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From Dementia Prevention Literacy to Realist-Informed Digital Dementia Education: An Integrated Theoretical Perspective

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Abstract

The growing use of digital health education to support dementia prevention has intensified interest in understanding how educational interventions influence knowledge, engagement, and behaviour change. This paper presents a comparative conceptual analysis of two frameworks: the Dementia Prevention Literacy Translation Framework (DPLTF) and the Realist-Informed Digital Dementia Education Framework.

The DPLTF explains how dementia prevention evidence is translated into preventive action through processes of health literacy, interpretation, appraisal, and behavioural engagement. In contrast, the Realist-Informed Digital Dementia Education Framework adopts a realist evaluation perspective, explaining how digital educational interventions generate outcomes through Context–Mechanism–Outcome (CMO) configurations, with particular emphasis on engagement, interpretative processes, and behavioural readiness.

The analysis shows that although both frameworks seek to explain pathways from exposure to information through to behaviour change, they differ in theoretical foundations, treatment of context, and conceptualisation of mechanisms. The DPLTF emphasises knowledge translation and health literacy processes, whereas the realist-informed framework explicitly theorises contextual conditions and mechanisms that shape intervention effectiveness across settings. Despite these differences, the frameworks are complementary. The realist-informed framework extends the DPLTF by making mechanisms explicit and embedding them within a CMO structure, while retaining core principles of health literacy and behavioural appraisal.

This paper argues that integrating both frameworks provides a more comprehensive explanation of how digital dementia education influences behaviour change. Such integration bridges health literacy, implementation science, behaviour change theory, and realist evaluation, enabling a more complete understanding of how evidence is translated into action, for whom, and under what circumstances. The comparative analysis contributes to theoretical development in dementia prevention education and supports the design, implementation, and evaluation of more effective digital interventions.

Keywords: Dementia Prevention Literacy, Digital Health Education, Realist Evaluation, Context–Mechanism–Outcome (CMO), Health Literacy, Behaviour Change, Implementation Science, Digital Interventions

1. Introduction

The increasing effectiveness of dementia prevention depends on public access to evidence-based information to support informed health decisions and behavioural change. With the increasing use of digital health education to promote dementia risk reduction and brain health, there is growing interest in the impact of educational interventions on knowledge, engagement and preventive behaviours. Theoretical frameworks provide important tools for explaining these processes and for guiding the design, implementation, and evaluation of educational interventions.

Two frameworks that contribute to this understanding are the Dementia Prevention Literacy Translation Framework (DPLTF) and the Realist-Informed Digital Dementia Education Framework.

Although both seek to explain pathways linking information and behaviour, they differ in their theoretical foundations, conceptual focus, and treatment of context and mechanisms. The DPLTF focuses primarily on how dementia prevention evidence is translated into understanding and action through health literacy and behavioural appraisal processes, whereas the Realist-Informed Digital Dementia Education Framework examines how digital educational interventions generate outcomes through Context–Mechanism–Outcome relationships. Comparing these frameworks provides an opportunity to clarify their respective contributions and explore how they may collectively advance understanding of digital dementia education and behaviour change.

Theoretical frameworks are increasingly used in dementia prevention and digital health education, but little attention has been paid to comparing how different frameworks conceptualise pathways from information exposure to behaviour change. In particular, the relationship between dementia prevention literacy models and realist-informed approaches to intervention evaluation has been under-explored. A comparative analysis may therefore clarify the unique and complementary contributions of these frameworks while identifying opportunities for theoretical integration and future development.

1.1. The Need for an Integrated Theoretical Perspective

The increasing complexity of digital dementia education requires theoretical approaches that extend beyond individual explanatory traditions. Existing frameworks have contributed valuable insights regarding health literacy, behaviour change, implementation, and evaluation; however, these perspectives have generally developed independently. Consequently, there remains limited understanding of how dementia prevention evidence is translated into behavioural action through educational interventions operating within diverse contextual environments.

The Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework each address different aspects of this challenge. The former focuses primarily on knowledge translation, health literacy, and behavioural appraisal, whereas the latter focuses on the mechanisms through which educational interventions generate outcomes under varying contextual conditions. Examining these frameworks together provides an opportunity to develop a more comprehensive explanation of how digital dementia education influences behaviour change.

