

Research Assessment Exercise 2020

Impact Case Study

University: The University of Hong Kong (HKU)
Unit of Assessment (UoA): UoA41 education (incl. curriculum & instruction, education administration & policy and other education)
Title of case study: Transforming 21st-century skills development and assessment in higher education and beyond

(1) Summary of the impact

The importance of 21st century skills is captured by a statement in the viral video *Did You Know? Shift Happens* (2018): ‘*We are currently preparing students for jobs and technologies that don’t yet exist...in order to solve problems that we don’t even know are problems yet.*’

Cecilia Chan’s research on 21st-century skills has spearheaded a global shift in teaching and assessment practices away from ‘academic-discipline focused’ and ‘teacher-centred’ towards ‘whole-person focused’ and ‘student-centred’. Her research has benefitted educational policymakers, teachers, students and the general public, with impact in at least five forms: (1) the adoption of Chan’s research frameworks and instruments by local and overseas higher education institutions; (2) the adoption of her research frameworks and instruments by an educational technology company for its software ‘YOCLÉ’; (3) enhanced competencies in secondary school and university students; (4) consultations and professional development workshops held by government-related organisations; and (5) increased public awareness of competencies.

(2) Underpinning research

Chan (employed by HKU since 2008) has developed the evidence-based research frameworks, instruments for evaluation, practical approaches, programmes and curriculum guidelines to assess and enhance students’ skills so that they can be better prepared for life in the 21st century. In her work, she uses ‘holistic competency’ as an umbrella term to include different types of generic skills (such as communication and problem-solving) and positive values and attitudes (such as consideration, integrity and resilience). Governments and societies worldwide recognise the development of these competencies as one of the grand challenges to help solve unemployment and personal and societal problems. These competencies are valued by universities and serve as criteria for accreditation bodies.

To understand holistic competencies in educational contexts, an instrument known as the Generic Skills Perception Questionnaire [(R1)] was developed, supported by Grant (G)1. The results have enabled policymakers and educators to better understand student and teacher perspectives and thus to better integrate holistic competencies into educational settings. The instrument, which is the first of its kind, is being used in many countries, enabling benchmarking across disciplines and countries.

One of the main findings arising from G1, G2 and G3 is that self-understanding of strengths and weaknesses in competencies is very important. By using the instrument, students become more aware of their competency levels. Based on the findings from the use of the instrument, a Holistic Competency Development (HCD) model [R2] was established under G2. This model is a suggested framework for the integration of holistic competencies into out-of-class, extra-curricular and in-class learning experiences. The framework identifies five key components: (1) students’ characteristics; (2) rationale for learning; (3) actual learning experience and students’ perceptions and interpretations based on their learning experience; (4) students’ approaches to developing holistic competencies; and (5) students’ development of holistic competencies. At the heart of this model is the approach that a student develops towards holistic competencies. It was found that students’ rationale, their actual experience (e.g., quality of supervision, positive relationship with peers) and their perceptions of their experience (including reflection) could influence the development approach they take. Chan coined the term ‘*Approach to develop*’ and associated this term with ‘engage’ and ‘avoid’ activity. This

contrasts with the ‘Approach to learn’ concept (with ‘deep’ and ‘surface’ learning), which is associated with traditional academic learning. This is an important movement in holistic competency development and can significantly help educators to understand how to motivate their students in developing competencies.

In a cross-institutional project [G3], a practical process called ‘Chain of Mirrors – Metacognitive Learning Process’ was developed based on the research, enabling teachers to design the curriculum in such a way that maximises students’ development of holistic competencies in and out of class. This practical process highlighted the ‘must’ elements that teachers need to provide for students to fully develop their competencies. These elements include the Rationale for Participating, Self-Understanding, Expectation, Experience, Learning, Reflection, and Self- and Peer-Appraisal. A number of programmes [G3] were designed using the ‘Chain of Mirrors’ to enhance students’ holistic competencies in secondary schools and universities [R2 and R3].

(3) References to the research

- R1. Chan, C.K.Y., Zhao, Y., & Luk, L.Y.Y. (2017). A Validated and Reliable Instrument Investigating Engineering Students’ Perceptions of Competency in Generic Skills. *Journal of Engineering Education*, 106, Issue 2, 299 – 325. DOI: [10.1002/jee.20165](https://doi.org/10.1002/jee.20165).
- R2. Chan, C.K.Y. & Yeung, N.C.J. (2019) Students’ ‘approach to develop’ in holistic competency: an adaption of the 3P model, *Educational Psychology*, DOI: [10.1080/01443410.2019.1648767](https://doi.org/10.1080/01443410.2019.1648767).
- R3. Chan, C. K. Y., Fong, E. T. Y., Luk, L. Y. Y., & Ho, R. (2017). A review of literature on challenges in the development and implementation of generic competencies in higher education curriculum. *International Journal of Educational Development*, 57, 1-10. DOI: [10.1016/j.ijedudev.2017.08.010](https://doi.org/10.1016/j.ijedudev.2017.08.010).

