TASO Transforming Access and Student Outcomes in Higher Education

Enhanced Theory of Change (EToC) Institutional Data Use: University of Huddersfield – Score As I Learn (SAIL)

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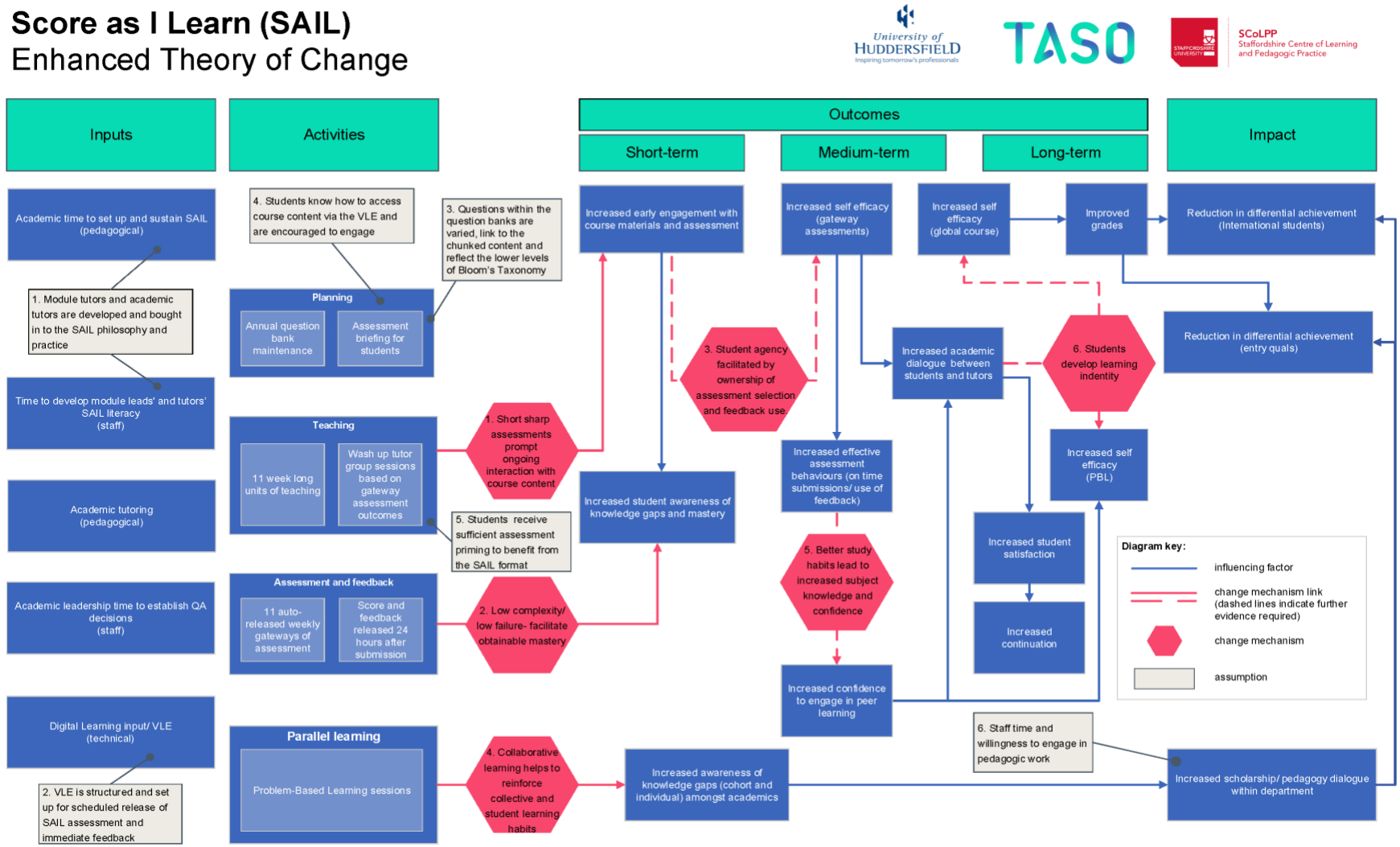
ENHANCED THEORY OF CHANGE DIAGRAM