This paper therefore extends beyond framework comparison by proposing an integrated theoretical perspective that links knowledge translation, health literacy, implementation science, behaviour change theory, and realist evaluation within a single explanatory model.

1.2. Comparison of the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework

While both frameworks aim to explain pathways from information to behavioural outcomes, they are developed for different purposes and operate at different levels of analysis. The Dementia Prevention Literacy Translation Framework (DPLTF) was developed to explain how dementia prevention evidence is translated into public understanding and preventive action through processes of interpretation, evaluation, and behavioural engagement [1-3]. In contrast, the Realist-Informed Digital Dementia Education Framework was developed to explain how digital dementia education interventions generate behavioural outcomes through interactions between contextual conditions, explanatory mechanisms, and outcomes [4].

The DPLTF is primarily concerned with knowledge translation. It conceptualises dementia prevention literacy as a process through which biomedical evidence is interpreted through existing public beliefs, processed through health literacy capacities, appraised in terms of personal relevance, and translated into preventive action. This pathway reflects broader understandings of health literacy as the ability to access, understand, evaluate, and apply health information in ways that support informed decision-making [5].

By comparison, the Realist-Informed Digital Dementia Education Framework adopts a realist perspective and focuses on understanding how educational interventions work within specific contexts. Rather than beginning with biomedical evidence, the framework begins with access to educational resources and considers the extent to which user engagement, interpretative engagement, and behavioural readiness impact real-world outcomes. In line with realist evaluation theory, outcomes are seen to derive from interactions between contexts and mechanisms rather than from educational exposure alone.

A key distinction between the frameworks lies in their treatment of context. In the DPLTF, structural and environmental influences operate across all stages of the framework, shaping opportunities for knowledge acquisition and behavioural engagement [6,7]. In the Realist-Informed Digital Dementia Education Framework, context is more explicitly theorised through access conditions, contextual influences, wider contextual factors, and contextual moderators. This stronger emphasis reflects implementation science and realist evaluation perspectives, which recognise that intervention outcomes are contingent upon the environments in which they are delivered [8,9].

The frameworks also differ in their conceptualisation of mechanisms. While the DPLTF implicitly incorporates mechanisms through health literacy processes and behavioural appraisal, the Realist-Informed Digital Dementia Education Framework explicitly identifies user engagement, interpretative engagement, and behavioural readiness as mechanisms through which educational resources influence behaviour. Of particular significance is the introduction of interpretative engagement as a distinct explanatory mechanism. This concept describes the process through which individuals actively construct meaning, evaluate personal relevance, and integrate educational content with prior knowledge and lived experience before behavioural readiness

emerges. This interpretation is consistent with behaviour change theory, which emphasises reflective motivation, self-efficacy, and capability development as prerequisites for behavioural enactment [10].

Despite these differences, the frameworks are complementary rather than competing. Many concepts from the DPLTF, including health literacy, behavioural appraisal, contextual influences, and feedback processes, are retained and extended within the newer framework. The Realist-Informed Digital Dementia Education Framework may therefore be viewed as an evolution of the DPLTF, adapting its knowledge translation principles to the evaluation of digital dementia education interventions through a realist Context–Mechanism–Outcome perspective.

Table 1 provides a structured comparison of the Dementia Prevention Literacy Translation Framework (DPLTF) and the Realist-Informed Digital Dementia Education Framework across key conceptual dimensions. It highlights differences in their theoretical foundations, treatment of context and mechanisms, and conceptualisation of behavioural pathways and outcomes.

The comparison demonstrates how the realist-informed framework extends the DPLTF by explicitly theorising mechanisms and embedding them within a Context–Mechanism–Outcome (CMO) structure to explain how digital dementia education produces behaviour change under varying conditions.

