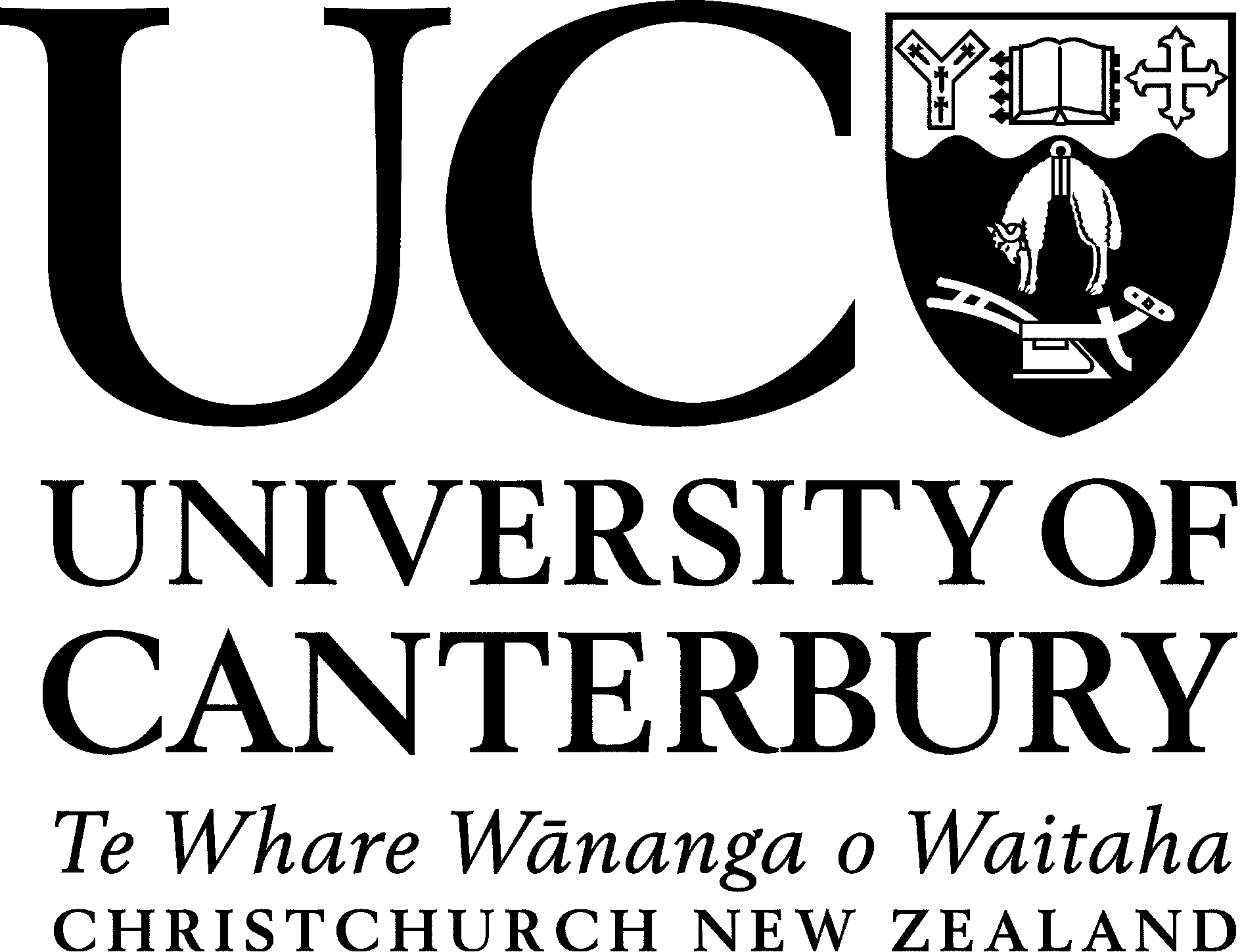
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| Distributed Leadership in Teaching Programme |

**Scholar**

**Application Form**

**(V7 – 10 August 2020)**



**Application for the**

**Distributed Leadership in Teaching Programme**

To be completed by Applicant, Head of School/Department and College Pro-Vice Chancellor

