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Bridging the Gap: Developing Effective Revision Strategies to Support T Level Computing Learners in Tackling Core Exam Questions

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Abstract
This paper presents a practitioner enquiry examining three revision strategies designed to improve T Level Digital Production, Design and Development learners' performance in written Core programming examination questions. Analysis of mock examination outcomes indicated that learners' difficulties stemmed less from programming knowledge than from limited assessment literacy and the cognitive demands of constructing structured written responses. The strategies were implemented over the course of one academic year and comprised paired peer marking, small-group collaborative discussion, and structured question analysis with guided response construction. The evaluation combined systematic classroom observations with descriptive analysis of successive mock examination outcomes. Findings suggest improvements in learners' interpretation of command words, response organisation, confidence, and independent application of examination techniques. The proportion of learners achieving a pass increased from 54% to 68%, providing quantitative evidence that complemented the qualitative findings, although some learners continued to require additional scaffolding. Overall, the study demonstrates that integrating Constructive Alignment, Assessment Literacy, and Cognitive Load Theory provides a stronger foundation for revision than content-focused approaches alone.
Keywords: T Level Computing, Assessment Literacy, Revision Strategies, Cognitive Load Theory, Constructive Alignment, Programming Education.
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Introduction

In the T Level Digital Production, Design and Development qualification, it is anticipated that learners show good applied computing knowledge alongside an expectation to be able to apply this understanding in written core exams. However, the mismatch of competencies that has been found is that, whilst the learners demonstrated success in their programming assignments, they had difficulty when writing their structured responses to such programming questions during their exams (Carless, 2007). Core 1 programming questions, which assess algorithmic thinking and sequencing, have been seen to present learners with greater challenges. This has been linked to their lack of assessment literacy rather than any lack of subject knowledge (Torrance, 2020).

The aim of this paper is to critically examine three targeted revision strategies designed to improve learners' responses to programming examination questions. These strategies were developed following analysis of mock assessment outcomes, which identified both knowledge gaps and weaknesses in assessment literacy. The paper reviews key pedagogical principles within computing education and evaluates how these principles informed the design and implementation of the strategies. In doing so, the paper addresses Learning Outcome MLO1 by critically analysing the implications of subject specialist pedagogy for teaching and learning within programming education.

Rationale and Teaching Context

The T Level curriculum has a strong focus on problem solving and programming for context. However, the Core examination requires learners to express this requirement in developing their writing using task-specific criteria. Formative mock results highlighted common areas of challenge including misinterpretation of command words, omission of key constraints, and answers having poor structure which failed to address the number of marks on offer. Analogous problems have been found in work-based education, where students perform well on the job but experience difficulty responding to assessment requirements (Torrance, 2020). These problems indicated that learners' problems were mainly not related to programming knowledge, but rather in limited assessment literacy and less effective exam strategies.

Research shows that learners often cannot effectively demonstrate their understanding as a result of lacking explicit guidance on how to interpret and respond to assessment tasks, especially in vocational contexts (Cross et al., 2016). For example, in the mock exam many learners misinterpreted command words such as "explain" and

"evaluate", omitted key constraints stated in the question, and produced responses that did not match the mark allocation. Revision strategies therefore were reconceptualised to focus primarily on how learners engage with the exam questions, rather than the content of the exam itself. Therefore, the purpose of this practitioner enquiry was to investigate the effectiveness of the three revision strategies in supporting learners' understanding of written programming exam questions in the T Level Core examination. It also examined the extent to which structured teaching of question analysis and response planning enabled learners to produce independent and coherent written responses.

Methodology

This study adopted a practitioner enquiry approach (Cohen et al., 2018), allowing the revision strategies to be developed, implemented and refined iteratively within an authentic classroom setting over the course of one academic year, from September 2025 to May 2026. The enquiry was situated within a single T Level Digital Production, Design and Development cohort of 25 learners taught by the researcher, all of whom were preparing for the Core written examination. The three revision strategies paired peer marking, small-group collaborative discussion, and structured exam question analysis were introduced sequentially across the year, with each strategy building on, and remaining in use alongside, those introduced subsequently, consistent with a cyclical, formative practitioner enquiry design.