ENHANCED THEORY OF CHANGE UNDERPINNING NARRATIVE

VERSION

V3

The EToC was initially drafted on chart paper in a collaborative workshop with input from key stakeholders including representation from academics delivering Score as I Learn (SAIL), faculty leadership, senior leadership, the Strategic Teaching and Learning Team (STLT), student services, and data analysts and dashboard experts.

NAME

Score as I Learn (SAIL)

WHY IS THE INTERVENTION BEING RUN?

The SAIL initiative emerged organically following initial implementation in 2019-20 as a blended learning and scaffolded learning response from the Department of Engineering and Technology to COVID-19. The initial rationale was to increase engagement and reduce isolation during periods of mandated remote learning. Low-stakes assessment was viewed as a 'proxy' for attendance and engagement, during a period in which in-person monitoring of these components was not possible. Improved student attainment outcomes and positive feedback from students and staff alike led to the intervention being retained as a core model for modular teaching and learning in the department. Increases in student attainment was apparent for students who were entering university with a portfolio of qualifications which included BTECs and international qualifications. It is hypothesised that this is because these student groups have a differential preparation for higher education (HE), and the structure of SAIL encourages these students to adopt self-study habits that are more suited to the typical structure at Huddersfield.

The potential benefits of the shift in assessment model from a heavily summative weighting to a low-stakes assessment approach was hypothesised to have potential benefits for all students, but particularly for students with low levels of engagement: '*We wanted to*

reward those engaging well and "awaken" those who fall behind to start engaging with tutors as well as their own "learning sets" under PAT [Personal Academic Tutor] system.' Theoretical grounding for this intervention focuses on active learning principles through a more effective assessment model in which learning is granular, tested, monitored, and reflected on by both staff and students ensuring increased self-efficacy for students and oversight for staff. A scaffolded approach featuring low-complexity continuous assessment is considered to increase engagement and build confidence as the module progresses in a way that is more difficult to achieve within the structure of a heavy-weighted summative assessment model.

WHO IS THE INTERVENTION FOR?

SAIL is run uniformly across all modules and year groups within the Department of Engineering and Technology, except in rare exceptions where a module is entirely project-based. This includes final year projects and level 7 individual or group projects owing to the different nature of engagement these types of modules necessitate. Though all students are expected to benefit from SAIL, a more pronounced effect is hypothesised for students on BTEC pathways and international students who have had differential preparations for UK HE, and whose outcomes are typically lower than their peers entering through the A-level pathway. The programme was introduced in Engineering and Technology as it was a locally developed initiative based on department-level identification of need during COVID-19.

WHAT IS THE INTERVENTION?

SAIL is an ongoing curricular intervention implemented universally and uniformly within Engineering and Technology modules, with the exceptions captured in the previous section. Modular learning is structured through weekly units or topics that are delivered and assessed in low-stakes assessments. Each module contains 11 weekly, online, low-stakes assessments worth 3% each. Students' can take as many or as few of these assessments as they want. Students' best 8 marks contribute to the final module grade, with a maximum of 24% of the grade available through this component. While students are only allowed a single take for each assessment, the time is not limited except for the weekly deadline. SAIL is part of a broader set of active learning approaches, such as problem-based and group-based learning activities, many of which are overseen by PATs. PATs also act as a system of support for SAIL delivery.

There is flexibility in the types of low-stakes assessments that module leaders can select for the SAIL aspects of module design. For example, they can include quizzes, drawings, the solution of an equation, etc. The remaining 76% of module marks are awarded through other modes of assessment, as determined by individual module leaders.

WHO IS DELIVERING THE INTERVENTION?