Please refer to the Distributed Leadership in Teaching Program - Programme Overview and Guidelines

**Scholars will be selected based on the following criteria:**

* Alignment of project to the Teaching and Learning Objectives within the University of Canterbury Strategic Plan and/or Rautaki.
* Capacity of the project to inform teaching and learning improvements/developments within a wide range of disciplines
* Capacity of applicant to more broadly influence colleagues across the university to improve teaching and learning outcomes
* Innovative nature of the project proposal
* Evidence of recent and sustained scholarship of teaching and learning

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| **1** | **General Information** | | | |
| 1.1 | Name of the Applicant: | Arindam Basu | | |
|  | Department/School: | School of Health Sciences, College of Education, Health, and Human Development | | |
| 1.2 | Email address: | [arindam.basu@canterbury.ac.nz](mailto:arindam.basu@canterbury.ac.nz) | | |
| 1.4 | Present position: | Associate Professor | | |
| 1.5 | Field of special interest and/or expertise: | Epidemiology, Environmental Health, Public Health, Genomics, Health Services Research, University teaching and learning, Mental models, Formative Assessments, Data Science, Machine Learning | | |
| 1.6 | **Application Title** | Project Sherlock: enhancing expertise in observation, inference, and science of deduction through mastery rubric | | |
| **2** | **Proposed project outline. (max. 500 words) 30% weight** | | | |
|  | *Please note it is expected that this will be a high-level summary of proposed work, recognising that part of the project will be to define the proposed project.* | The goal of this project will be to facilitate UC students across academic disciplines build capacity for collaborative problem-solving through authentic, practiced-based expertise in skills of Holmesian style of observation, inference, and deduction (“HOID”) so that they become critically literate *across* disciplines. The following objectives are set over the two years of the project:   * **Development** stage: in collaboration with fellow academics and practitioners across UC, the project team will (1) develop maps of mental models of novices through experts, (2) develop generic and domain-specific sets of heuristics that will be used for graduated challenges and deliberate practice, and (3) put together sets of mastery rubric that can be applied across disciplines in HOID * **Engagement** stage: drawing on the Canon of Sherlock Holmes (“canon”), such heuristics and mastery rubric developed in development stage will be used to develop * (a) a bank of vignettes, challenges and cases; and * (b) build a community of practice, and * (c) workshops that will foster deliberate and graduated practice so that university students can develop expert level skills of observation-inference-deduction and critical thinking.   University graduates in post-covid19 world will need to solve large, planetary scale, uncertain, complex, and connected problems (pandemics, climate change, big data analytics, automation). At the same time, they will coexist in a paradoxical post-truth society where scientific consensus are at risk of being under-appreciated yet “intelligent machines” will rise. Hence, **every** graduate attribute set by UC (*employability*, *innovativeness*, *enterprise*, *bicultural competence and confidence*, *global awareness*, *community engagement*) will be **critical** for success of a university graduate. Beyond expertise and knowledge, successful university graduates will need to develop skills of mindful observation, sustained focus, reasoning, and cross-disciplinary critical understanding of the world around them. While university curricula will make them critically literate *within* their chosen disciplines, lack of tacit cross-disciplinary training in critical observation, deductive skills, and insight *across* disciplines in diverse contexts will leave them as novices in a rapidly changing complex world where trans-disciplinary expert level skills are valued. We will bridge this gap by building the frameworks, tools, and communities necessary for ***skills of observation, inference, and deduction in our students across disciplines and move them from novices to experts so that in real complex world, they will be able to deal with uncertainties. The rationale, concept, model, and the plan are as follows.