where learners see themselves as both participants and contributors to the learning process.
5. **Effective use of ICT:** Technology allows for an anywhere, anytime, anyone approach to learning and can support the culture shift required for a student-centred approach across two broad areas: (1) providing the infrastructure to support personalised learning (learning analytics) and (2) providing a platform to deliver learning activities and resources to students.
6. **Classroom culture:** The relationship between educators and students is emphasised in a personalised learning environment and the educator must be aware of each student's interests, learning styles and readiness to ensure the needs of each student are met. This creates challenges for large classes but generates opportunities to use educational technologies and learning analytics to support the educator with this.

## 3. What are the implications of personalised learning?

The availability of new technologies provides greater opportunities to support more personalised approaches to teaching and learning. How to do this at scale, in a sustainable and cost effective way, requires careful analysis and planning. Bates (2014) suggests there are three key considerations: (1) implications for the design of curricula, pedagogy and assessment; (2) implications for the development of staff as teachers and students as learners; and (3) implications for the development of institutional cultures and infrastructures.

### 1. What are the implications for the development of curricula, pedagogy and assessment?

Developing a personalised learning approach requires a number of complex and multi-faceted considerations: (1) timing of learning – when; (2) pacing of learning – accelerated vs not; (3) place for learning – within and beyond campus; (4) ways of learning – blending learning, self-paced, inquiry-based, collaborative, etc; (5) support for learning – subject matter experts, key role of advising; (6) aims for learning – how will students achieve skills and competencies through disciplinary knowledge?; and (7) technology for learning – as a catalyst, enabler or connector?

Bates (2014) argues that developing program level outcomes should be the first step irrespective of discipline. Generic competencies provide a basic framework for this step and can be used as a starting point for engaging in program-level discussions with schools. At a course level, educators must consider *epistemology* (what do they think it means to know something in their discipline?), *assessment* (how will they evidence that students display those competencies?) and *pedagogy* (how will they scaffold the learner on their journey to achieve those competencies?) (Buckingham Shum, 2014). The use of learning analytics to provide data to personalise the learning experience may assist to make this scalable for large courses (Bates, 2014) (see Section 4).

## **2. What are the implications for the development of staff as teachers?**

Developing and embedding a personalised learning approach for courses will require educators to reflect deeply on their practice, and for some shift their pedagogical approach. Not all academics will have the broad range of instructional design skills required for this and universities will need to offer dedicated staff development activities (Bates, 2014).

Ambrose et al.'s (2010) seven research-based principles have been shown to be an effective framework for staff development activities, providing a bridge between research about learning (across a broad discipline range) and the implications for teaching practice. The seven-research based principles are: (1) students' prior knowledge can help or hinder learning; (2) how students organise knowledge influences how they learn and apply what they know; (3) students' motivation determines, directs and sustains what they do to learn; (4) to develop mastery, students must acquire component skills, practice integrating them and know when to apply what they learned; (5) goal-directed practice coupled with targeted feedback enhances the quality of student learning; (6) students current level of development interacts with the social, emotional and intellectual climate of the course to impact learning; and (7) to become self-directed learners, students must learn to monitor and adjust their approaches to learning.

## **3. What are the implications for the development of institutional cultures and infrastructures to enable and support the “personalisation of learning”?**

The student body has become increasingly complex and diverse. Students arrive at university from different starting points, with different resources and expectations, and learn at different paces with different styles. Adapting learning experiences to the variation of needs, interests and differences of individuals is a challenge for institutions but there is an increasing acceptance that educational systems need to change to become more flexible and adaptive, as well as to engage students who are at risk of not achieving within the current system (Williams, 2013). The purpose of 21st century education has evolved to include the generation of student competence in self-directed learning, citizenship, eco-sustainability and employability, in addition to traditional knowledge, skills and attitudes within particular domains (Deakin Crick et al., 2013).

Hargreaves (2005) describes nine areas that require a considerable degree of institutional policy development and organisational change to ensure a personalised learning approach is successfully embedded within the university culture: (1) curriculum, (2) advice and guidance, (3) assessment, (4) learning to learn, (5) school organisation and design, (6) workplace assessment, (7) new technologies (ICT), (8) mentoring, and (9) student voice. These areas fall across the two broad categories of systems and places.

*How can the University's systems be adapted to support a personalised learning approach?*

A personalised learning approach will require the university to be more agile and flexible. Several student-centred learning approaches, such as experiential learning that include reflection as a key step of learning, involve processes focussed on students' learning and development over a longitudinal time period, longer than a traditional 13-week semester. The redesign of curriculum to include learning experiences like these will have implications on semesterised courses and assessment. A transformative learning experience could include an expansion of learning opportunities outside of the formal classroom, for example community service learning, research experiences, internships and mentorships and international opportunities. Including these types of opportunities as formal components of degree programs could also have implications on the academic calendar. These learning experiences can include access to MOOCs and the recognition of MOOCs as prior learning.