The intervention is delivered by lecturers and supported by PATs. The principles of the SAIL interventions were developed by the Head of Department and the Director of Teaching and Learning and delivered to all staff through written and video documents on the virtual learning environment (VLE) (the video material also targeted the students). The staff instructions contain a detailed protocol for SAIL but are not overly prescriptive apart from setting the number of assessments, their weight, and the need to adjust other assessments to accommodate the workload and weight of SAIL. There have been no other SAIL-specific training sessions for staff. This approach and protocol continue to be used to introduce new members of staff to the system.

Each academic year, a mid-year SAIL feedback session with staff is held. Through these, some emerging patterns of SAIL implementation are summarised. Most of the staff deliver SAIL via automated quizzes available on the VLE, with variable types of questions and tasks depending on the nature of the content. The questions form a pool from which the VLE draws a small number (typically around 5 questions) randomly for each student. Even though the questions typically mirror low-Bloom taxonomy tasks, some variation in the difficulty of questions has been observed, as indicated by a 1.5-fold difference in average SAIL marks between different modules, and requires caution from staff setting up the quizzes.

HOW IS THE INTERVENTION DELIVERED?

SAIL assessments are completed through the VLE. Across Engineering and Technology modules, face-to-face and remote lectures and workshops, video tutorials, and practical workshops are used for teaching and learning, which build the knowledge students require to complete SAIL assessments.

The assessments are released at the beginning of the week, opening at 00:01 on a Monday and closing at 23:59 on a Sunday and, as students are allowed to miss 3 assessments, no extensions are possible. Students complete the assessments in their own time and the submissions are uploaded to or completed within the VLE. The assessments are comprised of questions randomly drawn from a large pool to ensure students do not all have the same questions, and students have the facility to pause and return to complete assessments. This is to provide variety rather than to inhibit discussion of content and peer learning. Peer learning in the process of low-stakes assessment is seen as a marker of good learning engagement and is actively encouraged through pre-determined peer learning groups. Students receive feedback from their assessment, consisting of the correct answers and explanations, within 24 hours of the closing of the weekly deadline. This enables students to reflect on their learning and course correct before moving on to the next topic. At the same time, the quick turnaround in assessment and feedback enables module leaders to promptly assess areas that need review or further attention and adjust weekly learning effectively.

WHERE IS THE INTERVENTION DELIVERED?

The mode of delivery for SAIL learning materials can be face-to-face, remote or hybrid depending on the module, however, most assessments are delivered through, and completed within, the VLE.

HOW MANY TIMES WILL THE INTERVENTION BE DELIVERED? OVER HOW LONG?

SAIL is a permanent curricular programme delivered on a weekly basis, every semester for all standard Engineering and Technology modules, with the exceptions noted above.

WILL THE INTERVENTION BE TAILORED?

SAIL was initially implemented in 2019-20 in response to COVID-19. Modules contained 10 low-stakes assessments worth a maximum of 30% of the final grade combined and a further 70% made up of other existing assessment components. Each of the 10 assessments were valued at a maximum of 5%, with the best 6 scoring attempts out of 10 modules retained as part of the final module grade. The pivot from 6 out of 10 assessments at 30% to 8 out of 11 assessments at 24% was informed by discussions with academic staff in the Engineering and Technology department.

Variations of low-stakes assessment are present across the university, including within the Departments of Physical and Life Sciences. The flexibility of low-stakes assessment means that it is adaptable to different subject areas, however, no other department matches the standardised format of SAIL implemented in Engineering and Technology.

No further revisions to the delivery format are planned, however, the agile nature of SAIL's introduction and evolution means that academic staff at all levels are equipped to monitor its effectiveness and impact and advise on any localised or generalised enhancements that may be necessary over time. Where possible, the current iteration and delivery mode are seen as optimal and a core rationale for the retention of this format is to maintain data uniformity for longer-term insights and evaluation.

HOW WILL IMPLEMENTATION BE OPTIMISED?

