

From transactional use to reflective engagement: Higher education students' evolving understandings of academic integrity and generative AI

Sehrish Javed

sehrish.javed@federation.edu.au

Federation University

Selena Firmin

Federation University

Jerry Maroulis

Federation University

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Abstract

The emergence of Generative Artificial Intelligence (GenAI) has disrupted established understandings of academic integrity in higher education, raising questions about authorship, ethical responsibility, and students' engagement with learning. Although existing research has examined students' perceptions, adoption patterns, and concerns regarding academic misconduct, less is known about how students' understandings of academic integrity and their approaches to using GenAI develop through sustained engagement over time.

This qualitative longitudinal study explored how undergraduate and postgraduate students from multiple disciplinary backgrounds at a regional Australian university understood and engaged with academic integrity while using GenAI tools over a 15-month period. Semi-structured interviews were conducted across four phases and analysed using reflexive thematic analysis. Organisational learning theory was used as an interpretive lens for examining changes in students' assumptions, practices, and reflective engagement with GenAI.

The findings indicate that students initially approached GenAI primarily as a tool for efficiency, task completion, and academic performance. Through repeated experiences of using, evaluating, and questioning AI-generated outputs, many participants became increasingly attentive to issues of authorship, responsibility, and learning. Some subsequently adopted more deliberate practices characterised by critical evaluation, purposeful verification, and greater ownership of learning. These patterns varied considerably across participants and appeared to be shaped by assessment demands, feedback, peer interactions, disciplinary expectations, and opportunities for reflection.

The study contributes to emerging scholarship by illustrating how students' understandings of academic integrity may change through ongoing interaction with GenAI technologies and by highlighting the educational conditions that appear to support more reflective and ethically informed engagement. The findings suggest that universities should move beyond predominantly detection-oriented responses and instead design educational approaches that support critical reflection, transparent GenAI use, and ethically responsible engagement with emerging technologies.

Introduction

The rapid emergence of Generative Artificial Intelligence (GenAI) has fundamentally altered the landscape of higher education. Tools such as ChatGPT, Copilot, and Perplexity are increasingly embedded within students' learning practices and are reshaping how information is accessed, generated, and communicated (Baidoo-Anu et al. 2024). While these technologies offer opportunities to support learning through personalised feedback, idea generation, and enhanced productivity, they also challenge established assumptions about authorship, intellectual ownership, and academic work. Consequently, universities are increasingly grappling with questions concerning responsible use, authorship, and the educational purposes of assessment in technology-mediated learning environments (Rodrigues et al. 2025).

Academic integrity scholarship has long been concerned with academic misconduct, including plagiarism and cheating. Foundational research demonstrated that misconduct is shaped not only by individual factors but also by peer, institutional, and contextual influences (McCabe et al. 2001). Over time, however, the field has increasingly challenged predominantly punitive and detection-oriented responses, advocating instead for teaching and learning approaches and institution-wide cultures of integrity (Bertram Gallant 2008, 2017; Bretag et al. 2011; Bretag and Mahmud 2016). The emergence of GenAI has renewed concerns about plagiarism, cheating, contract cheating, and unauthorised assistance (Evangelista 2025; Lancaster 2023; Zlotnikova et al. 2025), but a narrow focus on rule violations and detection risks overlooking this broader educational tradition.

Within this broader tradition, academic integrity extends beyond the avoidance of misconduct and is commonly associated with values such as honesty, trust, fairness, respect, responsibility, and courage (International Center for Academic Integrity [ICAI] 2021). Research has similarly argued for understanding integrity through ethical practice, student learning, and institutional culture rather than only through breaches and sanctions (Macfarlane et al. 2014; Bretag et al. 2014; Sefcik et al. 2020). More recent scholarship has cautioned that academic integrity should not be reduced either to rule compliance or to a list of general values, instead locating it within the protection of the internal goods of academic practice, including learning, growth, and knowledge production and sharing (Mejía and Garcés-Flórez 2025). From this perspective, academic integrity encompasses students' capacities to exercise judgement, assume responsibility for learning, and engage ethically with knowledge and technology.

In the context of GenAI, these established concerns take on new forms. Eaton (2023) argues that increasingly normalised AI technologies require reconsideration of conventional assumptions surrounding plagiarism, authorship, and scholarly practice, while Foltýnek et al. (2023) emphasise transparent acknowledgement, ethical use, and education in responsible AI practices. Lancaster (2023) similarly highlights the limitations of relying on technical detection as a primary response to AI-generated work. Recent scholarship has therefore argued that institutional responses to GenAI should not become preoccupied with misconduct, detection, and compliance at the expense of broader educational questions concerning how students develop understanding, judgement, and responsible engagement with knowledge in increasingly AI-mediated learning environments (Ali and Maroulis 2026). Understanding academic integrity in this broader sense is particularly important where students are required to make decisions regarding appropriate use, attribution, verification of information, and ownership of academic work.

Although a growing body of research has examined students' perceptions of GenAI, patterns of adoption, and concerns regarding academic dishonesty, most studies provide cross-sectional snapshots of students' experiences (Almassaad et al. 2024; Johnston et al. 2024; Acosta-Enriquez et al. 2024; Saihi et al. 2024; Chen et al. 2025). Recent studies have provided important evidence concerning students' perspectives on GenAI and their perceived ethical concerns but have examined these issues at a single point in time (Johnston et al. 2024; Acosta-Enriquez et al. 2024). A small body of longitudinal work is now emerging. Parker et al. (2026), for example, analysed student GenAI use and ethical perceptions across four semesters in a teacher education program and identified increasing use alongside continuing ethical uncertainty. This work provides important longitudinal evidence at program level, but does not offer

repeated qualitative accounts of how students themselves interpret and renegotiate academic integrity through sustained engagement with GenAI. Consequently, qualitative evidence concerning how students' understandings of academic integrity evolve through repeated experience remains limited.

Accordingly, this study adopts a qualitative longitudinal approach to examine how undergraduate and postgraduate students' understandings of academic integrity evolve through sustained engagement with GenAI tools. By focusing on changes in students' assumptions, practices, and reflective engagement over time, the research examines how students' capacity to enact academic integrity in AI-mediated learning may develop through sustained experience and reflection. The study was guided by the following research question: *How do higher education students' understandings of academic integrity evolve through sustained engagement with GenAI tools?* Collectively, it extends current scholarship by providing a longitudinal account of how students' understandings of academic integrity change through sustained engagement with GenAI and by illustrating the usefulness of organisational learning theory for interpreting these changes.

Literature Review

GenAI and Academic Integrity in Higher Education

Research examining students' use of GenAI has expanded rapidly across higher education and has largely focused on how these technologies are being incorporated into learning and assessment practices. Studies indicate that students commonly use GenAI tools to generate ideas, summarise information, improve writing, and support problem solving, while also perceiving these technologies as useful, efficient, and capable of supporting engagement and knowledge development (Baidoo-Anu et al. 2024; Francis et al. 2025). Consequently, GenAI is increasingly being positioned as an embedded feature of contemporary learning environments rather than merely an emerging educational technology.

