PreSS (Predict Student Success) usage in the Computing Learning Centre (CLC) (Technological University Dublin)

Key Features

1. Was the initiative established specifically to promote progression and retention and/or to address non-progression rates?

   Yes

2. Please state the institutional commitments or national priorities with which this initiative is aligned — for example, an institutional policy or strategic plan, an indicator in the institution's Performance Agreement under the System Performance Framework, and/or the National Access Plan?

   - Faculty of Computing, Digital and Data Retention Strategy
   - TU Dublin Strategic Plan 2024–2028

3. Title of lead or section responsible for the initiative/measure

Computing Learning Centre

4. Focus

- First-year students
- Early intervention initiative
- Targeted initiative (specific student cohort/faculty)

5. Theme

- Student wellbeing, experience, & success

Overview of Initiative

6. Briefly describe the initiative, with reference to

- Why, and when introduced
- Overview of activities/intervention
- Success to date & next steps.

PreSS (Predict Student Success) is an early-warning predictive model originally developed by Bergin (2006) to identify, within the first few hours of an introductory programming module, students who may be at risk of failing or withdrawing. Using three factors — secondary school mathematics results, hours spent playing computer games, and programming self-efficacy (students' confidence in their ability to learn and perform programming tasks based on the Rosenberg self-esteem measure) — the model achieved 80% prediction accuracy and 87% sensitivity in identifying at-risk students.

The TU Dublin Computing Learning Centre (CLC) introduced PreSS in 2025/26 as part of its retention and student success strategy. The CLC provides academic and transitional supports to first-year computing students to improve retention, progression, confidence, and belonging. This represents the first practical deployment of PreSS beyond its original research context.

In its first year, the model was applied to 375 first-year computing students and identified 88 students as potentially at risk of non-progression. Evaluation of prediction accuracy and the

effectiveness of subsequent interventions is currently underway, with future plans focused on refining interventions and exploring wider adoption across programmes.

Aims and Objectives

7. Aim of the initiative

Previously, PreSS existed only as a developmental predictive model. This initiative represents its first deployment in practice, with the aim of using machine learning predictions to identify students at risk of non-progression at an early stage and provide additional evidence to support timely, targeted interventions.

8. Objective 1

To identify students at risk of failing or withdrawing from their first-year programming module at an early stage, before traditional indicators such as attendance patterns, assessment results, or engagement data become available.

Actions

Use PreSS predictions as an additional source of evidence to support early identification of students who may require support. CLC staff review these predictions alongside other indicators, including attendance, assessment performance, and engagement with staff, and apply professional judgement when determining whether intervention is appropriate and what form it should take.

Expected Outcome

Earlier identification of students who may be at risk of non-progression, enabling proactive and targeted support interventions before difficulties become evident through conventional measures by which time it may be too late. The initiative provides a human-on-the-loop approach, where predictive analytics informs, but does not replace, staff decision-making. This is expected to contribute to improved retention, progression, and CS1 module success rates.

9. Objective 2

To use predictive analytics to inform and enhance student retention and support strategies.

Actions

Integrate PreSS predictions into CLC retention processes and use the information, alongside staff expertise and other student engagement indicators, to inform support planning, intervention prioritisation, and retention initiatives.

Expected Outcome

More informed and evidence-based student support planning, enabling earlier and more targeted interventions for students who may be at risk of non-progression. This is expected to contribute to improved student engagement, retention, progression, and overall student success.

10. Objective 3

To evaluate the accuracy of the PreSS model and the effectiveness of the support interventions informed by its predictions.

Actions

Monitor the academic progression and outcomes of students identified by the PreSS model, comparing predicted risk with actual outcomes. Review the nature, timing, and impact of support interventions provided to determine their effectiveness in supporting student retention and success.

Expected Outcome

Evidence of the accuracy and practical value of the PreSS model in identifying at-risk students at an early stage, together with evidence on the effectiveness of targeted support interventions. Findings will inform future refinement of the model and intervention processes, supporting improved retention, progression, and student success.

Resourcing

11. How is the initiative resourced?

The initiative is delivered through the TU Dublin CLC, which is funded through the HEA Information Technology Investment Fund (ITIF). We apply each November and the funding spans a year. The faculty has received this funding for several years and dedicates it solely to funding the CLC. The aim is to apply again for this funding on an ongoing basis.

The CLC comprises two staff members:

1. Academic Lead: oversees targeted academic interventions;
2. Transitions Coordinator: leads initiatives that promote belonging, and engagement for students entering into the first year of their programme.

Together, these roles provide the capacity to review PreSS predictions, monitor student progression, and implement appropriate support and intervention activities.

Monitoring & Oversight

12. How is the initiative monitored — is there a reporting structure in place or a committee where there is a monitoring of and reporting on progress and the achievement of objectives (e.g. academic council, university executive team)?

The initiative is monitored through the TU Dublin CLC, with oversight provided by the Academic Lead. Progress is reviewed through regular analysis of model predictions, student outcomes, and intervention activities. Findings are reported through Faculty retention and student success structures and inform ongoing refinement of both the PreSS model and associated support processes. Evaluation focuses on prediction accuracy, intervention effectiveness, and contributions to student retention, progression, and success.

Data & Evidence of Impact

13. How do you know that the initiative is working as planned, i.e.
    - Are data gathered (ongoing monitoring and evaluation of achievement of objectives)?
    - Have the objectives been achieved? What data and evidence are there to support this?

Data are collected on model predictions, student outcomes, attendance, and support interventions. In its first year, PreSS was applied to 375 first-year computing students and identified 88 students as potentially at risk of non-progression. Ongoing monitoring of attendance, assessment performance, and student progression is being used to validate predictions and evaluate intervention effectiveness, with findings informing future refinement of the model and support processes.

14. Has impact been established, and how? If not at present, how do you plan to gather data and evidence to establish impact?

Impact has not yet been fully established, as the initiative is in its first year of implementation. Impact will be evaluated by tracking the progression, retention, and module outcomes of students identified by PreSS and comparing predictions with actual outcomes.

Future Plans

15. How do you intend to further develop or expand the initiative?

Future development will focus on evaluating and refining the PreSS model and associated intervention processes, informed by evidence gathered during its first deployment.

Ethical approval is also in place to develop and evaluate a predictive model for first-year mathematics, another key threshold subject for progression for Computing students in our Faculty.

Together, these models will support earlier identification of students who may benefit from additional academic and transitional support.

Additional Information

16. Additional information including relevant URLs

Predicting Success in CS1 — An Open Access Data Project — TU Dublin Research

PreSS: Predicting Student Success Early in CS1. A Pilot International Replication and Generalization Study — TU Dublin Research

"CS1: how will they do? How can we help? A decade of research and practice" by Keith Quille and Susan Bergin

Programming: predicting student success early in CS1. a re-validation and replication study

Using Machine Learning Techniques to Predict Introductory Programming Performance

Insights on Gender Differences in CS1: A Multi-institutional, Multi-variate Study.

Press#, a web-based educational system to predict programming performance

Programming: Further Factors that Influence Success.

