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Abstract:

Learning theories can be a valuable source of evidence for those designing curricula and other educational resources. However, it has been suggested that the link between learning theory and practice is often unclear. Here we discuss findings from three studies recently conducted in the Research Division, exploring how learning theories are understood, evidenced and used in curriculum and resource development. The findings suggest that curriculum developers, educators and researchers should use learning theories in their work and explicitly refer to them to enable curriculum users to interpret and enact materials as intended. Practical guidance on applying learning theory and collaborative working between curriculum designers, educators and researchers can help to bridge the gap between abstract concepts and real-life applications. Strengthening these links can support more coherent curriculum design and is likely to improve learning outcomes.

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Learning theories unpacked: A discussion of the findings from three Research Division studies

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Background

The work of the Research Division at Cambridge University Press & Assessment includes providing research evidence to aid the decision-making of those who design curricula, learning materials and teacher support resources. Fundamental to the development of such materials is an understanding and integration of the most effective pedagogical strategies to enable learning to take place. Despite this, Schunk (2012) describes a problematic gap between learning theory and practice, which may relate to a historical separation of the fields of psychology and education. This article presents our findings from three studies related to learning theories, which aimed to understand how a stronger connection between learning theory and practice can be built.

What are learning theories and why are they important?

For centuries, philosophers have debated epistemological concepts such as rationalism (the belief that knowledge can exist outside of experience) and empiricism (the belief that experience is the source of all knowledge). From these foundations, psychological ideas were developed about how the mind works, how knowledge is created and how learning occurs. Learning theories strive to explain how people “acquire, process, retain, and recall knowledge during the process of learning” (Gandhi & Mukherji, 2023, first paragraph). Some learning theories are more familiar than others (e.g., behaviourism, which many might recognise from Pavlov’s experiments), while some theories have lost their appeal over time or been discredited only to be replaced by others. As research has expanded in this area and built on prior concepts, there are now many learning theories in the field, including those that focus on factors which contribute to learning such as motivation and self-regulation (Schunk, 2012). The most prominent learning theories include behaviourism, cognitivism, constructionism, constructivism and humanism. These are explored in greater detail when we discuss the findings.

An overarching aim of both pedagogy and curriculum is to ensure high-quality teaching to enable effective learning. In order to fulfil this aim, teachers, curriculum designers and resource developers can make use of learning theories to identify the most effective strategies for learning and teaching. Learning theories can provide evidence that can be used to decide which strategies can be deployed most successfully for different learning objectives, content and contexts. However, it is important to remember that not all theories are evidence-based and that some practices that derive from theory have more or stronger underpinning evidence than others.

Internationally, education systems usually present a curriculum as a formal document which sets out the learning content to be followed in formal schooling from early years to secondary education. Such documents may include mandatory or non-mandatory guidance on educational goals, content, pedagogy and assessment (OECD, 2020). Curricula can be complex documents and vary from country to country in how prescriptive the content is and how much autonomy schools and teachers have in interpreting, sequencing and delivering the curriculum. Curriculum developers must incorporate multiple considerations into their development frameworks including alignment to government policy and planning, stakeholder views and the operational capacity of the education system, including the practicalities of designing a curriculum that is deliverable within the available resources, such as funding and staffing levels. In addition, the learning theory and philosophy that underpin the curriculum are key aspects to be considered in the development process.

According to curriculum design training materials produced by the UNESCO International Bureau of Education (2017), an underpinning learning theory or philosophy for a curriculum should be suitable for the context (e.g., resulting in a programme which can be delivered using available resources) and be clearly articulated to teachers and stakeholders. However, although the training materials recommend that curriculum designers are familiar with the main learning theories, they do not provide guidance on how familiarity with learning theories can be translated into design decisions or how use of learning theories can be signposted for curriculum users. Similarly, Cunningham et al. (2007) found that there was a lack of information on how learning theories could inform curriculum design in higher education.

Our research into learning theories

This article explores three key pieces of work related to learning theories that were recently conducted in the Research Division: Ireland and Majewska (2024); Majewska et al. (2026); and Jin et al. (2026). The three pieces of work led to the identification of some of the main learning theories and their characteristics, along with a range of further learning theories that sit within these main categories. Table 1 shows the main learning theories identified and some key concepts relating to them. The work also provides insights into how these are used in curriculum development.

