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The Future is Connection:

Collaboration, Creativity and Compassion in a Digital Society

Building connection and belonging: Extending the course modernisation framework for first-year IT education

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This paper extends the course modernisation framework adopted at Victoria University by adding connection and belonging as an explicit relational dimension of first-year Information Technology (IT) education. The existing framework comprises six principles spanning industry practice and contemporary technology, career development, sustainability and professional ethics, pedagogical excellence, real-world scenarios, and culturally and gender inclusive perspectives including First Nations knowledge. While these principles modernise what is taught and how, many first-year learners still struggle with confidence, consistency, and engagement: de-identified grade records from four recent block offerings show that most failures were attributable to non-submission rather than performance. Drawing on Tinto's retention model and belongingness theory, the paper proposes connection and belonging as a seventh, cross-cutting principle, operationalised through 10 relational interventions embedded in a scenario-based learning design built around a single anchor scenario. The extended framework forms the foundation for a mixed-methods study—now ethics approved, with data collection commencing—that will validate its impact through analytics, surveys, and student feedback.

Keywords: connection, belonging, course modernisation, first-year experience, student retention, introductory programming, conceptual framework

Introduction

First-year IT students often arrive with limited programming experience and low confidence, leading to persistently high failure rates in introductory programming units worldwide (Watson & Li, 2014). Small setbacks can cause rapid disengagement, especially in block-model learning, where students study one unit at a time in intensive four-week blocks rather than several units in parallel (Loton et al., 2022). When students feel connected—to their teacher, peers, and the learning process—they are more likely to attend, participate, and persist (Tinto, 2017), and belonging becomes the anchor that keeps them moving through challenges (Strayhorn, 2018). Even the best-designed course, taught by the best teacher, fails if students are too disengaged to attend or too lost to follow; connection is the mechanism that catches both.

Victoria University has adopted a course modernisation framework of six principles that reshape curriculum content, delivery, and assessment (Victoria University, 2025). The framework modernises what is taught and how, but not the relational conditions under which first-year students learn. This paper therefore proposes an extension: connection and belonging as a seventh, cross-cutting principle, with a conceptual model linking connection, engagement, consistency, progression, and success.

Background and problem context

Three interrelated problems motivate the extension:

- Many first-year IT students struggle with confidence and fear of failure (Watson & Li, 2014), and irregular attendance leads to inconsistent practice, weakening the pathway between engagement and success (Kahu & Nelson, 2018).
- High non-submission and failure rates in a core first-year programming unit at Victoria University highlight the need for relational interventions. Aggregate, de-identified grade records from four block offerings in semester show that 147 of 389 completing enrolments (37.8%) failed; 21 (5.4%) submitted no assessable work, and approximately three-fifths of failing students had passed the work they did submit—their failure was attributable to non-submission rather than performance.

- Block-model delivery intensifies the impact of missing even one class, as content and assessment are compressed into a four-week block (Loton et al., 2022; McCluskey et al., 2019).

The course modernisation framework

The framework belongs to a five-year institutional project that brings students, teachers, and industry together as co-designers of curriculum, aiming to improve course quality, relevance, student support, career development, and employment outcomes (Victoria University, 2025). It comprises six principles:

- *CM1: Industry practice and contemporary technology*
- *CM2: Career development*
- *CM3: Sustainability practices, ethics and professional conduct*
- *CM4: Pedagogical excellence, including communication and collaboration skills*
- *CM5: Real-world scenarios and contextual frameworks*
- *CM6: Culturally and gender inclusive perspectives and First Nations knowledge*

These principles align with transition pedagogy's whole-of-curriculum focus (Kift, 2015), but they are primarily curricular: they specify what students learn and how, not the interpersonal conditions—connection to teachers, peers, and purpose—that determine whether students engage with that curriculum at all.

Theoretical foundations

Two complementary theories underpin the proposed extension:

- *Tinto's retention model*: persistence is strengthened when students are academically and socially integrated—staying connected to people and purpose supports persistence (Tinto, 1975, 2017).
- *Belongingness theory*: the need to belong is a fundamental human motivation, and students perform better when they feel part of a group (Baumeister & Leary, 1995; Strayhorn, 2018).

