**University of Leicester**

**Future 50 PhD Scholarship**

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**Section 2 – *Project Information***

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| **Project Title** | Analysing student interactions to promote learning and attainment: an ethnographic and modelling study | |
| **Project Highlights:** | 1. | This projects builds on the well-documented benefits of “active learning” in increasing performance and narrowing achievement gaps |
| 2. | It will research active learning approaches across the College, examining grade profile and observing interactions |
| 3. | Observations and grade profiles will then be used to generate an agent-based model to understand the impact of observed features on learning |
| **Project Summary** | | |
| Educational meta studies including Theobald et al. (2020) show “active learning” both increases student performance and narrows achievement gaps for underrepresented science students. The pandemic has allowed educators to put traditionally lectured material online, which could free up time for more active learning sessions with students. But what form should that interaction most effectively take? We know that student interaction in groups can improve learning (Swanson, 2019) but we also know that there are issues with high stakes group work. One of our main findings in our previous work has been the overwhelming influence of other students on a student's work ethic, both positively and negatively. Since work-ethic is the single most important determinant of success (Gibbs, 2012) it is important to understand how positive interactions can be promoted. The idea of this research will be to use observations to try to determine what works and modelling to understand why it works.    There is limited research that attempts to model student learning. The best known, the Carroll model (Carroll 1989), attempts to extract features from the observational data. There have been no attempts (beyond our own student project work) to use agent-based modelling (ABM) of the classroom to understand the impact of staff-student and student-student interactions.  Given the high profile of ABMs in policy work this is a gap waiting to be filled.  The project will review “active learning” and associated marks profiles across student demographic groups in the College, to establish any correlation with previous findings and to provide a baseline for further research. Following this a variety of active learning pedagogies will be selected for ethnographic observation. These observations would form the basis for the generation and refinement of an ABM which will provide further understanding on the impact of staff-student and student-student interactions. The modes of interaction to be explored will attempt to simulate observed behaviour to try to uncover and test some of the key variables in group learning.  The project will include  ·         Design of questionnaires and interview prompts that aid the exploration of key aspects identified interactions  ·         Breaking a complex socio-educational scenario down into rational elements that can be incorporated into an ABM computational simulation.  ·         Creating ABMs in NetLogo and use additional analysis software (such as R or Python) to evaluate simulation outputs. (Note no prior expertise for any of these software applications is required)  ·         Comparing the outcome of ABM simulations to observed real-world behaviours to critically evaluate the behaviours under investigation and suggest interventions to improve learning outcomes  **Reference list:**  Carroll, J.B., 1989. The Carroll model: A 25-year retrospective and prospective view.  <https://doi.org/10.3102/0013189X018001026>  Gibbs, G., 2012. Implications of" Dimensions of Quality" in a Market Environment. HEA Research Series. **ISBN:** 978-1-9072-0762-4.  Swanson, E., McCulley, L.V., Osman, D.J., Scammacca Lewis, N. and Solis, M., 2019. The effect of team-based learning on content knowledge: A meta-analysis. Active learning in higher education. <https://doi.org/10.1177/1469787417731201>  Theobald, E.J., et al 2020. Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering, and math <https://doi.org/10.1073/pnas.1916903117> | | |