Ireland and Majewska (2024) carried out an initial exploratory literature and document search to ascertain whether learning theories and research evidence have been used in the development of national or regional curricula. The curricula of Ontario (Canada) and Aotearoa New Zealand were used as case studies. Ireland and Majewska (2024) examined various academic databases and governmental websites and narrowed their focus to documents about the intended (written) curriculum. Majewska et al. (2026) identified meta-analyses and systematic reviews that investigated the effectiveness of pedagogical strategies and practices associated with various learning theories. The search was conducted in Google Scholar and Wiley and focused on evidence published between 2014 and 2024 from across the world. Relevant meta-analyses and systematic reviews were used to examine the evidence for the effectiveness of pedagogical strategies in supporting learning. Majewska et al. (2026) also noted pedagogical strategies for which there were no meta-analyses or systematic reviews. The outcome of this work was a comprehensive resource of learning theories, including their definitions, key characteristics, associated thinkers, explanations of how learning happens according to each theory, the pedagogical strategies associated with each theory, as well as the evidence behind them (or lack of such evidence). Lastly, Jin et al. (2026) conducted a systematic review of research published between 2014 and 2024 exploring the influences behind curriculum-makers' decisions. The search for literature was conducted in three databases (Scopus, Web of Science and ERIC [Education Resources Information Center]) and the literature was included on the basis of the following pre-determined criteria: peer-reviewed journal articles written in English and covering the intended curriculum from early years to upper secondary education only. The review followed the PRISMA guidelines (Page et al., 2021), which provide a well-defined process, including a strict screening and eligibility check.

What has our research into learning theories told us so far?

This section describes some overall observations and reflections on learning theories resulting from the three pieces of work conducted in the Research Division.

Table 1 shows a selection of the main learning theories and some key concepts associated with them. There are many further, more specific theories that sit within these categories.

Table 1: An overview of the main learning theories, with information taken from Majewska et al. (2026)

Learning theory	Focus	Key concepts
Behaviourism	Link between stimuli and learner response	• Positive / negative reinforcement • Positive / negative punishment • Observed learning • Measurable objectives
Cognitivism	How learners think and transfer knowledge	• Working memory • Cognitive load • Relating new information to prior knowledge • Retrieval • Instructor-led
Constructionism	Learning through construction of artefacts	• Learner-centred • Learn by making • Tangible objects • Collaboration
Constructivism	Learners’ mental construction of knowledge	• Learner-centred • Discovery • Experimentation • Problem solving • Collaboration
Humanism	Learning focused on the whole person; learners have freedom and autonomy	• Learner-centred • Holistic • Personal growth • Self-direction • Self-evaluation
Motivation and engagement	Factors driving enthusiasm for and willingness to engage in learning	• Competence • Autonomy • Belonging • Self-reflection • Goal setting • Task value

From the research studies, two observations became particularly clear. The first is that **there is a huge number of learning theories**. The second observation is that **there is a significant overlap in the characteristics of some learning theories**, making it difficult to disentangle them from one another. Figure 1 shows a high-level overview created to illustrate the similarities and differences between a selection of learning theories. The theories included in Figure 1 differ from those in Table 1 as they arose from the earlier exploratory work completed by Ireland and Majewska (2024). To examine overlapping learning theories more closely, we can compare constructivism and cognitivism as examples. This comparison demonstrates how learning theories which emphasise different learning processes can also share similarities. Constructivism sees learning as occurring through a process of reflection and one’s active construction of ideas (Gandhi & Mukherji, 2023; Mascolo & Fisher, 2005, as cited in Brau, 2022). According to constructivism, learners consider new information through the lens of previous experiences. Thus,

constructivism focuses on learners' internal thinking (Gandhi & Mukherji, 2023). In comparison, cognitivism puts a lot more emphasis on the mental processes that underpin learning, such as processing and reorganising information in relation to previously acquired information (Gandhi & Mukherji, 2023). Cognitivism highlights thought processes such as meta-cognition (thinking about one's thinking) (Gandhi & Mukherji, 2023). To evidence cognitive theory further, let us take the example of how we build schemas (units of knowledge and understanding about a specific action, event, object or experience) (Center for Teaching Excellence, n.d.). For instance, when having a meal at a restaurant, we build a schema about what eating out at a restaurant looks like; from entering the restaurant, looking at the menu, ordering, eating to paying. Without experiences, we may not be able to construct knowledge or build on it. In summary, both constructivism and cognitivism recognise the importance of experiences and prior learning.