Standardised implementation across all modules within Engineering and Technology means that SAIL is clearly understood and effectively deployed. Engineering and Technology students are now well-versed in the module format and know what to expect. Ad hoc feedback from students and staff, including a sample review of National Student Survey (NSS) comments from students indicated that students believe SAIL to be an effective model for modular learning. Feedback from staff was the basis for tailoring the delivery model and continues to inform department-wide delivery and in-module adjustments. As discussed above, the quick turnaround time helps to create a continuous process of dialogue, monitoring, and reflection that helps students and staff alike to react and respond effectively and efficiently to learning barriers. The use of learning sets helps to ensure students have options to both collaborate with their peers and engage independently. Simultaneously, the variety of question banks and types of questions facilitate a more engaging model of learning.

Deployment in the department of Engineering and Technology also serves as a useful case study from which other departments in the university can use learning to implement similar approaches. Due to the variable question models that are possible to use, SAIL is a versatile curricular intervention that can be tailored and introduced across local subject contexts. Early analysis of low-stakes implementation in both Biology and Chemistry indicates higher rates of engagement.

WHO ARE THE KEY ACTORS / STAKEHOLDERS?

- **Students** participate in SAIL through modular learning and completion of low-stakes assessments.
- **Module leaders** and **tutors** design and deliver learning activities, provide feedback, and adapt learning based on the results of low-stake assessments, i.e. reviewing or expanding on topics where necessary.
- **Personal academic tutors (PATs)** are an additional point of contact for feedback and support: they have access to their tutee's progress and can intervene in a regular small-group or 1:1 session.
- Occasional support from the **VLE team**: mainly technical support and improvements, e.g. automated calculation of final SAIL marks, inclusion of marking rubrics with each assignment inter alia.

CHANGE MECHANISMS

Change mechanism 1. Short sharp weekly assessed learning chunks, with quick grading and feedback, prompt ongoing interaction with course content and authentic reflection timelines.

The team discussed this in terms of timeliness, i.e. bringing assessment tasks closer to the content in recognition of cognitive load, but also in progressing the values of assessment as learning. Timeliness was also reflected in the structuring of content, which consists of bite-sized learning chunking of the module content into weekly "episodes" of learning that correspond to assessment windows and help students to increase engagement and progress through course threshold concepts.

Evidence:

- Young, J. Q., Van Merrienboer, J., Durning, S., & Ten Cate, O. (2014). Cognitive load theory: Implications for medical education: AMEE guide no. 86. *Medical Teacher, 36*(5), 371–384.
- Manning, K. D., Spicer, J. O., Golub, L., Akbashev, M., & Klein, R. (2021). The micro revolution: Effect of Bite-Sized Teaching (BST) on learning engagement and learning in postgraduate medical education. *BMC Medical Education, 21*(69), 1-11. https://doi.org/10.1186/s12909-021-02496-z
- Yan, Z., & Yang, L. (Eds.). (2021). *Assessment as Learning: Maximising Opportunities for Student Learning and Achievement* (1st ed.). Routledge. https://doi.org/10.4324/9781003052081.
- Kelly, E. (2022). Low-stakes failure as a method to improve learner agency and resilience. *WonkHE*. https://wonkhe.com/blogs/low-stakes-failure-as-a-method-to-improve-learner-agency-and-resilience/
- Currie, G., & Ryan, T. (2023). Improved Behavioral Engagement of Students through Low-stakes Online Tests and Immediate Dialogic Feedback. *Journal of International Education and Practice, 6*(1), 10-20. https://doi.org/10.30564/jiep.v6i1.5295.

Change mechanism 2. Low complexity/low failure – reinforcing obtainable mastery.

There is a clear mantra to recognise the lower order learning activities within Bloom's taxonomy within the assessment demands. Providing opportunities for the students to iteratively succeed and build confidence.