***  Stuart and Huber Dreyfus (1980)1 have described a linear, five-stage model (**Dreyfus Mode**l) of higher-order skill acquisition and development of expertise based on their training of language learners, aircraft pilots, and chess players. In this model, stage I students (***novices)*** depend on heuristics to learn skills in context-free situations. Stage II students (***competent practitioners)*** learn *within the context, guidelines, and graduated practice;* stage III (***proficiency***) students, after repeated practice in different settings, transform the mental model of a novice to that of a **goal directed maxim** and can solve unseen problems. Stage IV (***expertise***) students develop intuition based on the repertoire of “whole experiences” acquired in stage III. Finally, in Stage V (***mastery***), masters are capable of optimal experience or “flow”2 – a state of intense absorption in work where performance transcends the high level expected of an expert.  This five-stage model of expertise-acquisition consists of heuristics, deliberate practice of graduated challenges, guided instructions, formative assessment, feedback at each stage of development of mastery as the student steps through the stages. This framework has been widely applied for training and evaluation. Benner (2004) has demonstrated successful application in nursing on development of clinical skills and judgment in a setting of health professional training3 . Wilson et.al (2014) contend this model is the backbone of The Carpentries: community that teaches foundational coding and data science skills to researchers4. Tractenburg (2019) has layered a mastery rubric on this model to teach bioinformatics in Georgetown University5. In this project we will apply these principles so that students across disciplines can acquire mastery in the Sherlock Holmesian skills of observation-inference-deduction-critical thinking and transfer such skills to their domains of study and practice.  In order to build such skills, we will present the challenges of observation-inference-deduction in the form of storytelling – the stories themselves will be in the form of graduated challenges derived from the Canon of Sherlock Holmes (“canon”) – a compendium of 60 stories from Sherlock Holmes’ adventures (four novels and 56 stories)6. The canon is used to teach medicine, law, linguistics, and gender studies but there is no resource available beyond the stories themselves to systematically teach critical thinking 7-9.  . We will deliver derivatives from the canon through weekly meetings. Each week, we will present vignettes, challenges, and pastiches with graduated sophistication of the complexity of critical problems to be solved; each problem will be solved using guided practice, such that attendees progressively develop the skills of observation-inference-deduction over progressive sessions and be able to apply in their own knowledge domains. Besides, we will develop subject specific mental models of novices through experts in collaboration with faculty members across UC to guide the development of such graduated challenges and mastery rubrics. These will result in (a) community of practitioners, (b) a set of resources and stories and (c) training materials for critical thinking.  ------  1 Dreyfus, Stuart E., and Hubert L. Dreyfus. “A Five-Stage Model of the Mental Activities Involved in Directed Skill Acquisition:” Fort Belvoir, VA: Defense Technical Information Center, February 1, 1980. <https://doi.org/10.21236/ADA084551>.  2 Csikszentmihalyi, Mihaly. Flow: The Psychology of Optimal Experience. 1st Edition. New York: Harper Perennial Modern Classics, 2008.  3 Benner, Patricia. “Using the Dreyfus Model of Skill Acquisition to Describe and Interpret Skill Acquisition and Clinical Judgment in Nursing Practice and Education.” Bulletin of Science, Technology & Society 24, no. 3 (June 1, 2004): 188–99. <https://doi.org/10.1177/0270467604265061>.  4 Wilson, Greg, D. A. Aruliah, C. Titus Brown, Neil P. Chue Hong, Matt Davis, Richard T. Guy, Steven H. D. Haddock, et al. “Best Practices for Scientific Computing.” Edited by Jonathan A. Eisen. PLoS Biology 12, no. 1 (January 7, 2014): e1001745. <https://doi.org/10.1371/journal.pbio.1001745>.  5 Tractenberg and FitzGerald, “A Mastery Rubric for the Design and Evaluation of an Institutional Curriculum in the Responsible Conduct of Research.”  6 Wikipedia, “Canon of Sherlock Holmes.” <https://en.wikipedia.org/wiki/Canon_of_Sherlock_Holmes>, retrieved 22nd March, 2021  7 Alton, Stephen R. “The Game Is Afoot!: The Significance of Gratuitous Transfers in the Sherlock Holmes Canon.” The Significance of Gratuitous Transfers in the Sherlock Holmes Canon, 2011  8 Boucher, Abigail, and Ria Perkins. “The Case of Sherlock Holmes and Linguistic Analysis.” English Literature in Transition, 1880-1920 63, no. 1 (2020): 77–98.  9 Guerrier S. My immortal Holmes. The Lancet Psychiatry 2015; 2: 128–129. | | |
| **3** | **Motivations. 30% weight** | | | |