Dimension	**Dementia Prevention Literacy Translation Framework (DPLTF)**	**Realist-Informed Digital Dementia Education Framework**
Primary Purpose	Explain how dementia prevention evidence is translated into understanding and action	Explain how digital dementia education generates behavioural outcomes
Starting Point	Biomedical evidence and prevention research	Digital educational intervention
Primary Focus	Dementia prevention literacy and knowledge translation	Intervention effectiveness and behavioural outcomes
Theoretical Foundations	Health literacy theory, behavioural science, implementation science	Realist evaluation, COM-B, health literacy, implementation science
Context	Structural and environmental influences operate across all stages	Explicit contextual domains, moderators, and wider contextual factors
Mechanisms	Implicit mechanisms through literacy and appraisal processes	Explicit mechanisms of engagement, interpretation, and behavioural readiness
Interpretation Process	Public mental models and behavioural appraisal	Interpretative engagement and meaning-making
Behavioural Pathway	Evidence → Understanding → Appraisal → Action	Engagement → Interpretation → Readiness → Enactment
Outcomes	Preventive action	Behavioural and health-related outcomes
Feedback	Feedback and reinterpretation	Dynamic feedback loops and adaptation
Realist Orientation	Consistent with realist principles but not explicitly realist	Explicitly organised around Context–Mechanism–Outcome configurations
Principal Contribution	Explains dementia prevention literacy processes	Explains how digital dementia education works, for whom, and under what conditions

Note. DPLTF = Dementia Prevention Literacy Translation Framework; CMO = Context–Mechanism–Outcome. This table compares key conceptual dimensions across both frameworks, including purpose, theoretical foundations, contextualisation, mechanisms, behavioural pathways, and outcomes. The realist-informed framework extends the DPLTF by making mechanisms explicit and embedding them within a CMO configuration to explain how, why, and under what conditions digital dementia education leads to behaviour change and related health outcomes.

Table 1: Comparison of the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework

Both frameworks are conceptual but useful in advancing knowledge on dementia prevention and education, illustrating how information and education processes can ultimately result in behaviour change and improved health-related outcomes.

The DPLTF focuses on how dementia prevention evidence is translated into understanding and preventive action through health literacy and appraisal processes, whereas the Realist-Informed Digital Dementia Education Framework extends this by explaining how behaviour change arises through context-sensitive mechanisms within digital interventions.

When taken as a whole, the frameworks describe how knowledge is processed, operationalised, and converted into long-lasting behavioural change rather than just information transfer.

While Table 1 highlights important conceptual differences between the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework, these differences should not be viewed as competing explanations.

Rather, the frameworks provide complementary perspectives on how dementia prevention information and educational interventions contribute to behaviour change. Examining the benefits of integrating insights from both frameworks may therefore provide a more comprehensive understanding of how dementia education influences behavioural and health-related outcomes.

1.3. Benefits of Integrating the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework

Although developed for different purposes, the Dementia Prevention Literacy Translation Framework (DPLTF) and the Realist-Informed Digital Dementia Education Framework offer complementary strengths that collectively enhance understanding of how dementia prevention information and educational interventions contribute to behaviour change. Considered together, the frameworks provide a more comprehensive explanation of the processes through which evidence-based dementia prevention knowledge is translated into meaningful health-related outcomes.

One important benefit of integrating insights from both frameworks is the ability to examine the full pathway from evidence generation to behavioural enactment. The DPLTF explains how dementia prevention evidence is communicated, interpreted, appraised, and translated into preventive action through health literacy processes. The Realist-Informed Digital Dementia Education Framework extends this understanding by explaining how educational interventions generate behavioural outcomes through interactions between contextual factors, explanatory mechanisms, and outcomes. Together, the frameworks provide a more complete account of how information becomes action.

A second benefit is the integration of the knowledge translation and the implementation viewpoints. The DPLTF identifies the cognitive and literacy-related processes that influence understanding and decision-making, whereas the realist-informed framework explains why interventions may succeed in some circumstances and not others. This combined perspective acknowledges that effective dementia education depends not only on the quality of information provided but also on contextual conditions, individual engagement, and readiness for behaviour change.

The integration of both frameworks also strengthens understanding of behaviour change mechanisms. The DPLTF highlights interpretation, appraisal, and health literacy as important influences on behavioural outcomes, while the realist-informed framework explicitly identifies user engagement, interpretative engagement, and behavioural readiness as mechanisms that generate change. These complementary perspectives are consistent with contemporary behaviour change theory, which emphasises the importance of capability, opportunity, and motivation in shaping health behaviours. Together, the frameworks provide a richer explanation of how individuals move from awareness and understanding to sustained behavioural action.

A further advantage is the enhanced capacity to evaluate and improve digital dementia education interventions. By combining literacy-focused and realist perspectives, researchers can identify not only whether educational programmes are effective but also how, for whom, and under what conditions they produce positive outcomes. This supports more precise intervention design, implementation, adaptation, and evaluation across diverse populations and settings.