Evidence:

- Bottomley, S., & Denny, P. (2011). A participatory learning approach to biochemistry using student authored and evaluated multiple-choice questions. *Biochemistry and Molecular Biology Education, 39*, 352–361.
- McQueen, H. A., et al. (2014). PeerWise provides significant academic benefits to biological science students across diverse learning tasks, but with minimal instructor intervention. *Biochemistry and Molecular Biology* Education, 42(5), 371-381.
- Demars, C. E. (2007). Changes in Rapid-Guessing Behavior Over a Series of Assessments. *Educational Assessment*, 12(1), 23-45. https://doi.org/10.1080/10627190709336946

Change mechanism 3. Student agency facilitated by ownership of assessment selection (8 out of 11), and continually reflecting and acting (both individually and collectively) on feedback.

SAIL reinforces student agency by facilitating the option of completing all assessments or selecting which 8 out of 11 assessments are considered for the low-stakes portion of their module marks. Student agency is also promoted via the option of completing assessments independently or discussing these with peers, due to gateway assessments having a 'pause and return' facility. This is further reinforced by the nudge to continually reflect and act on assessment feedback.

Evidence:

- Wise, S. L., Pastor, D. A., & Kong, X. J. (2009). Correlates of Rapid-Guessing Behavior in Low-Stakes Testing: Implications for Test Development and Measurement Practice. *Applied Measurement in Education, 22*(2), 185-205. https://doi.org/10.1080/08957340902754650

Change mechanism 4. Collaborative learning helps to reinforce collective and individual student learning habits.

The corollary dimension of problem-based learning activities and learning sets facilitates collaborative learning amongst module peers and creates an environment in which discussion of learning content and continuous engagement is more likely. Increased engagement and the establishment of a learning community ensures students are bought-in to their modular learning.

The variety of question banks, which are generated per student at random, also facilitates wider discussion and promotes a more holistic understanding of learning concepts if students discuss the different questions peers are completing.

Evidence:

- Untested change mechanism.

Change mechanism 5. Effective study habits developed, which increase student SAIL buy-in, module engagement, gradual knowledge acquisition, and confidence.

SAIL promotes regular re-engagement with course content due to its iterative build consisting of weekly assessed topics. Students are nudged by the authentic weekly schedule which creates buy-in and increases regular contact with module content and naturally scaffolds learning and knowledge building. This, in turn, helps to build instinctive study habits over rushed and concentrated periods of absorbing larger chunks of learning context *in* short spaces of time triggered by looming weighty assessments.

Evidence:

- Yan, Z., & Yang, L. (Eds.). (2021). *Assessment as Learning: Maximising Opportunities for Student Learning and Achievement* (1st ed.). Routledge. https://doi.org/10.4324/9781003052081
- Kelly, E. (2022). Low-stakes failure as a method to improve learner agency and resilience. *WonkHE*. https://wonkhe.com/blogs/low-stakes-failure-as-a-method-to-improve-learner-agency-and-resilience/

Change mechanism 6. Students develop a learning identity.

These changes together help to develop a rounded student identity in which students adopt increasingly active study habits and are equipped with the tools to become independent learners as part of a wider learning community. Benefits are sustained beyond in-module learning to the wider course and increases the likelihood of students achieve positive end of year grades and final course outcomes.

Evidence:

- Untested change mechanism. Potential for qualitative evidence to measure this in future.

References for all assumptions

- Bottomley, S., & Denny, P. (2011). A participatory learning approach to biochemistry using student authored and evaluated multiple-choice questions. *Biochemistry and Molecular Biology Education, 39*, 352–361.
- Currie, G., & Ryan, T. (2023). Improved Behavioral Engagement of Students through Low-stakes Online Tests and Immediate Dialogic Feedback. *Journal of International Education and Practice, 6*(1), 10-20. https://doi.org/10.30564/jiep.v6i1.5295.