The growing integration of GenAI has renewed questions concerning academic integrity, but the movement beyond a narrow misconduct perspective predates these technologies. Academic integrity research has progressively shifted towards positive, educative, and institution-wide approaches that connect integrity with learning, ethical decision-making, and the culture of the academic community (Bertram Gallant 2008, 2017; Bretag et al. 2011; Bretag and Mahmud 2016). The ICAI (2021) similarly frames academic integrity through the values of honesty, trust, fairness, respect, responsibility, and courage. This broader orientation is also consistent with Macfarlane et al.'s (2014) review, which observed that the field had been disproportionately framed through misconduct and called for greater attention to ethical, as well as unethical, academic practice. Mejía and Garcés-Flórez (2025) extend this discussion by arguing that academic integrity should also be understood in relation to protecting the internal goods of academic practice, including learning, growth, and knowledge production and sharing. From this perspective, academic integrity extends beyond detecting rule violations and includes fostering critical judgement, intellectual responsibility, and ethical engagement with knowledge and technology.

GenAI adds new complexity to this established academic integrity agenda because students must make increasingly ambiguous decisions about authorship, acknowledgement, acceptable assistance, verification, and responsibility for generated content. ENAI recommendations emphasise that ethical AI use depends on transparent acknowledgement, clear educational guidance, and opportunities for students to learn how and why AI tools should be used responsibly (Foltýnek et al. 2023). Eaton's (2023) concept of postplagiarism similarly situates academic integrity within an environment where AI-mediated authorship and knowledge production are becoming normalised, while Lancaster (2023) cautions against assuming that technological detection can provide a sufficient response. Empirical studies further indicate that students frequently adopt GenAI because of its convenience and perceived usefulness while simultaneously expressing concerns regarding ethics, privacy, misinformation, and academic misconduct (Almassaad et al. 2024; Johnston et al. 2024; Acosta-Enriquez et al. 2024; Dai 2025; Saihi et al. 2024).

Taken together, the literature suggests that GenAI has complicated the ways in which longstanding academic integrity principles are interpreted and enacted by students. The relevant gap is therefore not whether academic integrity extends beyond plagiarism and misconduct, which is well established within the field, but how students come to understand and apply principles of authorship, responsibility, transparency, and ethical judgement while engaging with GenAI over time. Considerably less is known about how students themselves make sense of these tensions through sustained engagement with GenAI technologies.

Research Gaps and the Need for Longitudinal Inquiry

Despite the rapid expansion of scholarship concerning GenAI in higher education, existing research has largely documented students' perceptions and immediate experiences of these technologies and offers comparatively little insight into how their understandings change through ongoing engagement with them. Most studies have employed cross-sectional designs that capture patterns of adoption, perceived benefits, and concerns relating to academic integrity at a particular point in time (Almassaad et al. 2024; Johnston et al. 2024; Acosta-Enriquez et al. 2024; Saihi et al. 2024; Sánchez-Prieto et al. 2025). Table 1 summarises representative empirical studies examining students' use of GenAI in higher education and highlights the methodological and conceptual gaps that informed the present study.

Table 1
Empirical studies examining students' use of GenAI in higher education and implications for the present study

Study	Design	Main Focus	Key Findings	Limitations and Relevance to the Present Study
Chen et al. (2025)	Cross-sectional survey (218 GenAI users)	GenAI literacy: adoption, interaction, evaluation of output and ethics	Students commonly used GenAI to generate and develop ideas, remained critical of AI outputs, and wanted clearer guidance on ethical and appropriate use	Single-institution, self-reported and cross-sectional; cannot explain how ethical understandings or practices develop longitudinally
Sánchez-Prieto et al. (2025)	Quantitative	Self-learning and prompting	Students reported high satisfaction and perceived usefulness; simpler prompts generally produced better-performing example-generation tools.	Does not examine changes in students' learning approaches or understandings over time.
Sergeeva et al. (2025)	Cross-sectional quantitative (UTAUT2)	Adoption and habit formation	Habit and performance expectancy were strong predictors of GenAI adoption	Cross-sectional and self-reported; does not explain how adoption habits or ethical understandings change over time.
Dai (2025)	Quantitative survey	Educational uses and avoidance	Students used GenAI for design, brainstorming and communication	Provides cross-sectional perceptions but cannot explain developmental trajectories of use.
Almassaad et al. (2024)	Survey	Use and perceptions of ChatGPT	Benefits accompanied by concerns about ethics and integrity	Provides little insight into how perceptions and practices evolve through continued use.
Baidoo-Anu et al. (2024)	Cross-sectional survey and scale validation (n = 277)	Student perspectives on ChatGPT as a learning tool	Students reported academic benefits and accessibility alongside concerns about over-reliance, critical thinking, privacy, security and originality	Cross-sectional Ghanaian sample; identifies benefits and concerns but cannot show how academic-integrity understandings change through sustained use
Johnston et al. (2024)	Cross-sectional survey	Student perspectives on GenAI and academic integrity policy	Students reported widespread awareness and use of GenAI and expressed a need for clear institutional guidance	Large student sample, but captures perspectives at one point in time and does not examine how understandings or practices develop longitudinally.
Acosta-Enriquez et al. (2024)	Quantitative survey	Knowledge, attitudes and perceived ethics of ChatGPT use	Ethical perceptions and concerns were associated with student use; authors called for responsible-use education and guidance	Cross-sectional design cannot explain how ethical perceptions change through sustained GenAI use or educational experience.
Parker et al. (2026)	Longitudinal survey across four semesters	GenAI use, ethical perceptions, and policy in teacher education	GenAI use for studying and assessment preparation increased over time, while ethical uncertainty remained evident	Provides important longitudinal program-level evidence but does not offer repeated qualitative accounts of how students interpret and renegotiate academic integrity over time.
Saihi et al. (2024)	Cross-sectional questionnaire and PLS-SEM (n = 192)	Factors shaping student and educator adoption of GenAI chatbots	Participants generally viewed AI chatbots positively, while trust, privacy, response bias, information accuracy and ethical considerations remained important concerns	Combines students and educators and is cross-sectional; explains adoption factors rather than development of students' ethical reasoning over time

A small but emerging body of longitudinal work has begun examining how artificial intelligence may influence educational experiences over time (Liu and Reinders 2025; Parker et al. 2026). Liu and Reinders (2025) focus primarily on motivation, while Parker et al. (2026) provide four-semester survey evidence concerning changing patterns of GenAI use and ethical perceptions in teacher education. These studies demonstrate the value of longitudinal inquiry but leave comparatively little qualitative evidence concerning how students themselves interpret changes in authorship, responsibility, transparency, and the appropriate use of GenAI through repeated experience. This gap is notable because established academic integrity scholarship has repeatedly emphasised the value of holistic education, student engagement, and developmental rather than exclusively punitive responses (Bretag et al. 2014; Bertram Gallant and Stephens 2020; Sefcik et al. 2020). GenAI-specific guidance has likewise emphasised that responsible use requires education in ethical judgement, acknowledgement, and the purposes of learning rather than reliance on detection alone (Foltýnek et al. 2023). Consequently, relatively little is known about how educational experiences, feedback, and opportunities for reflection are understood by students as they negotiate academic integrity across sustained engagement with GenAI technologies.