Two complementary forms of data were gathered. First, qualitative classroom observations were recorded by the practitioner-researcher during revision sessions, focusing on how learners approached exam questions, engaged with peers, and constructed written responses; these observations were documented as field notes taken during and immediately after each session, consistent with established practitioner enquiry methods (Cohen et al., 2018). Second, quantitative attainment data were drawn from three formal mock examinations administered across the year: October 2025 (baseline, prior to full implementation of the strategies), December 2025 (interim), and March 2026 (final). Because the mock papers increased in length and curriculum coverage across the year (54, 57 and 89 marks respectively, reflecting the growing breadth of content assessed as the course progressed), percentage scores rather than raw marks were used to compare attainment across sittings. Combining observational and attainment data allowed the qualitative insights into learner behaviour to be triangulated against measurable changes in examination performance.

Pedagogical Principles Informing the Strategies

The revision strategies were informed by three key pedagogical principles: constructive alignment, assessment literacy, and cognitive load theory. Constructive alignment supports the alignment between teaching and assessment (Biggs & Tang, 2011), justifying the use of authentic exam-style tasks. However, alignment was not enough to enable independent performance to write under time constraints, as learners still lacked the ability to structure responses in writing. Assessment literacy highlights the importance of understanding mark and question allocations, command word importance, and the examiner perspective (Torrance, 2020; Ofqual, 2019). Although supported activities helped learners develop their assessment awareness, this did not guarantee that such understanding would transfer to unseen examination questions. Cognitive Load Theory advises breaking down challenging tasks into simpler steps to reduce cognitive load (Sweller et al., 2011). Breaking processes like question analysis, planning and writing could lower cognitive overload. However, excessive structuring posed a move towards fluency restriction thus required deliberate modelling and controlled release for the sake of independence enhancement. Collectively, these principles were most effective when applied in combination, as written programming examinations demand more than a single pedagogical framework.

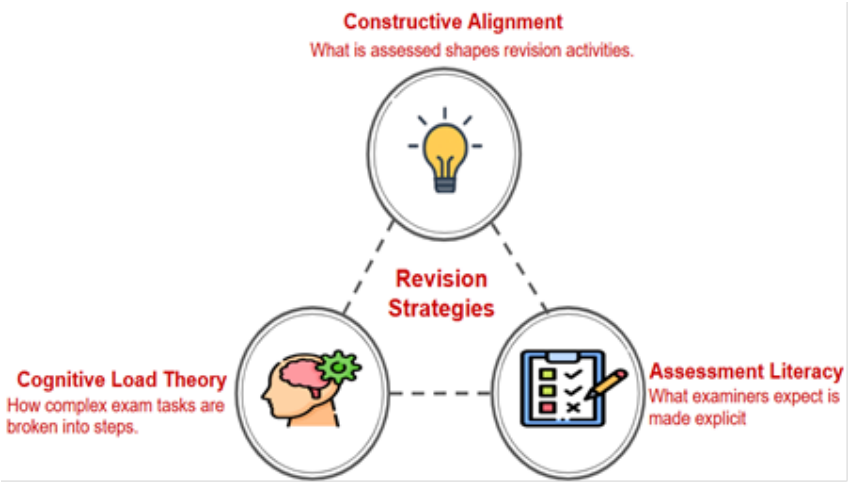

Figure 1. Pedagogical principles informing the design of the revision strategies.

Overview of the Three Revision Strategies

Three revision strategies were implemented. Each strategy targeted a different aspect of the learner challenge and was intended to complement the others, consistent with formative mock exams that focus on diverse feedback and student involvement (Black & Wiliam, 2009).