Tinto's model is adopted with a caveat: its integration thesis has been critiqued as assimilationist (Tierney, 1992)—a poor fit for the diverse, commuter, and first-in-family cohorts typical of first-year IT at Victoria University, and in tension with CM6. The framework therefore follows Kahu and Nelson (2018): it is the institution's structures, not the student's assimilation, that must adapt to build belonging.

Extending the framework: Connection and belonging

The paper proposes a seventh principle—CM7: Connection and belonging—that operates both as a principle in its own right and as a relational thread running through CM1–CM6. Ten classroom-level interventions operationalise CM7 in first-year IT units. Table 1 maps each to its evidence base, the principles it reinforces, and its implementation status. The interventions sit within a scenario-based design authored for the unit: one anchor scenario runs through the block, with sub-scenarios for each session (CM5), so students work on a shared, continuing narrative rather than disconnected exercises. The scenario enables belonging rather than producing it directly: it supplies connection to purpose (Tinto, 2017) and common ground, while the relational interventions inside that narrative convert shared context into connection between people. CM7 is likewise distinct from CM4: CM4 treats communication and collaboration as graduate skills to be taught and assessed; CM7 treats connection as a precondition for learning.

While CM1-CM6 focus on curriculum content, graduate capabilities, authentic learning, and inclusive practice, CM7 addresses the relational conditions that influence whether students engage with these opportunities in the first place. Rather than representing an additional curriculum domain, CM7 functions as an enabling principle that strengthens students' connection to peers, teachers, and purpose. Its distinctive contribution is making belonging an intentional design consideration within course modernisation, recognising that students cannot benefit fully from a curriculum from which they have already disengaged.

Table 1

Relational interventions operationalising CM7 and their alignment with existing principles

Intervention	Description and evidence	Reinforces	Status
Code Partner System	Structured peer accountability; pair programming improves retention, confidence, and program quality (McDowell et al., 2006).	CM1, CM4	Implemented
Debugging Diary	Reflective habit building through constructive engagement with errors (Chi & Wylie, 2014).	CM3, CM4	Implemented
Teach-Back Mini-Moments	Learning through explanation, the interactive mode of engagement with the strongest gains (Chi & Wylie, 2014).	CM4	Implemented
Nobody Left Behind Protocol (Live Coding)	Attendance is taken at the start of each class and a templated session summary is sent immediately afterwards, so absent students receive it straight away; personal first-week follow-up to learn reasons for absence is being explored. Active check-ins signal institutional care (Tinto, 2017). Live coding is conducted during class, and the completed code is shared with all students after the session to support revision and catch-up learning.	CM6	Implemented; follow-up contact being explored
Signal Strength Check-ins	Quick emotional and cognitive pulse checks in the educational interface (Kahu & Nelson, 2018).	CM4, CM6	In progress
Automated and AI-Assisted Feedback	CodeGrade and an AI chatbot give instant, judgement-free feedback on code and questions, lowering the social cost of help-seeking (Keuning et al., 2018; Ma et al., 2014).	CM1, CM4	Implemented
Near-Peer Mentoring	Second-year students mentor first-years; peer mentoring improves wellbeing, integration, and retention (Collings et al., 2014).	CM2, CM6	In action plan
Early Low-Stakes Wins	A small, achievable assessment early in the block builds confidence before fear of failure sets in (Kift, 2015).	CM4	Implemented
Peer-Assisted Study Sessions	Student-led group study; supplemental instruction is associated with higher grades and persistence (Dawson et al., 2014).	CM4	In action plan
Showcase Demo Day	Students present their major project to peers in the final session—a shared milestone and public sense of mattering (Strayhorn, 2018).	CM2, CM5	Implemented

Conceptual framework

Connection → Engagement → Consistency → Progression → Success (Figure 1, below). Each stage is defined observably. Connection is the presence of relational ties—to teacher, peers, and purpose—expressed through interaction in and beyond class. Engagement is active participation: attempting exercises, contributing to discussion, and acting on feedback. Consistency is rhythm: regular attendance and distributed practice across the block rather than last-minute effort. Progression is cumulative advancement: submitting assessments and building each week on prior skills. Success is completing the unit with the confidence to continue in the course.