Finally, the integration of both frameworks supports policy development and public health practice. The DPLTF contributes population-level insights regarding communication, health literacy, and prevention messaging, while the realist-informed framework provides practical guidance regarding implementation, contextual adaptation, and sustainability. Together, these perspectives can inform the development of scalable dementia prevention initiatives that are both evidence-informed and responsive to local contexts.

Overall, the combined application of the DPLTF and the Realist-Informed Digital Dementia Education Framework provides a comprehensive conceptual foundation for understanding how dementia prevention knowledge is translated into behavioural and health-related outcomes (see Figure 1). The integration of health literacy, implementation science, behaviour change theory, and realist evaluation strengthens the capacity to design, evaluate, and optimise digital dementia education interventions that promote meaningful and sustainable behaviour change.

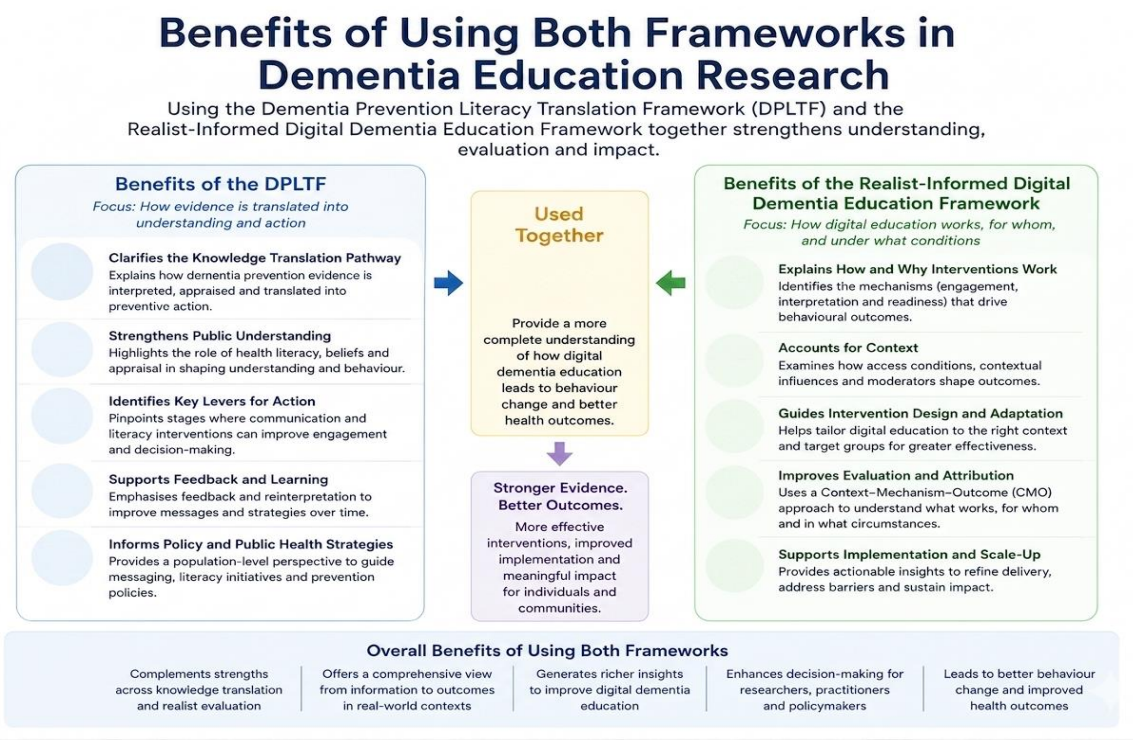


Figure 1: Benefits of Integrating the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework

2. The Emergence of an Integrated Theoretical Model

The comparison of the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework demonstrates that the two frameworks operate at different but complementary levels of explanation. The DPLTF primarily explains how dementia prevention evidence is translated into understanding, appraisal, and preventive action through health literacy processes. The Realist-Informed Digital Dementia Education Framework extends this perspective by explaining how educational interventions generate outcomes through interactions between contextual conditions and explanatory mechanisms.