Strategy 1: Paired Peer Marking Using Model Answers

In strategy 1, learners are placed into pairs assigning a stronger learner with a weaker one, and given a previously attempted mock exam question alongside a model answer. Learners marked each other's responses using the model answer as guidance. This approach was informed by constructive alignment, as learners engaged directly with authentic exam questions and exemplars that reflected the demands and marking processes of the core examination (Biggs & Tang, 2011).

Learners using peer marking gave them the opportunity to engage with the marking criteria as well as help them understand what the examiners expect from them. Studies have shown that when learners are provided with explicit assessment criteria and model answers, this aids in their ability to articulate how competent they are using these criteria. (Sadler, 1989; Nicol & Macfarlane-Dick, 2006). Observing students in class showed that they had improved their ability to recognise high-quality work. However, there were still some learners who had difficulty transferring their knowledge of assessment criteria to new or untested examinations, which supports previous research on assessment literacy (Torrance, 2020).

Strategy 2: Small Group Collaborative Exam Question Discussion

In strategy 2, the learners were organised in small groups to solve programming exam questions. Participants presented their reasons, debated concepts, and agreed upon a final response. This strategy was motivated by principles from constructive alignment which aimed at engaging learners in authentic exam-style practices that reflected the reasoning and judgemental processing necessary for the target examination (Biggs & Tang, 2011).

During the discussions learners developed different dimensions of their assessment literacy through their interpretation of command words and discussion about the mark allocation as well as their justifications for their answers (Sadler, 1989; Torrance, 2020). Collaborative discussions provided opportunities for learners to reduce the cognitive load associated with interpreting the demands of complex questions while enabling them to reason more deeply about these questions (Sweller et al., 2011). The classroom observations yielded evidence of increased confidence and shared understanding, but also that some learners still relied on their groups for support and struggled to apply the knowledge independently, reflecting known limitations of collaborative learning (Kirschner et al., 2006).

Strategy 3: Structured Exam Question Analysis and Response Construction

The third strategy focused on explicitly modelling exam question analysis and response construction, with the aim of gradually developing learners' independent performance. It was informed by assessment literacy and exam technique research, emphasising conscious practice in responding to examination questions (Stephens, 2021). Learners are encouraged to stop, think and reflect on the examination question first before providing an answer. This involves examining the command words, counting marks, and highlighting terms. The goal is to

keep the learners on task, helping to prevent them from generalising their answers. Observations of classroom practice clearly indicated that, without this intervention, students began writing immediately, which generally resulted in incomplete responses (Torrance, 2020; Ofqual, 2019).

Once the question is understood, learners are guided to plan their response before writing. At this stage, they locate the information offered, determine which information to use and put it in a logical sequence or order. This is the planning stage that overcomes one of the most common weaknesses in exam performance, writing without thought. Decomposing planning and execution of the solution will also decrease cognitive load, which is particularly beneficial for coordinated answers under exam conditions (Sweller et al., 2011).

Learners then use their plan to produce the final response. They shape their answer according to the requirements of the question, ensuring that all elements of the task are addressed and that their response reflects the mark allocation. This final checking of answers helps to prevent guessing and promotes accurate completion, as well as the development of self-regulation and exam judgement. In the short term, incomplete answers and errors linked to misinterpreted command words decreased during mock exams. In the longer term, the development of self-regulation and exam judgement is likely to support learners in approaching unfamiliar examination tasks more strategically, extending beyond the immediate T Level Core assessment context.