## What campus space designs support a personalised learning environment?

Formal learning spaces need to be appropriately designed to accommodate the use of student-centred pedagogies. A move away from, for example, the tiered traditional lecture theatres towards flat-floored learning spaces with round tables and movable chairs can promote collaborative learning and enable active learning strategies to be effectively utilised. Another key aspect of personalised learning is fostering connections between a student's life and their learning experience. Strategies to foster this include providing adequate on-campus accommodation to encourage students to live on campus and immerse themselves in the recreational facilities, and providing informal learning spaces across campus to extend the opportunities for on-campus learning and support student interactions outside of the formal classroom environment.

The types of resourcing required by universities have changed with the increase in technology usage. For example, the traditional academic libraries provided by universities for students have always been spaces to find tools for learning. In the current technology era, universities need to reconsider their resourcing of libraries to create more functions spaces for self-directed learning using educational technologies and visualisation hardware and software. The DeLaMare Science and Engineering Library at the University of Nevada is a leading example of this, providing students with access to tools and resources to discover, create, design, model, engineer and learn (Conway, 2014).

A Learning Spaces Rating System (LSRS) has been developed to provide a set of measurable criteria to assess the effectiveness of formal learning spaces for promoting student-centred learning. Developers intend to expand the scope of the LSRS to include informal and specialised learning spaces (Johnson, Adams Becker, Estrada & Freeman, 2015).

## 4. What are potential challenges of personalising learning?

Among the key principles and design features that must be met, a personalised learning approach must: (1) serve the moral purpose of meeting the learning requirements of each and every student; (2) be feasible to ensure this can happen on a large scale; and (3) produce educational outcomes that are valuable to the student, institution and society (Fullan, 2009). It is widely recognised that the cultural shift towards personalisation of learning is positive, however several potential challenges and limitations have been highlighted in the literature:

**1. Students don't know what they don't know:** In order to be co-authors of their learning, students need an understanding of the next steps of their learning. The role of educators cannot be underemphasised – they need to explain, demonstrate and guide future learning. **What role does the educator play in a personalised learning approach, and what degree of input do they still have into the pace and direction of a student's educational pathway?**

**2. Online learning should be designed to encourage deep learning approaches:** Hargreaves and Shirley (2009) warn that while there are advantages in students being able to access information instantly online, this process can lend itself towards students adopting a surface learning approach. **How can technology be utilised to ensure that students achieve the depth and challenge required to connect them to compelling issues in the discipline, the world and their daily lives?**

**3. Educators need to be skilled in delivering a student-centred pedagogy:** In a meta-analysis of over 800 studies relating to student achievement, Hattie (2009) concluded that the skills of a teacher account for about 30% of the variance in student achievement. Teachers need to be willing and able to shift their pedagogy to a student-centred approach – their ability to do this is a critical element of a personalised learning environment. **How can an institution ensure that all educators have the skills to develop and deliver an innovative and evidence-based, student-centred pedagogies?**

**4. Accreditation requirements can restrict the allowed 'flexibility' of courses:** Deakin Crick and colleagues (2013) contrast two metaphors, 'learning as script' and 'learning as design'. They suggest that a 'learning as script' produces outcomes that are inconsistent with the desired outcomes for 21st century learning. They argue that 'learning as design' fosters students to take ownership of their learning and achieves student engagement and improved learning outcomes. However, 'pedagogy as script' is deeply and systemically embedded in some professional degrees to ensure graduates meet accreditation requirements. **How can professional degrees be tailored to ensure students can adopt a personalised learning approach but still meet the professional requirements for registration/accreditation at graduation?**

## 5. Using learning analytics to scale personalised learning

Learning analytics is an emerging field that combines the areas of computational sciences and education, using computational techniques to capture and analyse data from within the learning environment (Suthers & Verbert, 2013). It can be used to scaffold personalised learning and make it feasible to embed at the mass scale required within a higher education institution. Although learning analytics has been used successfully for this purpose in other sectors, adaptation to a higher education context is dependent upon the institution's educational worldview. As Simon Buckingham Shum explained in his keynote address at the Universitas 21 (U21) Educational Innovation Conference 2014, 'If we are going to think about the role of data in personalisation, this requires us to reflect deeply on our epistemology, pedagogy and assessment. That can then shape a learning analytics strategy' (Buckingham Shum, 2014).

Epistemology is the philosophical study of what knowledge is, and what it means for someone to "know" something (Knight, Buckingham Shum & Littleton, 2014). Pedagogy (how to impart this knowledge to students) and assessment (how to measure students knowledge and understanding) are fundamentally entwined as the ways educators assess the tasks that they set, and their underlying beliefs of the learning taking place, are bound up in their notions of epistemology (Davis & Williams, 2002).

Leading researchers in the area of learning analytics argue that, to date, data have been predominantly used in higher education to measure assessment of learning at the end of course, i.e. simple metrics such as assessment scores. They suggest an effective learning analytics strategy should be used to collect data at multiple timepoints and on a broader scope than just assessment performance, such as students' self-efficacy and motivators, or their ability to contextualise and make meaning of their knowledge. These rich data can be used to support a personalised learning approach (Buckingham Shum, 2014; Knight et al., 2013).