| 3.1 | What is your main motivation for applying for this scholarship?  **(max 100 word)** | There is a critical need for students who are skilful in applying the powers of observation-inference-deduction across a range of domains where they will likely to find employment following university education. Systematic development of expertise is a desired pathway to enable students with such skills but these are rarely taught in universities as these are often assumed. As a result, when students graduate from the universities and start work, workplaces often end up with novices who are not quite job ready and must be trained to solve real world problems. Yet guided instructions, graduated challenges, and repeated challenges moving from heuristics to novel problems can help students and graduates of the university significantly.  At UC, I have applied the combination of heuristics, guided practice of graduated challenges, and mastery learning to teach environmental health, epidemiology, and evidence-based health, hence the motivation to extend the scope to a wider audience and create a set of resources and a community of practice.  This project draws on a diversity of sources to that end. The canon is an inexhaustible source of stories, vignettes, and challenges used worldwide for training and teaching or storytelling. However, evidence is sparse on what happens when Bloom’s mastery learning, the rubric, Dreyfus model of skill acquisition to develop Holmesian skills of observation-inference-deduction among university students. This is particularly relevant in a society where misinformation is rife online, and university graduates must critically examine every piece of information with scepticism they come across. This is where our project will contribute to building a culture of critical inquiry through storytelling.  Hence, my own observation of lack of transferable skills among young graduates and urge to address this unmet need in the society as we are experiencing increasing need for critical examination of information we obtain motivated me to develop this set of resources and community. | | |
| 3.2 | What appeals to you about developing teaching initiatives within your school/ College/ at UC?  **(max 100 word)** | The project I propose is possible only within an academic environment that UC provides for the following reasons:   1. UC in Christchurch campus makes it easy for communication and facilitation of bringing together faculty and students. 2. UC has excellent Information Technology services and premium high performance computing tools and instances are provided to staff members. Such excellent technology makes UC a natural home to develop, deliver, and host the resources 3. I have already put in place several of the related programmes in place such as mastery rubrics, so many students at undergraduate and postgraduate streams and PhD students are familiar with the resources and uptake can be easier rather than a “cold start”.   Finally, in general, University of Canterbury, the College of Education, Health, and Human Development, and the School of Health Sciences foster an environment of academic freedom, flexible collegial working environment and excellent academic culture that has encouraged me to explore options beyond teaching as usual. | | |
| 3.3 | As a member of UC’s teaching community, what activities do you currently engage in to promote your learning model/ideas to others and how have you constructively coached others to develop their capacity?  (**max 200 word)** | I engage in practice what I propose here.   * First, in the courses I teach, I have designed them on developing expertise and thus move students from novice to expert users to solve real world problems. * Second, I am a Carpentries instructor and trainer, and an active member of the community where we engage with researchers and academics in industry and academia to develop expert level skills of computational data science. In summary:   University teaching examples:   * Undergraduate students of HLTH301: Evidence In Health where I have used The Dreyfus Model and modelled the Carpentries approach. Here for hands on demonstrations in teaching how to use the software Gradepro (see https://www.gradepro.org) to conduct evidence appraisal. When I teach them, students start as “novices” (Stage I), then they work with repeated decontextualized examples using heuristics (Stage II) to familiarise themselves with the various features of the software, and then in Stage III (“expertise”), I demonstrate them how to take real world examples and repeatedly work with a plan to develop evidence based reviews (Stage IV: expertise). They are then examined on these activities with a detailed instructions. * Postgraduate students (HLTH403 and HLTH460) of Environmental Health are taught how to analyse Epidemiological data, how to conduct evidence mapping, and how to appraise articles on environmental health risk assessment using the above principles described.  1. Non-university informal settings of training:  * Carpentry workshops where I have taught 10 workshops with over 200 Carpentries instructors throughout Australia and New Zealand. These students were scientists in ESR, Scion, University of Technology in Sydney, and lecturers and researchers in various universities across Australia and New Zealand. * Software Carpentry workshop using the Dreyfus method, live coding, and related teaching strategy: taught several informal workshops on structural equation modelling, longitudinal data analysis using R, and software programming using R in UC   I wrote the following to outline and flesh out the ideas further: <http://bit.ly/carpentries_teaching> | | |