Observed Outcomes Across the Three Strategies

The learner progress was monitored through classroom observation during revision sessions, focusing on how learners approached exam questions and constructed written responses rather than on attainment outcomes, consistent with a formative practitioner enquiry approach (Cohen et al., 2018). Strategy 1 supported learners' understanding of examiner expectations and marking criteria, while also increasing confidence in identifying key features of high-quality responses. Strategy 2 promoted deeper collaborative dialogue. The rationale was that learners should express reasoning together, and that multi-stage questions demand that steps are apportioned in a collective manner. This was effective in that some of the students who had initially been uncertain about what was expected in taking an exam got to understand it after all. They could collaborate with others or work independently as they saw fit, and there was no unwontable pressure. Nonetheless, this was not always implemented in practice and transferring the sense of collaboration and support into independent work of exam type was a hurdle to some learners. Some students still depended on peer review as a source of ideas, while others found it hard working alone. The implementation of Strategy 3 led to changes in the learners' behavior thus they took more time understanding the demands of exam questions as per command words and mark allocation before writing decent responses. They also became more willing to try new questions too, suggesting they'd internalised the exam technique instead of needing external aids. This information was acquired through systematic classroom observations guided by practitioner enquiry methodology (Cohen et al., 2018). It was observed from a qualitative perspective that learners, who were encouraged to organise their thoughts in the set pattern, are better able to function independently during written response type of assessments (Black & Wiliam, 2009). These results also are a consequence of the combined concepts of Cognitive Load Theory and assessment literacy. Structured planning lessen extraneous cognitive demands; on the other hand, increased consciousness of assessment criteria helped in supporting more strategic response constructions.

Quantitative Outcomes: Mock Examination Performance

Attainment data from the three mock examinations provided a complementary, quantitative perspective on the impact of the revision strategies. In the October 2025 baseline sitting, the class achieved a mean score of 54.8% and a pass rate of 54% (14 of 26 learners). Following the introduction of Strategy 3 in December 2025, the mean score fell to 48.3% and the pass rate to 50%, a dip that coincided with the qualitative observation that lower-attaining learners needed additional scaffolding during the early, less independent stage of this strategy. By March 2026, despite the final paper assessing substantially more of the specification (89 marks, compared with 54 and 57 in the earlier sittings), the mean score recovered to 54.8% and the pass rate rose to 68% (15 of 22 learners who completed the paper), an increase of 14 percentage points on the October baseline.

Individual learner trajectories were mixed rather than uniformly positive: several lower-attaining learners in October, including those identified in observations as relying heavily on peer or teacher support, showed marked gains by March, while a number of higher-attaining learners' scores fell slightly, plausibly reflecting the increased length and difficulty of the final paper rather than a decline in underlying skill. These patterns are consistent with the qualitative finding that Strategy 3 had the greatest impact on learners who had previously struggled to structure independent responses, while already-proficient learners experienced smaller, less consistent gains. As the three mock papers were not directly comparable in length, content coverage or difficulty, and a small number of learners did not complete every sitting, these figures should be interpreted as indicative rather than conclusive evidence of impact, and are presented here to complement, rather than replace, the qualitative observational data.

Table 1. Mean score and pass rate across the three mock examinations.

Mock examination	Max marks	N	Mean score	Pass rate
October 2025 (baseline)	54	26	54.8%	54% (14/26)
December 2025 (interim)	57	26	48.3%	50% (13/26)
March 2026 (final)	89	22	54.8%	68% (15/22)