Movement along the pathway is neither automatic nor one-way: a failed submission or a missed week can return a student to the start of the chain, so the interventions rebuild connection continuously across the block.

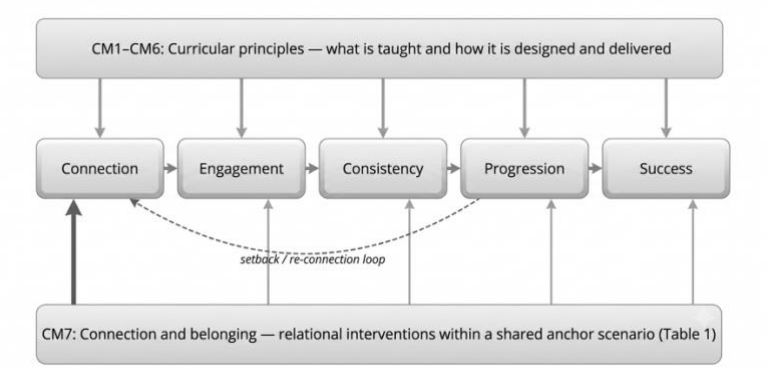


Figure 1. The extended course modernisation framework: CM7 supplies the relational entry point through which the curricular principles (CM1–CM6) reach students; setbacks loop students back to connection.

The sequence mirrors the mechanisms through which engagement translates into success (Kahu & Nelson, 2018) and positions belonging as the affective foundation of persistence (Strayhorn, 2018; Tinto, 2017). The local failure data trace this pathway: most failing students were passing the work they submitted but lost consistency and progression. CM7 supplies the entry point: without connection, the curricular strengths of CM1–CM6 cannot reach students who have already disengaged.

Limitations and tensions

Four limitations temper these claims. First, workload: 10 interventions delivered inside a four-week block carry real staff costs, and they are not uniformly low-cost—near-peer mentoring and dedicated follow-up contact require resourcing—hence the status column in Table 1. Second, care can be read as surveillance: attendance tracking and personal follow-up may be experienced as monitoring rather than support; the protocols are therefore transparent and invitational—students are told why contact occurs and may decline it. Third, the strongest evidence for automated and AI-assisted feedback predates current large language models (Keuning et al., 2018; Ma et al., 2014); the integrity, accuracy, and equity-of-access implications of chatbot use in the LLM era remain open questions that the planned study will monitor. Finally, the framework is untested: the pathway and the scenario–belonging link will be validated only by the study that follows.

Future research direction

This paper reports the framework and interventions to date. Ethics approval for the mixed-methods validation study has been granted by Victoria University Human Research Ethics Committee (Approval number: HRE26-057); data collection is commencing, and a subsequent full paper will report the findings. The study addresses three research questions:

- *RQ1*: To what extent do the CM7 interventions predict engagement, consistency, progression, and success in first-year IT units?
- *RQ2*: Which interventions contribute most, and does the anchor scenario exert an independent effect on engagement and cohort identification, or does its effect run through the relational interventions?
- *RQ3*: How do students experience connection and belonging under the extended framework?

Belonging will be measured with Yorke's (2016) survey of student belongingness, engagement, and self-confidence, triangulated with CodeGrade analytics, learning management system data, attendance records, and focus groups; cohort identification will be captured through the survey and focus groups. Consistency will be operationalised through attendance and distributed practice activity; progression through submission and pass rates; success through unit completion and continuation into the following study period. Transferability to first-year education across disciplines will then be tested.

Conclusion

Connection is a central driver of first-year IT success. Small relational practices—structured peer routines, predictable rhythms, early check-ins—reduce isolation and make disengagement visible before it becomes silent dropout (Baumeister & Leary, 1995; Tinto, 2017). Extending the course modernisation framework with a seventh, cross-cutting principle of connection and belonging, delivered through a shared anchor scenario, gives relational pedagogy the same explicit status as industry relevance, inclusion, and pedagogical excellence, and offers a practical way to improve engagement and outcomes within the resourcing limits noted above (Kahu & Nelson, 2018). This paper sets the theoretical foundation for a data-informed model to be validated in future research.

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