| 3.4 | What do you consider to be your primary skills and interests that make you suitable for undertaking the role of a *Teaching Development Scholar*?  (**max 100 word)** | * I have led an inter-disciplinary research team (2009) and won an Ako Aotearoa grant to investigate the best practices for teaching/training telehealth for practitioners and produced one of the first reports on the evidence based practices for telehealth teaching9 * In 2015, I received a teaching development grant on using Design Thinking in classrooms, and have used design thinking principles to teach health policy courses and classes. * I systematically studied and applied the methods outlined here (designing curricula for non-formal setting with graduated challenges of deliberate practice, formative assessments, mapping mental models of learners, and guided instructions). I applied them over 15 multi-day workshops in a range of settings in New Zealand (delivered in CRIs such as ESR and Scion and universities as in University of New South Wales and University of Otago).. | | |
| 3.5 | Please share with us details about your track record in teaching quality (e.g. teaching evaluations, teaching awards, testimonials). Include reference to your application of bicultural competencies where relevant.  (**max 100 word)** | My average overall rating as an effective teacher for the past five years have been around 4.5 on 5.00 averaged for four courses (HLTH214, HLTH301, HLTH403 and HLTH460) that I have taught.  While I do not have any teaching award, testimonials from students have been positive.  In terms of bicultural competency, all courses where I coordinate have Māori cultural aspects embedded; this is attributable to the courses I teach (evidence based health, environmental health, and research methods); besides, I am part of the research team from UC (PI: Professor Steven Ratuva) where we are investigating social protection issues and health for Pacific Islander community in NZ; this also informs my teaching | | |
| **4** | **Project Impact. 40% weight** | | | |
| 4.1 | How does your project connect to the University Strategic Plan, 2020-30 and/or *Rautaki*? Make specific reference to the teaching and learning components of the Strategic Plan.  **(max 200 word)** | “***Co-develop with our partners a research platform and commons to respond to identified needs, support city development and wellbeing of all who live here (Theme: UC as an engaged university)***”. – We fulfil this **directly** as we will co-develop with fellow academics and others a platform and commons that will enable anyone who will access and use the resource to develop Holmesian critical thinking skills (self-taught or be used as teaching tool, whether in university, or community setting)  “***Expand the University’s educational services to students living offshore through a portfolio of transnational education and online educational offerings (Theme: Internationalisation)***”. – We meet this component **directly**: our online resource will be accessible over the world wide web; the challenges and the videos of workshops will be made freely available under a creative commons license. This resource will expand the University’s educational services.  ***“(Education: Future Focussed): Stimulate and support academic development and innovation to become the best educators in Aotearoa New Zealand***”. – as we have explained in the project outline, we are developing a resource and putting it in the hands of students and academics that have not been done before, it is unique, novel, and directly meets the need of an information literate society.  ***“(Education: Future Focussed): Provide a learning environment that uses effective pedagogies”. –*** As explained in the project outline, the model of expertise development and mastery learning has been tested in different contexts and evidence of its effectiveness continues to emerge. We propose a pedagogically sound strategy.  ***“(Education: Future Focussed): Continue to develop the UC Graduate Profile so that UC graduates are known for their bicultural competence and confidence, global understanding, community engagement, employability, and innovative thinking”. –*** Based on the canon, and building on it to contextualise to our setting, we will develop Te Reo versions of the lessons and biculturally appropriate challenges and vignettes in partnership and consultation with the M`aori academics and participants***.*** As Konnikova has argued, the canons (and thereby challenges and vignettes on observation-inference-deduction) directly foster creative thinking10***.***  ***“(People – Nurturing Staff, thriving students): Develop and provide targeted interventions and a positive environment to support student success”, and “create a diverse and inclusive community”. –*** As explained in the project outline, we will not only create resources that can be used, we will also build a whanau through this programme. The overall purpose of this project is to create a conscious, critically literate citizendium across disciplines. | | |