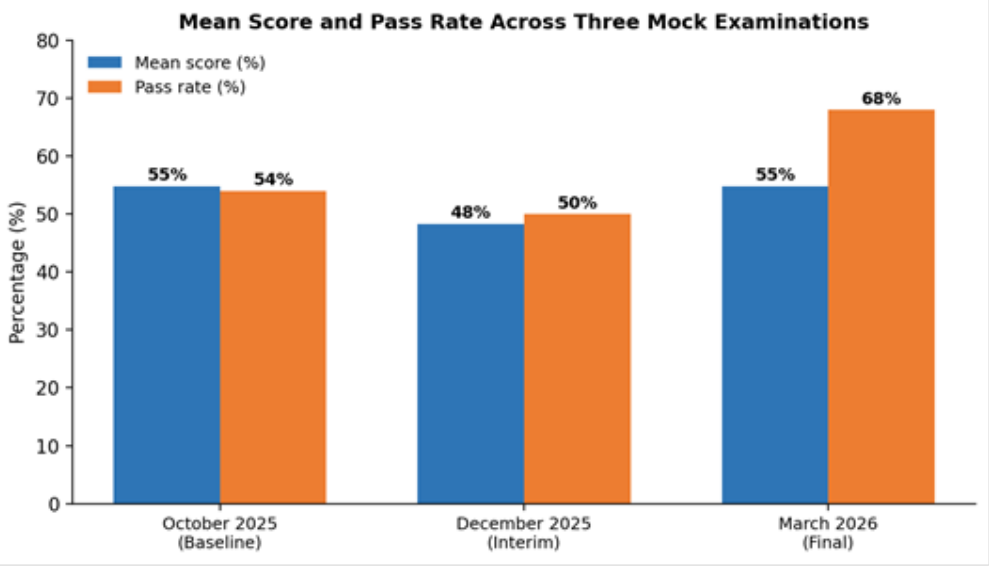

Figure 2. Mean score and pass rate across the three mock examinations (October 2025, December 2025, March 2026).

Critical Evaluation

Working together, the three strategies took care of the issues learners encountered; nevertheless, there are limitations. Some of the learners with lower attainment required additional scaffolding to align them fully in the directed approach particularly in the early stages when strategy 3 was introduced. This reveals that although the structure is in place for independent work, it still has to be scaffolded eventually to prevent overloading students' cognitive capacity. Strategy success required teachers constantly modelling response and this, thus proved that direct instruction rather than students will pick up exam skills intuitively has value.

Furthermore, while the evaluation was substantially informed by classroom observation, it was supplemented by mock examination data, which allowed the qualitative findings to be triangulated against measurable changes in attainment. Nonetheless, the relatively small, single-class cohort, the absence of a comparison group, and the variation in length and content coverage across the three mock papers mean that the quantitative findings should be treated as indicative rather than definitive evidence of impact. This is significant as the process remains one of an exploratory practitioner enquiry, in which observation techniques continue to aid, and are valid to use within, this kind of research even where supplementary quantitative data are available (Cohen et al., 2018). The three strategies were most effective when applied together. Peer marking and discussion strengthened assessment literacy by increasing learners' awareness of examiner expectations. As regards to structured analysis framework, it helped in line with Cognitive Load Theory by way of reduction in task complexity, while authentic exam questions were used for the display of constructive alignment principle. In consequence of such joint operation revision in computing education has undergone a transition from content recall type towards structured reasoning operation which results in more learner independent and clear written explanations delivery.

Implications for Practice

Instead of focusing on content review, these sessions can involve showing learners how the questions are phrased and timed marks as well as guiding how to correctly write answers. Combination learning groups or marking pairs who discuss examination questions are very helpful in helping students develop advice on good examination preparation alongside comprehension skills (Torrance, 2020; Black & Wiliam, 2009). In addition, this initiative also provides a relevant model for incorporating Core 1 programming assessments in other

vocational and technical subject areas where higher level cognitive functions need to be expressed in written form. For computer teachers it forms a theoretical basis for decrease of discrepancy between programming skills and exam performance.

Conclusion

This paper examined three revision strategies developed to address the gap between programming competence and written examination performance in T Level Computing. The findings demonstrate that improved results were achieved through using both constructive alignment and assessment literacy and Cognitive Load Theory together rather than through content revision alone. Collectively, these principles reshaped revision practice within computing education by strengthening learners' ability to interpret command words, structure responses, and engage more independently under exam conditions. The short-term impact was evident in clearer and more complete written responses, while the longer-term intention is to sustain learner independence and strategic exam judgement across future assessment contexts. Ongoing refinement of modelling and gradual release strategies will further strengthen the development of independent performance in written technical examinations.

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