Addressing this gap is important because students are increasingly required to make decisions regarding when, how, and why GenAI should be used in support of learning. Understanding how these judgements emerge and change over time has important implications for educational practice, assessment design, and institutional responses to GenAI. Accordingly, this study adopts a qualitative longitudinal approach to examine how undergraduate and postgraduate students' understandings of academic integrity change through sustained engagement with GenAI tools.

Organisational Learning as an Interpretive Lens

This study draws selectively upon organisational learning theory as an interpretive lens for understanding how students' engagements with GenAI and their understandings of academic integrity evolve over time. This theoretically informed approach responds to calls within academic integrity scholarship for greater use of theory to move beyond predominantly descriptive accounts and to explain how integrity-related behaviours and understandings develop (Curtis and Clare 2024). Organisational learning theory was originally developed to explain learning within organisational systems (Argyris and Schön 1978,

1996). The present study does not treat individual students as organisations. Rather, it uses selected theory-of-action concepts as sensitising constructs for examining how participants modified practices and reconsidered assumptions in response to experience. This selective use is intended to support interpretation of individual meaning-making without collapsing the distinction between individual and organisational learning.

Argyris and Schön (1978, 1996) distinguished between single-loop learning, in which actions are adjusted while underlying governing assumptions remain largely unchanged, and double-loop learning, in which those assumptions themselves become objects of questioning and reconsideration. Concepts of third-order or triple-loop learning developed later in the organisational learning literature. Importantly, Tosey et al. (2012) demonstrate that the term “triple-loop learning” does not appear in Argyris and Schön’s published work and that later conceptualisations are diverse and sometimes weakly grounded. In the present study, triple-loop learning is therefore used cautiously, drawing on later scholarships such as Snell and Chak (1998), as a heuristic for considering more fundamental reflection on purposes, roles, and responsibility rather than as a discrete or empirically established developmental stage. The clear depiction is below Fig. 1:

The above-mentioned figure is a conceptual representation of single- and double-loop learning derived from Argyris and Schön (1978, 1996), with triple-loop learning included as a later extension discussed by Snell and Chak (1998) and critically reviewed by Tosey et al. (2012). This framework is employed as a heuristic interpretive lens rather than a sequential stage model. The emphasis on reflection and changing assumptions resonates with broader conceptions of higher education as a developmental process through which students construct increasingly sophisticated identities as learners and future professionals (Daniels and Brooker 2014). From this perspective, learning involves more than the acquisition of knowledge and skills; it also encompasses changes in how students exercise judgement, assume responsibility, and engage ethically with knowledge and practice. Within academic integrity scholarship, reflective and developmental responses have similarly been proposed as mechanisms for moving beyond behavioural compliance towards greater understanding and ethical responsibility (Dalal 2015; Bertram Gallant and Stephens 2020). Scholarship on student learning has also distinguished between more instrumental and surface approaches to learning and deeper forms of engagement characterised by reflection, meaning making, and ownership of learning (Dolmans et al. 2016; Frăsineanu 2013).

This perspective resonates with contemporary understandings of academic integrity as involving judgement, responsibility, and ethical engagement with knowledge and practice. In contexts where GenAI is increasingly embedded within learning, students are required to make decisions regarding appropriate use, evaluate the limitations of AI-generated outputs, and determine how such outputs should be integrated into their own learning practices.

Accordingly, selected organisational learning concepts provide a useful interpretive lens for the present study because they enable examination of how students’ practices and underlying assumptions may change through sustained engagement with GenAI technologies. The framework is not proposed as a general theory of academic integrity, nor are individual students treated as organisational learning systems. Rather, consistent with calls for theory-informed academic integrity research (Curtis and Clare 2024), single- and double-loop learning, together with the more cautiously employed concept of triple-loop learning, are used as sensitising concepts for interpreting changing practices, assumptions, and purposes over time.

Methodology

Research design

The purpose of this study was to explore how higher education students’ understandings of academic integrity evolved through sustained engagement with GenAI tools. Given the study’s focus on change, meaning-making, and evolving practices, a qualitative longitudinal design was considered most appropriate. Qualitative longitudinal research is particularly useful for examining continuity and change, including how participants reinterpret earlier experiences as circumstances and understandings develop over time (Thomson and Holland 2003; Calman et al. 2013). This approach therefore enabled attention to temporal processes that may not be readily captured through cross-sectional designs.

The longitudinal approach enabled the study to move beyond snapshot accounts of students’ experiences and instead examine how their engagements with GenAI and understandings of academic integrity developed through repeated interactions with these technologies. The design was especially suited to investigating processes of reflection, adaptation, and changing assumptions regarding ethical and responsible GenAI use.

The study was informed by selected concepts from organisational learning theory, particularly single- and double-loop learning and later discussions of third-order learning (Argyris and Schön 1978, 1996; Tosey et al. 2012). Rather than serving as a predictive model, these concepts provided an interpretive lens for examining whether and how students modified practices and reconsidered underlying assumptions over time. The theoretical framework was applied at the interpretive stage rather than used as a prescriptive sequence through which participants were expected to progress.

Participants and Sampling

Higher education students represent an appropriate population for this study because their increasing engagement with GenAI technologies requires them to make ongoing decisions about how these tools should be integrated into their learning, prompting reflection on issues of authorship, responsibility, and academic integrity. As students engage with GenAI to support activities such as information gathering, idea generation, writing, and problem solving, they are increasingly confronted with questions concerning authorship, intellectual ownership, responsibility, and the purposes of learning. Consequently, higher education contexts provide a particularly relevant setting for investigating how students negotiate issues of academic integrity while interacting with rapidly evolving technologies.

The study was undertaken at a regional Australian university that enrolls students from diverse disciplinary, educational, and socioeconomic backgrounds. Regional universities frequently serve students with varied prior educational experiences and differing levels of exposure to emerging technologies and

institutional support. Examining students’ experiences within this context therefore provided an opportunity to explore how understandings of academic integrity and GenAI developed within a setting that may differ from larger metropolitan institutions.

Participants were recruited using a snowball sampling strategy. This approach was considered appropriate because students who actively and regularly engage with GenAI technologies represent a dispersed and evolving population that may not be readily identifiable through conventional recruitment methods (Parker et al. 2019). Initial participants were recruited through university networks and were subsequently invited to identify other students who routinely incorporated GenAI tools into their learning practices, thereby facilitating access to individuals with relevant and sustained experience of using these technologies.

Table 2 provides an overview of participant engagement across the four phases of data collection. There were 20 students that participated in Phases 1 and 2 of data collection, with 16 participants continuing into Phases 3 and 4. The reduction in participant numbers reflected voluntary withdrawal arising from changes in study commitments and availability over the 15-month period. The final sample comprised both undergraduate and postgraduate students drawn from a range of disciplinary backgrounds, including information technology, business, engineering, and science. Including participants from diverse disciplinary contexts enabled the study to capture a broad range of experiences and perspectives regarding the educational use of GenAI and the ways in which students understood and negotiated issues of academic integrity. Situating the study within a regional Australian university also provided an opportunity to examine students’ experiences in an institutional context that is comparatively under-represented in the emerging literature concerning GenAI and academic integrity.