Taken together, the frameworks suggest the emergence of a broader integrated theoretical model of digital dementia education. Within this model, dementia prevention evidence forms the foundation for educational interventions, which are subsequently interpreted through health literacy processes, individual engagement, and contextual influences. Behavioural readiness emerges through these interactions and ultimately contributes to preventive behavioural action and health-related outcomes.

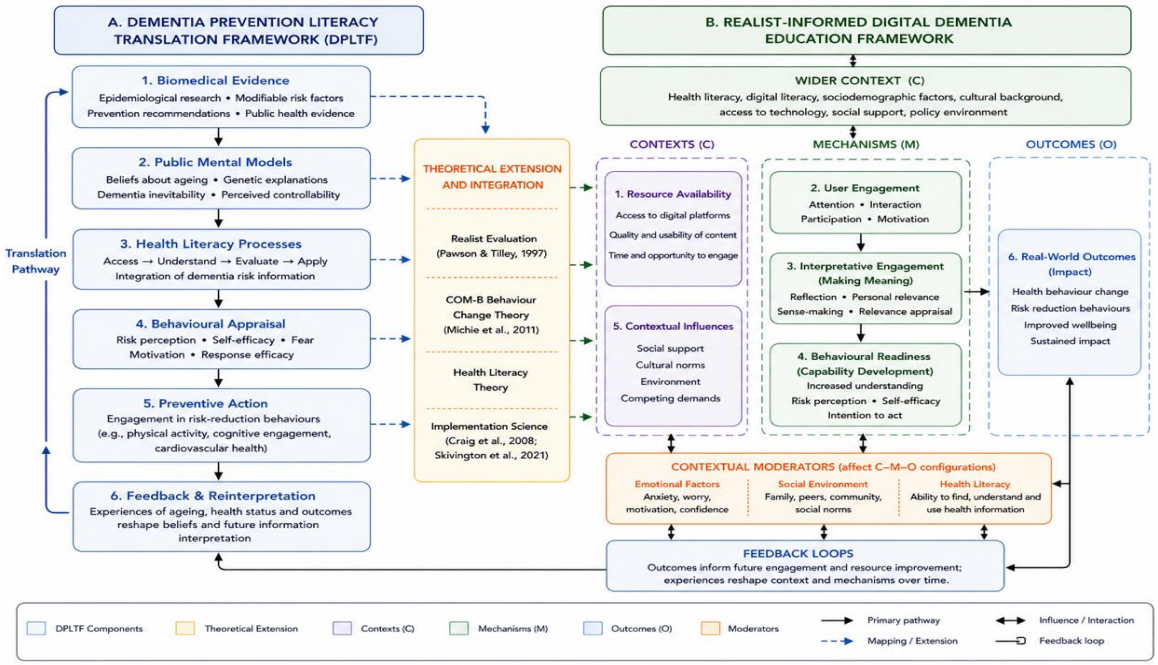
The integrated model therefore links four previously distinct theoretical traditions: health literacy theory, knowledge translation, behaviour change theory, and realist evaluation. Rather than viewing these traditions as competing explanations, the model positions them as complementary components of a unified pathway extending from evidence generation to behavioural enactment.

This integrated perspective represents the culmination of the broader doctoral programme of research. Earlier studies contributed understanding of dementia prevention literacy, digital dementia education, educational engagement, and behavioural outcomes. The present synthesis brings these strands together within a single explanatory framework capable of informing future intervention design, implementation, and evaluation.

The integrated theoretical perspective arising from this synthesis is illustrated conceptually through the combined contributions of both frameworks presented in Figure 1.

2.1. Evolution of the Frameworks

Figure 2 presents the conceptual evolution from the Dementia Prevention Literacy Translation Framework (DPLTF) to the Realist-Informed Digital Dementia Education Framework.



Note. The figure illustrates the theoretical progression from the Dementia Prevention Literacy Translation Framework (DPLTF), which focuses on translation of dementia prevention evidence into behavioural engagement, to the Realist-Informed Digital Dementia Education Framework, which extends this through explicit Context–Mechanism–Outcome (CMO) relationships. The newer framework retains core DPLTF concepts while incorporating realist evaluation principles, COM-B-informed behavioural readiness, and implementation science perspectives to explain how digital dementia education generates outcomes under varying contextual conditions [11].