Specific examples of how learning analytics have been used successfully to tailor future learning to the needs of the student, allowing for adaptive learning pathways for individuals include:

- survey-based analytics have been used to establish student's learning dispositions and provide personalised and timely feedback on their readiness to undertake specific courses (Deakin Crick et al., 2013).
- data collected from students use and performance within online learning platforms have been used to provide personalised tutoring for skills mastery (<http://oli.cmu.edu>), and
- visualising textchat from a webinar has been used to gauge student understanding and progress within specific courses and their overall learning experience (Buckingham Shum, 2014).

## 6. Personalised learning: a conceptual model for UQ

This conceptual model depicts the student (learner) at the 'heart of the education system' (Leadbetter, 2008) and the considerations at each level outside of this: (1) options for personalisation within a student's course; (2) methods that can be used to personalise a student's learning experience; and (3) the resources directed to areas that will require considerable institutional policy development and organised change to ensure a personalised learning approach is successfully embedded within the university culture and staff are equipped to effectively deliver an adaptive program. The model is meant to illustrate the 'ripple effect' outwards from the student.

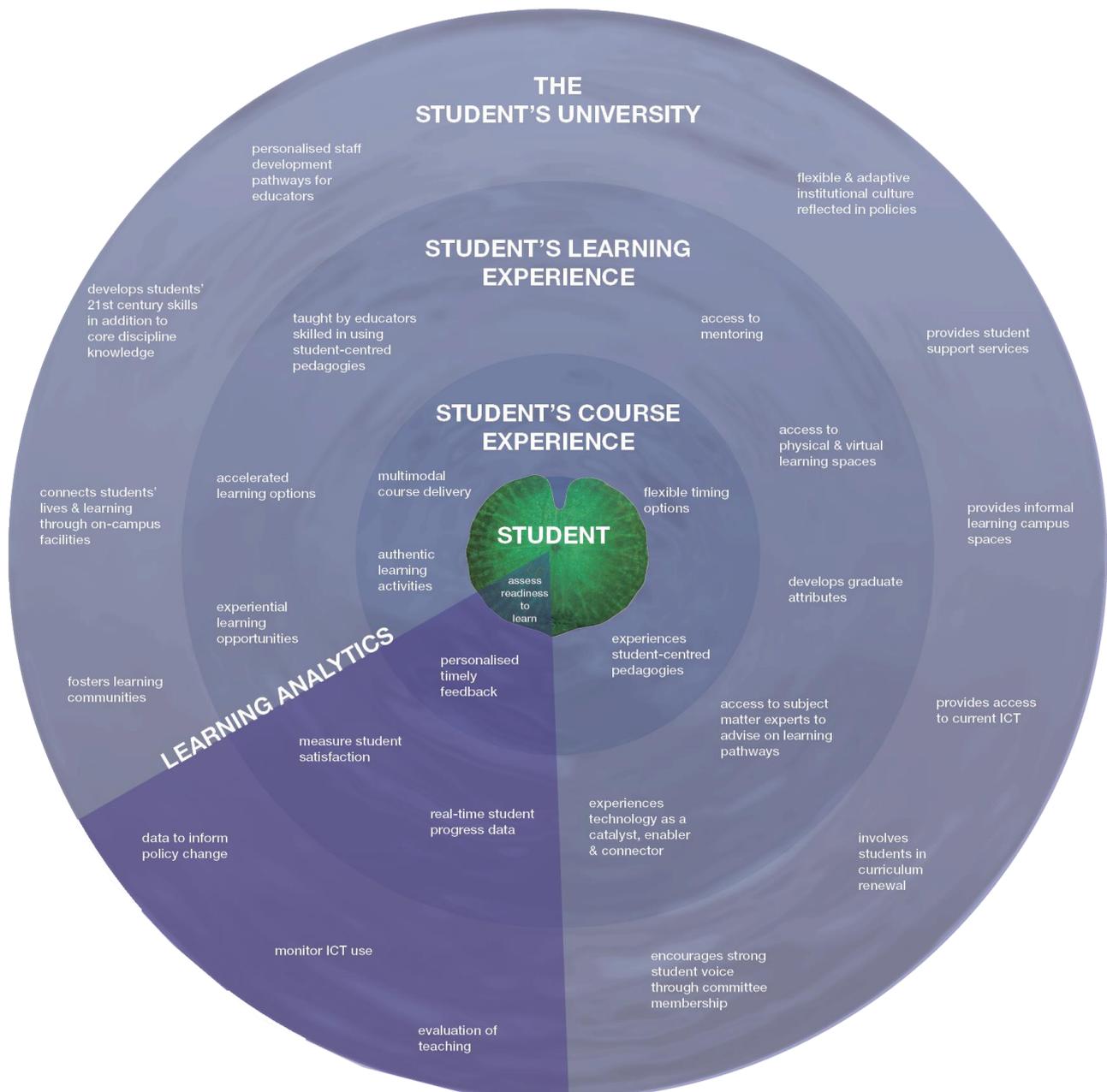


Figure 1: A conceptual model of personalised learning for UQ.

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