Table 2
Overview of Participants and Interview Phases

Interview Phase	Time Conducted	Number of Participants	Average Interview Length
Phase 1	July–September 2024	20	60 minutes
Phase 2	November 2024–January 2025	20	56 minutes
Phase 3	March–June 2025	16	45 minutes
Phase 4	August–October 2025	16	45 minutes

Data Collection

Data were collected through semi-structured interviews conducted across four phases over a 15-month period (Table 2). Semi-structured interviews were selected because they provide flexibility in exploring participants’ experiences while allowing researchers to examine issues of importance in greater depth (Adams 2015). The repeated interview approach enabled the study to examine continuity and change in students’ experiences and understandings of academic integrity and GenAI use over time.

Interview questions focused on three broad areas: participants’ experiences using GenAI tools, their understandings of academic integrity and ethical responsibility, and their reflections on how their practices and perspectives had changed throughout the study period. Interviews lasted between approximately 45 and 60 minutes and were audio-recorded with participants’ informed consent. All interviews were professionally transcribed and checked for accuracy prior to analysis. The longitudinal nature of the study allowed participants to revisit earlier experiences and reflect upon changes in their assumptions and practices. Repeated engagement with participants therefore provided opportunities to explore not only what students thought about GenAI but also how and why their perspectives developed over time.

Data Analysis

Interview data were analysed using reflexive thematic analysis (Table 3) following Braun and Clarke’s six-phase approach (Braun et al. 2023; Byrne 2022). Reflexive thematic analysis was selected because of its flexibility and suitability for exploring participants’ experiences, meaning-making processes, and changing understandings over time. Consistent with the principles of reflexive thematic analysis, data analysis was understood as an interpretive and iterative process in which researcher subjectivity and reflexivity form part of knowledge production rather than the mechanical application of coding procedures. Reflexive memoing was undertaken throughout the study to document emerging insights, analytical decisions, and assumptions regarding participants’ evolving engagements with GenAI and academic integrity. Memos were used to record observations about changes across interview phases, note potential relationships between themes, and critically examine how researchers’ interpretations were developing over time. Regular discussions among the research team supported reflexive interrogation of questioning assumptions, emerging interpretations and refining the developing analysis, rather than establishing inter-coder reliability or achieve coding consensus.

Table 3
Reflexive Thematic Analysis Procedures

Phase	Description	Longitudinal Purpose	Analytical Approach
Familiarisation	Reading and re-reading transcripts and recording reflections	To understand participants' evolving experiences and identify preliminary patterns of change	Manual reading and reflexive memoing
Generating Initial Codes	Systematic coding of each interview phase	To identify key features and emerging understandings at each time point	Line-by-line coding in NVivo
Constructing Themes	Grouping related codes into broader patterns of meaning	To identify recurring and changing patterns across phases	Thematic mapping and NVivo
Reviewing Themes	Examining coherence and consistency across the dataset	To identify continuity, change, and shifting patterns across phases	Iterative comparison within and across phases
Defining and Naming Themes	Refining the scope and central meaning of themes	To represent participants' evolving assumptions and practices clearly	Thematic refinement and sub-theme development
Producing the Report	Integrating themes, extracts, literature, and theory	To construct an interpretive account of continuity and change in students' understandings of academic integrity and GenAI use	Integrative narrative writing

Analysis occurred both within and across phases of data collection. Following each interview phase, transcripts were read and re-read to facilitate familiarisation with the data and to generate initial observations and reflections. Coding was undertaken inductively and iteratively using NVivo. Initial codes were then grouped into broader patterns of meaning that reflected participants' experiences, assumptions, and practices regarding GenAI use and academic integrity.

The longitudinal design required particular attention to continuity and change across the four phases of data collection. Consistent with qualitative longitudinal guidance (Thomson and Holland 2003; Calman et al. 2013), analysis involved comparison of themes within each phase and across successive phases to identify recurring, emerging, and shifting patterns in participants' accounts. The analysis therefore focused on temporal patterns across the repeated interview dataset while remaining attentive to variation and non-linearity rather than assuming a common developmental sequence.

Themes were subsequently refined through iterative engagement with the data and ongoing discussions among the research team to strengthen analytical coherence and reflexivity. Organisational learning concepts were then applied as a secondary interpretive lens after the inductive development and refinement of themes, enabling consideration of how the observed patterns related to behavioural adjustment, the questioning of assumptions, and broader reflection on learning and responsibility.

Research Rigour and Ethical Considerations

Ethical approval for the study was obtained from the University's Human Research Ethics Committee prior to data collection. Participation was voluntary and all participants provided informed consent. Confidentiality and anonymity were maintained throughout the study using pseudonyms along with the removal of identifying information from transcripts and reports.

Several strategies were employed to enhance the trustworthiness of the study. Reflexive memoing was undertaken throughout the research process to document emerging interpretations and analytical decisions. An audit trail was maintained to record coding decisions and the development of themes over time. Ongoing discussions within the research team facilitated critical examination of assumptions and alternative interpretations. Finally, the presentation of participant quotations within the findings section enables readers to evaluate the credibility and interpretive plausibility of the study's conclusions.

The interviews were conducted by myself, and I did not teach, assess, or have a direct academic supervisory relationship with the participating students. The research team had professional and research experience in HE, academic integrity, and the use of GenAI. These experiences were recognised as potential influences on how participants' accounts were interpreted. Accordingly, the researchers engaged reflexively with their assumptions throughout the analysis, including through research-team discussions that questioned initial interpretations and considered alternative explanations. The longitudinal design itself also contributed to trustworthiness by providing repeated opportunities to examine participants' experiences and reflections over time. Rather than relying on single-point accounts, the repeated interviews allowed the study to explore how students' assumptions, practices, and understandings of academic integrity developed through sustained engagement with GenAI technologies.

Findings

Analysis of the longitudinal interview data suggested that students' understandings of academic integrity and GenAI were neither fixed nor static. Instead, participants' experiences reflected three broad forms of engagement that became apparent across the four phases of data collection: *transactional engagement*, *emerging tensions and reflection*, and *reflective and ethically informed engagement*. Although these forms of engagement are presented separately for analytical purposes, participants frequently moved between them in dynamic and non-linear ways over time.

Table 4 provides an illustrative summary of phase-level patterns that emerged across the four periods of data collection. The table does not represent a stage model, imply uniform progression among participants, or substitute for participant-level longitudinal analysis. Rather, it summarises tendencies that were more visible at particular time points across the dataset; earlier forms of engagement also persisted in later phases, while more reflective practices were not confined exclusively to the later phases.

Table 4: Illustrative phase-level patterns in students’ engagement with GenAI and academic integrity

Interview phase (aggregate pattern)	Predominant Characteristics	Illustrative Understand
Phase 1 (Jul–Sept 2024)	GenAI primarily viewed as a tool for efficiency, productivity, and task completion	Academic integrity prec
Phase 2 (Nov 2024–Jan 2025)	Increased experimentation with GenAI and emerging awareness of limitations and risks	Growing recognition of
Phase 3 (Mar–Jun 2025)	Greater questioning of AI-generated outputs and increased verification of information	Increased reflection on
Phase 4 (Aug–Oct 2025)	More deliberate and purposeful use of GenAI to support learning and critical engagement	Academic integrity incr

Note: These are aggregate phase-level tendencies rather than individual developmental trajectories. The forms of engagement overlapped across phases, and participants did not necessarily move through them in a fixed or sequential order.