Figure 2: Evolution of the Dementia Prevention Literacy Translation Framework into the Realist-Informed Digital Dementia Education Framework

3. Future Research Directions

The integrated perspective developed in this paper generates several testable propositions for future research. First, educational interventions that successfully promote interpretative engagement may be more likely to generate behavioural readiness than interventions focused solely on information delivery. Second, contextual factors such as digital literacy, social support, and access to preventive health services may moderate the relationship between educational engagement and behavioural outcomes. Third, the mechanisms identified within the Realist-Informed Digital Dementia Education Framework may provide a basis for developing and testing Context–Mechanism–Outcome configurations across different populations and educational settings.

Taken together, this paper makes three principal contributions. Such testing would also enable refinement and validation of the integrated theoretical perspective proposed in this paper.

Such work would strengthen understanding of how dementia prevention literacy is translated into sustained behavioural action and would provide opportunities to refine the integrated framework proposed in this paper.

4. Limitations

As a conceptual comparison, this paper does not empirically test the proposed relationships between frameworks. Future research should examine the applicability of the integrated perspective across diverse educational interventions, populations, and implementation settings. Empirical evaluation may further refine understanding of how contextual factors and explanatory mechanisms interact to influence dementia prevention behaviours.

5. Conclusion

The Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework provide complementary perspectives on how dementia prevention information and education contribute to behaviour change. While the DPLTF explains how prevention evidence is interpreted, appraised, and translated into action through health literacy processes, the realist-informed framework extends this understanding by explicitly theorising the contextual and mechanistic pathways through which digital educational interventions produce outcomes.

The comparison demonstrates that the frameworks are not competing approaches but rather represent different levels of explanation. The DPLTF contributes a strong knowledge translation perspective, whereas the Realist-Informed Digital Dementia Education Framework provides a context-sensitive explanation of how interventions work, for whom, and under what circumstances. Together, they offer a more comprehensive understanding of the processes linking education, engagement, behavioural readiness,

and health-related outcomes.

Importantly, this paper moves beyond framework comparison by advancing an integrated theoretical perspective that emerged through the progression of the doctoral research programme. By bringing together insights from the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework, the paper synthesises knowledge translation, health literacy, behaviour change theory, implementation science, and realist evaluation into a more comprehensive explanation of how digital dementia education contributes to behavioural and health-related outcomes. This integrated perspective clarifies the relationships between educational engagement, contextual influences, behavioural readiness, and preventive action, while providing a foundation for future empirical testing, intervention development, and theoretical refinement.

Taken together, this paper makes three principal contributions. First, it provides the first detailed conceptual comparison of the Dementia Prevention Literacy Translation Framework and the Realist-Informed Digital Dementia Education Framework. Second, it demonstrates how the newer framework extends dementia prevention literacy theory through explicit theorisation of Context–Mechanism–Outcome relationships. Third, it advances an integrated theoretical perspective that combines health literacy, implementation science, behaviour change theory, and realist evaluation to provide a more comprehensive explanation of how digital dementia education may generate meaningful and sustainable behaviour change across diverse contexts and populations.

6. Implications for Research and Practice

This comparative analysis contributes to the broader doctoral programme by providing a theoretical bridge between previous studies examining dementia prevention literacy, digital dementia education, and behaviour change. While earlier papers focused on specific aspects of dementia education, health literacy, intervention design, and educational outcomes, the present paper integrates these findings within a unified conceptual framework.

The Dementia Prevention Literacy Translation Framework provided an initial explanation of how dementia prevention evidence may be translated into public understanding and preventive action. Building upon this foundation, the Realist-Informed Digital Dementia Education Framework incorporates insights derived from the broader programme of research, including the importance of contextual influences, user engagement, interpretative processes, and behavioural readiness in determining intervention effectiveness.

As a result, this paper represents a synthesis of the theoretical, empirical, and methodological contributions developed throughout the PhD. It demonstrates how findings from individual studies can be integrated into a more comprehensive explanation of how digital dementia education works, for whom it works, and under what conditions positive outcomes are most likely to occur.

The comparison also strengthens the overall coherence of the doctoral thesis by illustrating the progression from knowledge translation and health literacy perspectives toward a more comprehensive realist-informed explanation of behaviour change. In doing so, the paper establishes the conceptual foundation that links earlier publications and provides a framework for future research, intervention development, implementation, and evaluation within dementia prevention and digital health education.

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