| 4.2 | Briefly describe how your project will proactively help to support the development of teaching and learning across the Colleges?  **(max 100 word)** | We will achieve the following targets over the two years of the project life:   * **Development** stage: We will collaborate with academics and practitioners across UC. The goal of such collaboration will be to * (1) develop discipline specific, and trans-disciplinary maps of mental models of novices through experts, * (2) develop generic and domain-specific sets of heuristics that can be used to solve challenges, and * (3) develop programme level or at least for the purpose of Project Sherlock, mastery rubric that can be applied across disciplines where observation-inference-deduction play a major role in knowledge. * **Engagement** stage: We will draw on the Canon of Sherlock Holmes and use the heuristics and mastery rubric in the development stage to * (4) develop a bank of stories, challenges and cases that will foster deliberate and graduated practice, and * (5) put together periodic meetings (possibly from fortnightly to monthly) where university students and academic can develop expert level skills of observation-inference-deduction and critical thinking, and * (6) offer workshops once a term where anyone can learn how to create vignettes and case studies relevant to their disciplines based on the canon | | |
| 4.3 | Are there potential collaborators from across UC who could be included in your proposed project?  *This question is seeking indicative information only. These details can change as part of the project development process.* | Yes, there will be collaborators from across the UC.  In particular, there will be collaboration from the M`aori and Pasifika academics and students to design vignettes and challenges to be truly bicultural/multicultural.  Besides, canon experts in UC, and others who are interested to design vignettes and challenges will be invited to design and share the resources.  We will also draw on the expertise of the Carpentries instructor community within UC, Christchurch, and wider New Zealand to contribute to the teaching of the skills of Sherlock Holmesian observation-inference-deduction. | | |
| **5** | **Resourcing** |  | | |
| 5.1 | Please provide the breakdown of your intended workload balance as it stands now and your estimation of what it will be once you have entered the programme. | Teaching  Research  Administration  DLTP Scholar | **Normally**  40  40  20  - | **Under the scholarship**  40  30  10  20% |
| 5.2 | Please provide details of the provision your School/Department have agreed upon, to ensure you can be successfully released from your 0.2. commitment.  E.g. identify tasks or responsibilities that you can be released from. | As I have no senior administrative role within the School, hence, my time commitment is flexible. The teaching load will remain the same. I will focus on this project and this project may contribute towards my research contribution/commitment. I have at the moment three service roles within the CoEHHD and the wider university: (1) I sit on the Scholarship Advisory Committee; (2) I sit on the UC Library Committee, and (3) I am Co-chair of the CoEHHD Learning and Teaching committee. I will not take on any other role or position. | | |
| **6** | **Period of engagement** | | | |
| 6.1 | Please indicate the intended start and finish dates | Start ……01……./……05……../……2021……….  Finish ……30……./……04……../……2023………. | | |
| ***Please ensure that this application has been fully discussed with your HOD/S.*** | | | | |
| **7** | **Approvals** | | | |
| 7.1 | **Head of School/ Department, University of Canterbury** | | | |
|  | Comment: |  | | |
|  | **Name**  **Signature:**  **Head of School/Department**  **Date:** | **…………………………………………………**  **of………………………………………………** | | |
| 7.2 | **College Pro-Vice Chancellor, University of Canterbury** | | | |
|  | Comment: |  | | |
|  | **Name**  **Signature:**  **Head of College**  **Date:** | **…………………………………………………**  **of ……………………………………………...** | | |
| 7.3 | **Deputy Vice Chancellor – Academic** | | | |
|  | Approved or declined: | | | |
|  | **Signature:**  **Date:** | **…………………………………………….** | | |

***Updated 10 February 2021***

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|  | *Applicant to forward completed paperwork to Administrator, Centre for Academic Success.* |