There is also significant overlap between theories that derive from main learning theories, such as social constructivism (also known as socio-cultural theory) and social learning theory – both of which derive from constructivism. Social constructivism sees social and cultural backgrounds as important in learning and understanding behaviour, and it emphasises the interaction between interpersonal, cultural, historical and individual factors. Similarly, social learning theory emphasises the interaction between personal factors (such as cognitions), behaviours and the environment, stipulating that learning occurs in a social environment where we can observe others (Majewska et al., 2026). If there is no explicit mention of which learning theory has been used to inform a specific resource or curriculum, this overlap can present difficulties in correctly identifying the learning theory educational designers had in mind. For instance, a curriculum statement highlighting that activities should help students to integrate new learning with what they already know could be seen as relating to several theories, such as constructivism, information processing or situated learning.¹ It is also possible that the curriculum statement was not designed based on any particular learning theory.

¹ Information processing theory explains learning in terms of how people attend to environmental events, encode information, relate it to their existing knowledge and retrieve it when needed (see Majewska et al., 2026). Situated learning suggests that learning should take place in the context in which it is situated, e.g., working in a physical location depicted on a map is helpful in teaching how to read and work with maps (Griffin, 1995).

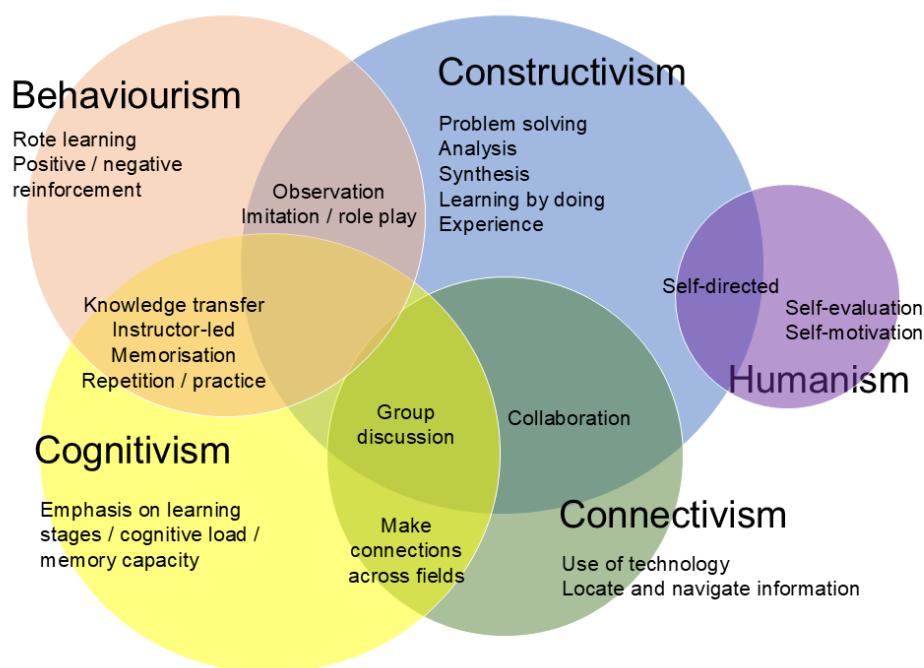


Figure 1: Diagram showing differences and similarities between some learning theories (taken from Ireland & Majewska, 2024)

A further observation is that **there is little evidence in the literature about how learning theories influence curriculum development**. Jin et al.'s (2026) review found that out of seventeen articles included in the review, only two articles explicitly stated and explained which learning theories were used during the curriculum-making. One article explicitly pointed out that the theoretical framework behind their curriculum design was based on constructivist principles (Haagen-Schützenhöfer & Hopf, 2020) and the second article stated that a social constructivist framework guided the construction of a primary school curriculum on artificial intelligence (Dai et al., 2023).

