## Brief background to theory of change

Theories of change can be used to make clear how learning technology innovations are designed to produce their desired outcomes in a given context (Century & Cassata, 2016; Cukurova et al., 2019; Weatherby et al., 2022).

However, identifying the key features in technologies that produce their impact can be hard. Therefore, working with a range of experts and end users, with the technology and resources created to support the innovation, can be a helpful way to identify and define these features, and express their relationship to outcomes (Century & Cassata, 2016).

It can also be challenging to align research evidence with innovations and existing practices, because priorities in evidence production and use may differ, and often we have to navigate incomplete or jigsawed evidence alongside new and emerging tools and practices (Ming & Goldenberg, 2021, p. 130). For example, while evidence is often referred to in terms of a hierarchy from anecdotal to causal (often randomised control trials), this may not reflect evidence *quality* for particular *purposes* (Cukurova et al., 2019; Weatherby et al., 2022)*.*

Similar to logic models, in the field of ‘persuasive technology’ behaviour change support systems can be modelled using an ‘outcome/change’ design matrix. These matrices are intended to map desired changes (attitudes, existing behaviours, or compliance with new behaviours), to outcome spaces (formation, alternation, reinforcement) (Langrial et al., 2013; Tikka & Oinas-Kukkonen, 2019). This model can be used to map *features* that target particular behavioural or attitudinal changes, to *outcomes* that reflect the longer term changes in users. Moreover, they provide an additional approach to mapping evidence to connect features of interventions to desired outcomes.

Similarly, ‘driver diagrams’ have been used in implementation and improvement research in education, to express how the key drivers towards our goals are addressed by secondary-drivers, to develop measurement models that allow us to test interventions across contexts (Bryk et al., 2015).

Practically, many funders now *require* applicants to have an explicit theory of change model. For example, the Victorian government ‘Mental Health Fund and Menu’ supplier application requires a logic model. These can be used to:

1. Make explicit how tools/interventions are connected to existing evidence
2. Shape product development, by making clear how proposed product changes influence desired outcomes
3. Drive evaluation by clearly defining desired outcomes, the observable indicators and outputs we may measure to evaluate progress on these outcomes, and the features of the tool that may be producing outcomes (and could be systematically varied).

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