Transactional Engagement: GenAI as a Tool for Efficiency and Task Completion

Participants’ early experiences with GenAI (Table 4) were predominantly characterised by instrumental and efficiency-oriented forms of engagement. During Phase 1 of the study, many participants described GenAI primarily as a productivity tool for completing academic tasks efficiently. GenAI was used to generate summaries, structure assignments, paraphrase content, improve grammar, and solve immediate academic problems. Successful use was commonly framed in terms of productivity, convenience, and satisfactory assessment outcomes rather than deeper understanding.

An information technology student explained:

“For instance, in my project report of agile methodology for software engineering course I used ChatGPT to complete my assignment quickly. I didn’t change my understanding, just used the material from ChatGPT and polished the write-up to make it look better.” (R103, Phase 1)

Similarly, a business student stated:

“I gave ChatGPT some basic details about the company and it generated a full structure using SWOT analysis.” (R111, Phase 1)

At this stage, academic integrity was generally understood procedurally, primarily as avoiding plagiarism or penalties. Participants rarely discussed authorship, ownership of learning, or broader responsibilities as learners.

Emerging Tensions and Reflection: Questioning Assumptions and Recognising Limitations

Although Table 4 illustrates broad shifts in participants’ experiences over time, evidence of emerging tensions and reflection was neither uniform nor sequential. These tensions became increasingly visible during Phases 2 and 3 as participants accumulated experience using GenAI technologies. In Phase 2 as participants continued using GenAI, many began recognising limitations in AI-generated outputs. Experiences with generic, inaccurate, or inconsistent responses prompted students to evaluate outputs more critically and reconsider the role of GenAI in their learning.

One participant reflected:

“I sometimes get responses from Generative AI which are too generic, so I need to ask again with different keywords. Sometimes it happens that I get too basic responses, so I use other resources to fill missing details and also to double check the information.” (R109, Phase 2)

Another student explained:

“Previously I relied on the outcomes of ChatGPT blindly but now I try to figure out its reasoning and concept behind it by verifying academic resources and references.” (R108, Phase 2)

For some participants, these experiences also prompted reflection on ownership and responsibility:

“I realised I was unable to explain some parts of my assignment because I had relied too much on ChatGPT. That made me realise the importance of producing work which I can actually understand and take ownership of.” (R118, Phase 2)

Reflective and Ethically Informed Engagement: Developing Responsibility and Ownership of Learning

By the later phases of the study, some participants demonstrated forms of engagement broadly consistent with the patterns summarised in Table 4, characterised by more deliberate, critical, and ethically informed uses of GenAI. By Phases 3 and 4, some participants increasingly described using GenAI as a resource for clarification, evaluation, and concept development rather than as a mechanism for task completion. For some participants, sustained engagement with GenAI was associated with more reflective and ethically informed practices. GenAI was increasingly viewed not as a substitute for learning but as a resource for clarifying concepts, testing understanding, and developing ideas.

A business student explained:

“Now, I use it to explore different perspectives, clarify my concepts by asking different questions until the concept is clear and then I rewrite the idea in my own words. This process helps me in my learning process.” (R212, Phase 4)

An information technology student reflected:

"I used ChatGPT not only to help write a function in Python, but I also started understanding how that particular concept works." (R205, Phase 4)

Some participants also described encouraging peers to use GenAI responsibly:

"I helped my peers to use Perplexity as a learning tool, not as a shortcut to complete the task." (R211, Phase 4)

Taken together, the findings suggest that students' engagements with GenAI and academic integrity were characterised by three broad forms of engagement: transactional engagement, emerging tensions and reflection, and reflective and ethically informed engagement. Although these forms are presented separately for analytical purposes, participants frequently moved between them in dynamic and iterative ways that were influenced by educational experiences, assessment demands, disciplinary expectations, peer interactions, and opportunities for reflection.

Figure 2 presents an interpretive synthesis of these findings. The figure does not represent a stage model, imply linear progression, or suggest that all students moved towards increasingly reflective forms of engagement. Rather, it visually represents the broad forms of engagement observed in the data and highlights the contextual conditions that appeared to influence students' evolving understandings of academic integrity and GenAI over time.

Uneven and Non-Linear Patterns of Change

Participants' experiences did not conform to a uniform pattern of change. Some continued to use GenAI primarily to improve efficiency and task completion, while others demonstrated more deliberate forms of engagement only in particular learning contexts or assessment situations.

Educational experiences, lecturer feedback, peer interactions, disciplinary expectations, and opportunities for reflection appeared to influence these patterns of engagement. Rather than possessing or lacking academic integrity, participants described ongoing processes of negotiating how GenAI could be used in ways that aligned with their learning goals and understandings of responsible academic practice.

Participant level trajectories further depicted how students' engagement with GenAI developed over the period of 15-months. For instance, participants moved from efficiency and task-completion-oriented account in Round 1, Phase 1 to a greater emphasis on critically evaluating and verifying GenAI-generated information in Round 2, Phase 1. As shown in the quotations presented in the prior section, this pattern suggests a shift toward more deliberate and critical engagement with GenAI over time.

A similar trajectory was evident for other participants, whose earlier account in Round 1, Phase 2 reflected a largely task-focused and efficiency-oriented use of GenAI, while their later account in Round 2, Phase 2 demonstrated greater attention to verifying outputs, questioning the reliability of generated information, and using GenAI more critically. These participant-level patterns suggest that some students became more reflective and evaluative in their use of GenAI across successive phases.

Discussion

The findings suggest that students' engagements with GenAI and academic integrity were characterised by considerable variation and change over time. Rather than demonstrating stable understandings of academic integrity, participants described experiences of using, evaluating, questioning, and reconsidering how GenAI should be incorporated into their learning practices. Figure 2 synthesises these findings by illustrating three broad forms of engagement and the contextual factors that appeared to shape students' changing assumptions and practices.

Developing the Capacity to Enact Academic Integrity

The findings indicate that students' understandings of academic integrity were shaped through ongoing experiences of using and reflecting upon GenAI technologies. For many participants, academic integrity gradually came to involve more than avoiding plagiarism or complying with institutional expectations. Instead, students increasingly described academic integrity in terms of assuming responsibility for learning, exercising judgement regarding appropriate GenAI use, and critically evaluating AI-generated outputs.

These findings align with a well-established academic integrity tradition that frames integrity as more than the avoidance of misconduct. The ICAI (2021) positions integrity around values of honesty, trust, fairness, respect, responsibility, and courage, while teaching and learning approaches emphasise the development of students' ethical judgement and responsibility through educational practice (Bertram Gallant 2008, 2017). Systemic approaches similarly argue that cultures of integrity depend on alignment among policy, education, assessment, support, and institutional responsibility (Bretag et al. 2011; Bretag and Mahmud 2016). Mejía and Garcés-Flórez (2025) further caution against reducing academic integrity either to rule compliance or to general virtues detached from academic practice, instead emphasising the protection of goods associated with learning, growth, and knowledge production. The present findings are consistent with this broader educational understanding of academic integrity.