References for major grants awarded to Chan as Principal Investigator

- G1. General Research Fund (2011-2014) Project Title: The development of generic skills: A curriculum design framework adapting student and teacher perspectives and approaches to learning in a discipline-specific context for Hong Kong higher education. Amount: *HK\$753,594*.
- G2. General Research Fund (2015-2017) Project Title: The development of generic skills competency: A conceptual evidence-based model to effectively engage students from out-of-class, extra-curricular and in-class learning experiences in a discipline-specific context. Amount: *HK\$895,000*.
- G3. UGC Teaching and Learning Fund (2017-2020) Project Title: Driving cultural and educational shift: Providing support, activities and professional development in the pedagogy, assessment and evidence of student learning in holistic competencies. Amount: *HK\$8,947,836*.

(4) Details of the impact

Holistic competency development is undoubtedly important, as highlighted by the policy papers and funding of many governments and non-profit organisations, including the Gates Foundation. However, teachers, educational institutions and the public tend not to accept the notion of competencies as readily as they accept academic knowledge, and the traditional drive for grades in academic knowledge generally takes precedence. Society believes in the importance of competencies, but the educational system is not yet fully ready to accept such changes. Competencies need to become a part of education that is not overshadowed by academic knowledge. To achieve this, Chan has built frameworks and instruments based on her research findings. She has also implemented programmes and teacher training using these frameworks and instruments.

Chan’s research outputs have been adopted and put into practice by various disciplines and institutions around the world. The instrument is now being used in six Hong Kong universities, an Australian university and many Malaysian and Thai universities. In addition, a technology company has adopted the research frameworks and used a modified version of the instrument, YOCLC (‘Your Out-of-Classroom Learning Experience’), within its system [see letter of corroboration at S2].

Australia: The School of Dentistry and Oral Health and the School of Medicine at Griffith University

are currently using Chan's instrument to investigate competencies in their curriculum reform. According to its Associate Dean [S1], 605 students from the School of Dentistry and Oral Health have already been administered the instrument, and the teachers are using the findings to revamp their curriculum. The instrument is helping students to be more aware of the strengths and weaknesses of their competencies.

Malaysia: The Engineering Faculty at INTI International University is also adopting Chan's instrument and process to assess and enhance its students' holistic competency development [S1]. In October 2016, INTI International University invited Chan to provide consulting and a full-day teacher professional development session on assessing generic competencies [S3]. The Dean of Engineering and Quantity Surveying stated [S1]:

'Through employing Dr Chan's latest research inventory and e-platform (YOCLE) on generic skills and organising masterclasses to improve the teaching and assessment of generic skills, I believe not only that students from INTI will benefit from this process, but that we will contribute to transforming the education landscape and mindsets towards more balanced, holistic development of our students.'

South Korea: The Sungkyunkwan University Hub Center for Innovative Engineering Education and the Ministry of Trade, Industry and Energy invited Chan to conduct workshops/presentations on developing and assessing 21st-century skills through the research evidence-based skills frameworks in January 2013 and 2016, respectively [S10].

Hong Kong (Secondary Education): Chan and her team designed a number of holistic competency programmes for school students based on her evidence-based curriculum frameworks. In 2017, a four-full-day programme for secondary school students, the HAVE, U Can programme, was successfully launched. The motto of HAVE (Holistic Competencies and Virtues Education) is 'With hearts, we transform'. The programme was conducted seven times for seven different secondary schools in Hong Kong, with over 1,000 students participating [S4]. The HAVE, U Can programme addresses the lack of competency development noted by many principals of Hong Kong secondary schools. Many parents and students were inspired by this programme [please watch the video in S5]. The Principal of Cognitio College (Hong Kong) stated [S4]:

'Dr Chan's work was able to engage the students to reflect on and develop their generic skills, particularly some of the affective skills such as respect, consideration and resilience.'