- Kelly, E. (2022). Low-stakes failure as a method to improve learner agency and resilience. *WonkHE*. https://wonkhe.com/blogs/low-stakes-failure-as-a-method-to-improve-learner-agency-and-resilience/
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- Yan, Z., & Yang, L. (Eds.). (2021). *Assessment as Learning: Maximising Opportunities for Student Learning and Achievement* (1st ed.). Routledge. https://doi.org/10.4324/9781003052081
- Young, J. Q., Van Merrienboer, J., Durning, S., & Ten Cate, O. (2014). Cognitive load theory: Implications for medical education: AMEE guide no. 86. *Medical Teacher, 36*(5), 371–384.

ASSUMPTIONS

Assumption 1. Module tutors and academic tutors are developed and bought in to the SAIL philosophy and practice.

Evidence:

- Untested assumption.

Assumption 2. VLE is structured and set up for scheduled release of SAIL assessment and immediate feedback.

Evidence:

- Untested assumption.

Assumption 3. Questions within the question banks are varied, link to the chunked content and reflect the lower levels of the Bloom's Taxonomy.

Evidence:

- This was generated by SAIL working group discussions indicated that during the early stages of adoption (2020). There wasn't standardised approach to the difficulty of weekly assessments. This is also indicated within the, at times, wide variation of achievements across modules (source- departmental mid-year review report).

Assumption 4. Students know how to access course content via the VLE and are encouraged to for the purposes of the SAIL assessments.

Evidence:

- Feedback from student panels suggested that students recognise SAIL as a method of telling them “where they are” with their studies every week.

Assumption 5. Students are receiving sufficient assessment priming to benefit from the SAIL format- buy-in.

Evidence:

- Untested assumption.

Assumption 6. Staff time and willingness to engage in pedagogic work.

Evidence:

- Untested assumption.

WHAT IS THE EVALUATION AIM?

The evaluation aims to explore whether the SAIL initiative supports students' course engagement habits, and subsequent grades on their course.

Comprehensive evaluation aims can be found in the trial protocol document.

WHAT ARE THE EVALUATION QUESTIONS?

RQ1: Does SAIL impact students' engagement on their course?

H_0: students on courses with SAIL engage with their course to the same extent as students on non-SAIL courses.

H_1: students on SAIL courses engage with their course to a different extent than those on non-SAIL courses.

RQ2: Does SAIL impact students' degree outcomes on their course?

H_0: there is no difference in degree outcomes between students on SAIL courses compared to non-SAIL courses.

H_1: students on courses with SAIL have different degree outcomes than students on non-SAIL courses.

RQ3: Does SAIL differentially impact non-A Level and international students' grades depending on their qualifications on entry to the university or home/international status?

H_0: there is no difference in grades for non-A Level and international students on SAIL courses compared to non-SAIL courses.

H_1: non-A Level and international students on SAIL courses will be awarded different grades to those on non-SAIL courses.

RQ4: Does engagement with SAIL impact on students' assessment submission habits?

H_0: there is no difference in substantive assessment submission habits between students on SAIL and non-SAIL courses.

H_1: the timing of substantive summative assessment submissions is different for students on SAIL courses relative to students on non-SAIL courses.

RQ5: Does engagement with SAIL impact grades for engineering students?

H_0: there is no difference in the grades of students who engaged in SAIL courses compared to the student who didn't engage in SAIL courses.

H_1: The students on SAIL will have different grades than those who didn't engage with SAIL course.

RQ6: Does participation in SAIL program impact students' continuation from Level 4 to Level 5 and Level 5 to Level 6?

H_0: Participation in SAIL has no impact on continuation from Level 4 to Level 5 or from Level 5 to Level 6?

H_1: Participation in SAIL has an impact on continuation from Level 4 to Level 5 and from Level 5 to Level 6?
WHAT METHODOLOGY ARE YOU USING? The evaluation will use Linear Mixed Models and model comparisons to explore the impact of the SAIL initiative. Comprehensive evaluation aims can be found in the trial protocol document.