Viewed in this way, the contribution of the present study is not to propose that academic integrity itself is newly developmental. Rather, the longitudinal evidence suggests that students' capacity to interpret and enact academic integrity in AI-mediated learning may be educable and developmental. This interpretation is consistent with work advocating educational and developmental responses to misconduct (Bertram Gallant and Stephens 2020) and with research showing that academic integrity education is strengthened when it moves beyond rules and referencing to engage students with underlying values, skills, and responsibilities (Sefcik et al. 2020).

From Transactional Use to Reflective Engagement

A central finding of this study was that students' engagement with GenAI evolved over time and was characterised by varying forms of instrumental and reflective engagement. Consistent with previous research, participants initially described using GenAI primarily because of its convenience, efficiency, and perceived usefulness in supporting academic tasks (Dai 2025; Francis et al. 2025). Students frequently used GenAI to generate ideas, summarise information, improve writing, and complete tasks more efficiently. These findings support earlier studies suggesting that students often adopt GenAI as a practical resource that assists with productivity and task completion (Jensen et al. 2025; Sullivan et al. 2023).

Previous scholarship has expressed concerns that reliance on AI-generated outputs may encourage passive forms of engagement and diminish opportunities for critical thinking, self-regulation, and meaningful participation in learning processes (Memarian and Doleck 2023; Yu 2023). These concerns sit alongside academic integrity scholarship arguing that AI use cannot be addressed adequately through detection alone and instead requires transparency, acknowledgement, critical evaluation, and explicit education regarding responsible use (Lancaster 2023; Foltýnek et al. 2023; Eaton 2023). More broadly, large language models can expand access to explanations, feedback, and personalised learning while also creating challenges relating to accuracy, critical judgement, over-reliance, and responsible use (Kasneji et al. 2023). The present findings suggest that these concerns are justified but also incomplete. Recent scholarship similarly argues that educational responses to GenAI should move beyond narrowly framed concerns regarding misconduct and instead examine how AI technologies shape students' learning processes and intellectual engagement (Ali and Maroulis 2026). The longitudinal patterns observed in the present study suggest that students' understandings of responsible GenAI use and academic integrity may themselves change through sustained engagement and reflection.

Importantly, students' engagement with GenAI was neither static nor predetermined. Sustained interaction with GenAI, coupled with experiences of inaccurate, superficial, or contextually inappropriate outputs, prompted many participants to reconsider how and why they used these technologies. Feedback from educators, assessment requirements, discussions with peers, and opportunities for reflection similarly encouraged students to question assumptions regarding efficiency, authorship, and learning. In many cases, students increasingly described evaluating AI-generated information, verifying responses against other sources, and using GenAI to support rather than replace their own intellectual engagement.

Importantly, this development should not be interpreted as a universal or linear progression from less desirable to more desirable forms of engagement. Participants moved between transactional and reflective engagement in dynamic and iterative ways depending on contextual factors, including assessment demands, disciplinary expectations, prior experiences, and opportunities for reflection. Some students continued to prioritise efficiency and productivity in particular contexts, while others demonstrated more reflective and ethically informed engagement only intermittently. Consequently, the findings suggest that students' relationships with GenAI are fluid and negotiated rather than fixed or predictable.

Taken together, these findings suggest that transactional engagement and reflective engagement should not be understood as opposing or mutually exclusive categories. Instead, they represent broad forms of engagement through which students make sense of the opportunities and tensions presented by GenAI technologies. Sustained interaction with GenAI appears capable of prompting reflection on issues of authorship, responsibility, and learning, thereby creating opportunities for more critically informed and ethically responsible engagement with these technologies over time.

Interpreting Development Through Organisational Learning Theory

Organisational learning theory provided a useful interpretive lens for understanding how students' engagements with GenAI and academic integrity changed over time. Its use also contributes to calls for more explicitly theory-informed academic integrity research capable of explaining, rather than only describing, integrity-related practices and change (Curtis and Clare 2024). Rather than viewing learning as the accumulation of knowledge alone, organisational learning theory emphasises how individuals respond to experiences, reconsider assumptions, and modify practices through ongoing cycles of reflection and adaptation (Argyris and Schön 1996; Snell and Chak 1998). This emphasis also resonates with integrity scholarship that has identified reflection and developmental responses as potential mechanisms for moving beyond externally imposed compliance (Dalal 2015; Bertram Gallant and Stephens 2020).

The patterns identified in the findings can be broadly interpreted through the concepts of single-, double-, and triple-loop learning. Transactional engagement shared characteristics with single-loop learning because students largely incorporated GenAI into existing study practices while maintaining underlying assumptions concerning learning and assessment. During the earlier phases of the study, participants primarily used GenAI to improve efficiency, complete tasks more quickly, and support academic performance. Although these practices often involved adapting behaviours to accommodate new technologies, they rarely prompted participants to reconsider broader questions concerning learning, authorship, or responsibility.

Emerging tensions and reflection were more consistent with aspects of double-loop learning. Experiences of inaccurate, superficial, or contextually inappropriate AI-generated outputs frequently prompted participants to question assumptions regarding the reliability of GenAI and the extent to which efficiency necessarily translated into meaningful learning. Participants increasingly described reconsidering how and why they used GenAI, becoming more attentive to issues relating to authorship, understanding, and intellectual responsibility. These experiences suggest that engagement with GenAI can create opportunities for students to critically examine underlying assumptions that shape their learning practices.

Reflective and ethically informed engagement can be interpreted, more cautiously, through later conceptions of third-order or triple-loop learning. Some participants not only modified their practices and reconsidered assumptions but also described broader reflection on their responsibilities as learners and on the purposes of their academic work. These students increasingly positioned GenAI as a resource that could support understanding, stimulate thinking, and facilitate learning rather than substitute for intellectual effort. Given the conceptual ambiguity surrounding triple-loop learning (Tosey et al. 2012), this interpretation is treated as heuristic rather than evidence of a distinct higher stage of learning.

Although participants' experiences can be broadly interpreted through single- and double-loop learning and, more cautiously, later conceptions of triple-loop learning, these forms of reflection overlapped in practice. Participants moved between different forms of engagement depending on assessment demands, disciplinary expectations, prior experiences, and opportunities for reflection. Consequently, the framework should not be interpreted as representing discrete

developmental stages or a uniform sequence of progression. Rather, it provides sensitising concepts for interpreting dynamic and iterative changes in practices and assumptions over time.

This interpretation aligns with Argyris and Schön's distinction between behavioural adjustment and the reconsideration of underlying governing assumptions (Argyris and Schön 1978, 1996), while recognising that third-order or triple-loop learning is a later and contested extension rather than a concept developed by Argyris and Schön themselves (Tosey et al. 2012). It also resonates with broader understandings of higher education as a developmental process through which students construct identities as learners and future professionals (Daniels and Brooker 2014). Viewed from this perspective, students' interactions with GenAI can be understood not simply as instances of technology adoption but as experiences that may encourage reflection upon learning, responsibility, and the ethical dimensions of engaging with increasingly AI-mediated educational environments.

Implications for Educational Practice and Policy

The findings have several implications for educational practice and institutional policy. Firstly, they reinforce longstanding arguments that academic integrity should be supported through coherent educational and institutional approaches rather than predominantly punitive or detection-oriented responses (Bertram Gallant 2008, 2017; Bretag et al. 2011; Bretag and Mahmud 2016; Morris 2018). Although policies and procedures addressing inappropriate GenAI use remain necessary, they are insufficient for developing students' capacities for ethical and responsible engagement with these technologies. This finding is consistent with recent calls for universities to foreground learning, judgement, and the design of meaningful learning experiences in AI-mediated contexts (Ali and Maroulis 2026).