Chan also received many reflective letters and messages from students. This is an excerpt from one of them (the full letter is available at [S12]):

'My relationship with my father is not that good, or maybe only the way I treat him is not that good, and not very long after I finished mentoring at the workshop, it was my father's birthday. In the past, even if it was his birthday, I would not say something very impressive or something that came from my heart. However, this time, I made a big step to help to improve the relationship and said 'sorry' and 'I love you' to him, which are things I did not say for years. Maybe you will think that it is easy to say, but for me, it is really hard. Moreover, I am a person who hates doing housework and almost never does it, but one time, I did, because I knew my dad was a bit sick, and I think this shows consideration. I think this change came after seeing the video of the parents' interviews and how the students acted when they saw it in the [HAVE, U Can programme] ... My father told me that he appreciated it, and this made me feel very happy and proud of myself and the improvement I had made. I also think that I grew up a lot, not just physically, but mentally.'

Hong Kong (Higher Education): In Hong Kong, six universities (HKU, HKUST, CUHK, HKBU, LingnanU and EdUHK) are also using the frameworks, the evaluation instrument and the YOCL e-system. Data on 5,000 students have been collected to provide the researchers with a large benchmarking sample on student development and the assessment of holistic competency in Hong Kong [S1]. This is the largest representative sample that has ever been collected on holistic competencies in Hong Kong. The President of LingnanU stated [S1]: *'Dr Chan's instruments have been adopted by higher education institutions outside of Hong Kong. Comparisons with foreign*

institutions would mark where our university is stationed regarding generic skills and competencies.’

In 2018, Chan led six Hong Kong universities to organise an enhanced version of the HAVE, U Can residential programme for university students [S1]. The HAVE, U Can programme was facilitated by trained university-student mentors who guided junior university students in the development of competencies. The impact of this work has been featured in media articles in Hong Kong. One article included this quote from a student [S12]: *‘The programme has really given me the opportunity to overcome mental hurdles and enhance self-confidence’*.

Students have also benefited significantly in terms of resilience and self-confidence [S12]. Perhaps the most important impact of the programme has been the strong awareness of and support for competency development from the UGC and university leaders such as presidents, vice-presidents and deans [S1 and S6]. President Cheng of LingnanU said: *‘The HAVE, U Can programme has helped our students become more aware of their competencies’ strengths and weaknesses’*.

Moreover, the strong network of support involving the UGC, universities and secondary school principals is helping to change the educational culture [S1]. This shift demonstrates the impact of Chan’s research and how it has influenced universities and schools in their curriculum changes. These evidence-based programmes have had significant impacts on students and raised public awareness.

Taiwan, Thailand, and Australia (in progress): Other universities, such as National Taiwan University (Taiwan), King Mongkut’s University of Technology Thonburi and Prince of Songkla University (Thailand), and the University of Sydney (Australia), are working with Chan to implement the instrument and her approaches to the assessment of holistic competencies for their students [S1 and S10].

The reach of Chan’s research outputs, insights and successful practices covers audiences in numerous countries. Research guidelines and good practices in assessment were uploaded onto an Assessment Resources website developed by Chan, which has provided substantial resources for teachers. The total number of unique visitors to the website between October 2010 and June 2019 was over 10 million [S8]. Most recently, Chan has received a request from the Wake County Public Schools in the US to use one of her videos as part of their online professional development course [S9]. It will be used as training materials for all of the schools in Wake County. In addition, Chan has received many invitations to provide consultation and professional development workshops for government-related organisations in various countries, including South Korea, China, Singapore, Thailand and Estonia [S10]. In 2018, Chan was invited by UNESCO and Times Higher Education to undertake a webinar [S11] and podcasting [S11] to share her views on competencies.

(5) Sources to corroborate the impact

- S1. Evidence of different universities in various countries using Chan’s research instruments and frameworks.
- S2. A letter from the educational technology company using Chan’s research to enhance students’ holistic competencies.
- S3. Evidence of invitations for Chan to provide consulting and teacher professional development sessions on the assessment of generic competencies.
- S4. Evidence of collaboration with Hong Kong’s secondary schools to conduct the HAVE, U Can programme.
- S5.
- S6. Evidence of the impact of the HAVE, U Can programme for university students.
- S7. Video clip of the HAVE, U Can programme for university students.
- S8. Evidence of the number of visitors to the Assessment Resources website developed by Chan.
- S9. A university’s request to use Chan’s assessment materials as part of an online professional development course.
- S10. Invitations received by Chan to provide consultation and professional development workshops for government-related organisations in many countries.
- S11. Evidence that Chan has shared her expertise via different media platforms.
- S12.