In the specific context of GenAI, these implications align with recommendations that institutions establish clear expectations while also educating students to acknowledge AI use transparently, critically evaluate generated content, and understand the learning purposes of academic work (Foltýnek et al. 2023). Eaton (2023) similarly argues that increasingly normalised AI use requires academic integrity frameworks to engage with changing conditions of authorship and knowledge production rather than relying on conventional plagiarism assumptions alone. Instructional design research likewise highlights the importance of creating learning environments that support critical evaluation, ethical reasoning, and informed decision-making regarding AI technologies (Kumar and Gunn 2025).

Secondly, assessment design appears to be one of the conditions associated with how students engaged with GenAI. Within the longitudinal accounts, more reflective engagement was described in connection with learning and assessment situations that required students to explain reasoning, critically evaluate information, or demonstrate understanding of AI-generated outputs. This interpretation is consistent with principles-based approaches to assessment security that emphasise designing assessment to elicit trustworthy evidence of learning rather than relying primarily on surveillance or detection (Dawson 2020). It also aligns with recent Australian guidance emphasising evaluative judgement, critical thinking, and ethical reasoning as adaptive capabilities for learning in GenAI-integrated environments (Lodge et al. 2026). Assessment tasks that require students to disclose GenAI use, justify decisions, and demonstrate ownership of learning may therefore support more transparent and reflective engagement.

Finally, the findings suggest that explicit educational conversations regarding responsible GenAI use should be embedded within curricula. Students need opportunities not only to understand institutional expectations but also to examine why particular practices matter educationally and ethically. This recommendation is consistent with earlier student-focused academic integrity research calling for universities to move beyond the provision of policy information towards active engagement and education (Bretag et al. 2014), as well as research showing that integrity education is strengthened when values and skill development are explicitly addressed (Sefcik et al. 2020). It is also consistent with recent TEQSA-commissioned guidance emphasising evaluative judgement, critical thinking, and ethical reasoning (Lodge et al. 2026) emphasis on developing evaluative judgement, critical thinking, and ethical reasoning while assuring learning in GenAI-integrated environments.

Conclusion and Future Directions

Conclusion

This study examined how higher education students' understandings of academic integrity changed through sustained engagement with Generative Artificial Intelligence (GenAI) technologies over a 15-month period. By adopting a qualitative longitudinal approach, the study moved beyond cross-sectional accounts of GenAI adoption and use to explore how students' assumptions, practices, and understandings developed through repeated interactions with these technologies. Alongside an emerging body of longitudinal research on GenAI use and ethical perceptions (Liu and Reinders 2025; Parker et al. 2026), the study contributes repeated qualitative interview evidence concerning how students make sense of academic integrity within increasingly AI-mediated learning environments.

The findings indicate that students engaged with GenAI in varied ways that changed through repeated experiences of use and reflection. Participants initially approached GenAI primarily as a tool for efficiency and task completion. Over time, many became increasingly attentive to issues concerning the reliability of AI-generated outputs, authorship, responsibility, and the purposes of learning. Some subsequently adopted more deliberate forms of engagement characterised by critical evaluation of AI-generated content, purposeful verification of information, and greater ownership of their learning processes. Importantly, these patterns of engagement varied considerably across participants and educational contexts.

The study contributes to emerging scholarship by providing qualitative longitudinal evidence of how students' understandings and enactments of academic integrity may change through ongoing interaction with GenAI technologies. In doing so, it extends rather than replaces established academic integrity scholarship that has conceptualised integrity as a teaching and learning issue, a values-based practice, and an institutional responsibility (Bertram Gallant 2008, 2017; Bretag et al. 2011; ICAI 2021; Mejía and Garcés-Flórez 2025). Selected organisational learning concepts provided a useful interpretive lens for

examining behavioural adjustment and the reconsideration of underlying assumptions, while later conceptions of triple-loop learning were treated cautiously as heuristic rather than as a sequential stage. The distinctive contribution of the study lies in illustrating how these processes may unfold unevenly across sustained engagement with GenAI.

The findings also have important implications for educational practice. Universities may need to move beyond predominantly compliance-oriented responses to GenAI and instead consider how learning environments, assessment practices, and institutional guidance can create opportunities for students to engage critically and responsibly with these technologies. Educational experiences that encourage reflection, evaluation, transparency, and discussion of appropriate GenAI use may play an important role in supporting students' capacities to make informed and ethical decisions regarding technology use in learning.

Ultimately, the central educational challenge presented by GenAI is not simply how universities detect inappropriate uses of these technologies but how they cultivate students' capacities to engage with them critically, transparently, and responsibly. The findings therefore support treating students' capacity to enact academic integrity in AI-mediated learning as educable and potentially developmental, rather than treating academic integrity solely as compliance with institutional rules. Thoughtfully designed learning experiences, assessment practices, explicit guidance, and opportunities for reflection may provide important conditions through which such capacities can be strengthened.

Limitations and Future Research

Like all qualitative longitudinal studies, this research has several limitations. Firstly, participants were recruited from a single regional Australian university using snowball sampling and represented students who were willing to discuss their experiences of GenAI use. The sample may therefore over-represent students who were already relatively engaged with GenAI or comfortable discussing academic integrity, and their perspectives may differ from those of students studying within metropolitan, international, or differently resourced institutional contexts. The reduction from 20 participants in Phases 1 and 2 to 16 participants in Phases 3 and 4 also introduces the possibility of attrition bias, as students who remained in the study may have differed systematically from those who withdrew.

Secondly, the findings are based on participants' self-reported accounts of their GenAI use and understandings of academic integrity rather than direct observation of their academic practices. Because academic integrity is a normatively sensitive topic, responses may have been influenced by social desirability or by participants' retrospective reconstruction of earlier practices. Repeated interviewing may itself also have encouraged participants to reflect more deliberately on their GenAI use, meaning that participation in the study may have contributed to some of the reflective processes being examined. In addition, the capabilities of GenAI tools, institutional policies, and public discussion of acceptable AI use changed substantially across the 15-month study period, making it difficult to separate individual development from changes in the wider technological and policy environment.

Thirdly, the sample combined undergraduate and postgraduate students from several disciplinary areas. This diversity was valuable for identifying a range of experiences, but the relatively small number of participants within each subgroup limits the extent to which disciplinary or level-of-study differences can be interpreted. The findings should therefore be understood as theoretically informed patterns within this particular longitudinal dataset rather than as a developmental sequence that would necessarily occur across other student populations or educational contexts.

However, the purpose of qualitative longitudinal inquiry is not statistical generalisation. Rather, the contribution of the present study lies in generating theoretically informed insights into how students' understandings of academic integrity may change through sustained engagement with GenAI technologies. By adopting a longitudinal and interpretive approach, the study offers a conceptual account of how educational experiences, opportunities for reflection, and ongoing interaction with AI-mediated learning environments may influence students' assumptions and practices regarding responsible technology use.

Future research could extend these findings by examining students from different institutional, cultural, and disciplinary contexts and by undertaking longer-term longitudinal investigations of how assessment design, institutional policies, and educational experiences shape students' engagements with GenAI and academic integrity. Comparative studies involving different disciplinary settings and educational systems may further illuminate the conditions that support critically informed and ethically responsible engagement with GenAI technologies.

Declarations

Author Contribution

Conceptualization, S.J.; methodology, S.J. and S.F.; investigation, S.J.; data curation, S.J.; formal analysis, S.J.; writing original draft preparation, S.J.; writing review and editing, S.J., S.F. and J.B.; supervision, S.F. All authors have read and approved the final manuscript. Ethics standard All procedures performed in this study were conducted in accordance with the ethical standards of the Federation University Australia Human Research Ethics Committee and the principles of the Declaration of Helsinki (1964) and its later amendments or comparable ethical standards. Funding This research received no external funding. The study was conducted as part of the corresponding author's Doctor of Philosophy (PhD) research at Federation University Australia.

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Figures

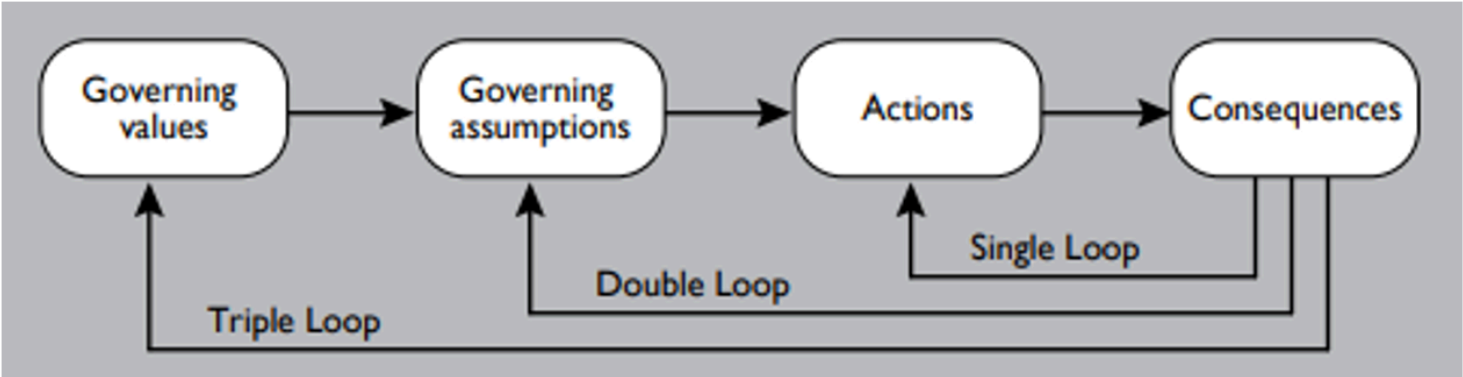


Figure 1

Conceptual representation of single-, double-, and triple-loop learning (Argyris & Schön, 1978, 1996; Snell & Chak, 1998; Tosey et al., 2012)

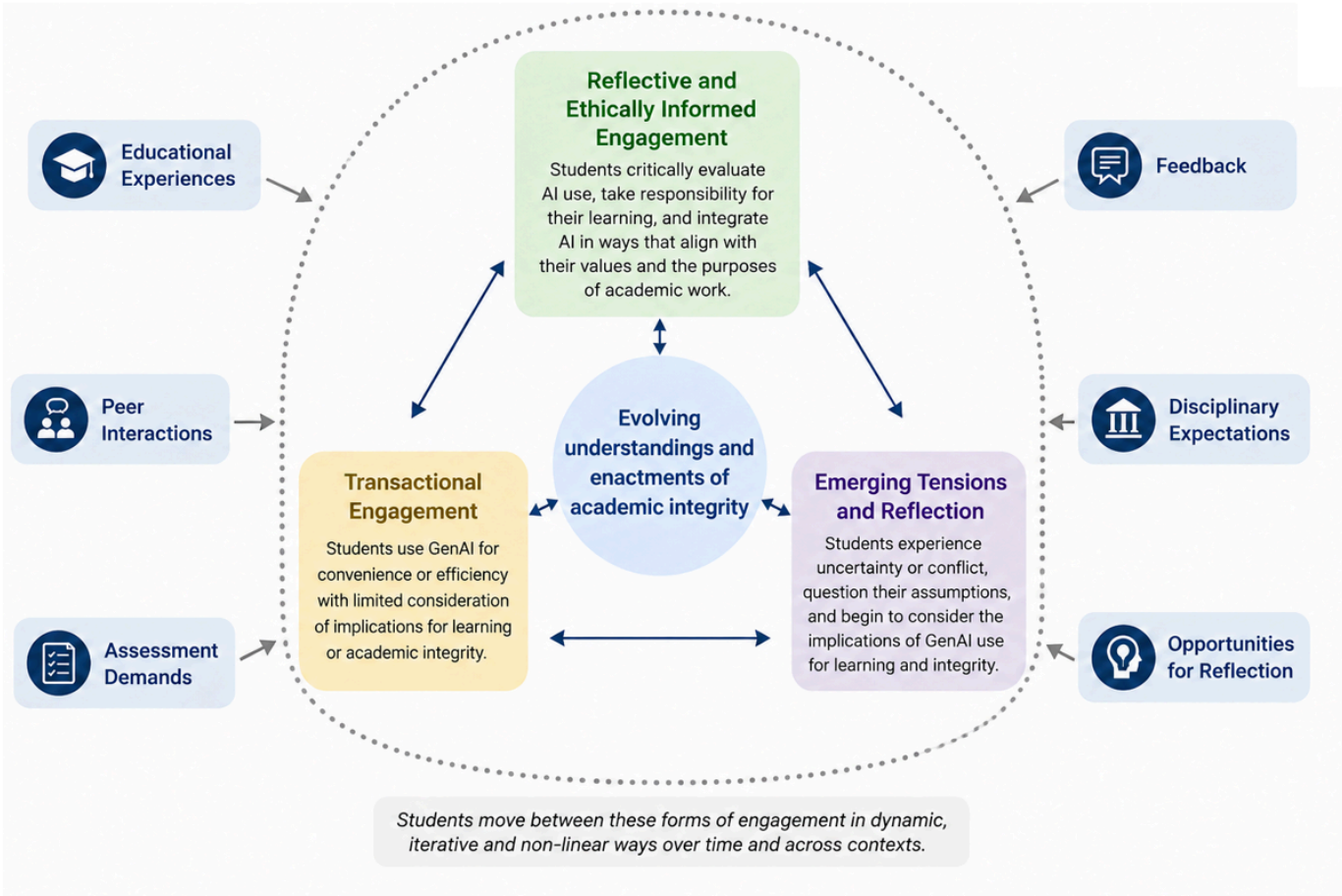


Figure 2

Interpretive synthesis of students' dynamic and non-linear engagement with GenAI and academic integrity. The figure depicts three broad forms of engagement identified in the longitudinal data and illustrates that movement between them was iterative, overlapping, and shaped by educational experiences, feedback, assessment demands, disciplinary expectations, peer interactions, and opportunities for reflection. The figure should not be interpreted as representing a stage model or implying uniform progression among participants.