Similarly, Ireland and Majewska's (2024) literature review found limited evidence for the use of or reference to learning theories in the development of curricula in Aotearoa New Zealand and Ontario (Canada). Some evidence was noted of learning theories being considered during the development of the 2007 New Zealand Curriculum.² For instance, some authors involved in the development of the New Zealand Curriculum mentioned learning theories they had considered, although these could not be linked to any specific parts of the curriculum. In addition, a series of statements in the 2007 New Zealand Curriculum (Ministry of Education, 2007) seemed to relate to learning theories, as they mentioned the social and cultural context of learning and that students learn best “when they are able to integrate new learning with what they already understand” (p. 34), implying a constructivist approach to learning. However, these examples do not explicitly refer to learning theories and it is through interpretation that a link to a

² The 2007 New Zealand Curriculum is the English-medium version in current use. Following a period of redevelopment, the updated curriculum will be compulsory in schools from 2027.

specific learning theory can be inferred. Similarly, when inspecting documents and articles related to the Ontario curriculum, some evidence of use of learning theories was found, with constructivism being mentioned at times across the literature (e.g., Byers, 2004; Golafshani, 2020; Ruddock & Sainsbury, 2008; Zhu & Xie, 2020 – all as cited in Ireland & Majewska, 2024). However, no definitive evidence was found of how learning theories were used in the development of the Ontario curriculum and often, learning theories were only implied. The absence of references to learning theories in the curricula of New Zealand and Ontario prevents curriculum users from accessing the foundational principles of the curriculum content and may lead them to make their own assumptions. These findings support Schunk's (2012) assertion that there is a gap between learning theory and practice, considering that we might expect curriculum documents to represent a bridge between the two.

The findings relating to the lack of information about how learning theories have informed curriculum design also prompt another observation – namely that **we cannot be confident that learning theories have been considered when this is not stated explicitly and when we rely on implicit assumptions** based on the phrasing in curriculum documents. The importance of making explicit statements was stressed by Oates (2018), who stated that designers should be ready to specify what evidence and model(s) they used “to determine the construct base, to determine the domain, to sequence or order the content, ... and to determine key elements such as practice activities, formative assessments etc.” (p. 13). This, he argued, ensures that materials are of a high quality and provides clarity on their purpose and use.

Another reflection from the work on learning theories is that **there is a need for practical guidance for educators and for content and curriculum designers about how to successfully translate the theories of learning into practice.**

Although the literature on learning theories is vast, those working in the field of education may need training and guidance on how to use the theories when designing lessons, activities, tasks, curricula or resources, as it is difficult to bridge this gap from theoretical into practical without prior experience or support given the volume of information available. Majewska et al. (2026) reflected on this when creating the learning theories resource, which collated examples of pedagogical practices associated with each learning theory and the evidence behind them. This reflection posed several questions, such as “how can developers create an effective curriculum that follows principles of learning theories?” and “how can developers design activities that would benefit students the most if following specific learning theory principles?” Such questions highlight the need to create a bridge from the theoretical to practical, making use of evidence in order to support learners in the best way possible.

Implications for practice: What do our findings mean for those working in education and curriculum development?

Given the large number of learning theories and the overlap in key concepts, it is perhaps unsurprising that practitioners may not make explicit references to the learning theories they use when doing so would involve disentangling the complexities of learning theories. In practice, education professionals may already be applying principles of learning theories in their work without consciously linking them to the wider framework they came from. For instance, a teacher may show how to solve a mathematical problem or equation on the board by providing step-by-step guidance. This is known as a worked example according to cognitive load theory. The theory stipulates that worked examples reduce unnecessary mental load in learners' working memory (see Majewska et al., 2026). This allows learners to focus on the steps necessary to solve a task without being overburdened by too much information being presented at once. To take another example, by encouraging students to work together, teachers may be using collaborative learning, which is a strategy associated with social constructivism. This enables learning through social interaction, sharing diverse perspectives, challenging each other's thinking and co-constructing understanding (see Majewska et al., 2026).

Support and training in this space may equip educators with shared professional language to aid discussions with colleagues and help them understand why certain practices may be more effective than others. It can also enable educators to become more conscious of decisions about their teaching practices and help them to reflect on those decisions rather than rely on habits. Jin et al.'s (2026) review also raised the need for guidance, finding that teachers reported a lack of knowledge of curriculum development and a lack of training opportunities as barriers to curriculum making. Through strengthened understanding of the mechanisms through which learning occurs, teachers can make informed decisions about which strategies are likely to be effective and match the learning theory to the intended outcome. For instance, teacher training courses could provide theories of learning alongside clear, applicable examples of how to use them when designing lessons and resources. While it might not be necessary (or achievable) to cover each of the many learning theories, the key messages from the main learning theories could be usefully conveyed. Such training could provide educators with important professional knowledge. For instance, it could highlight certain nuances of the application of learning theories, such as that some behavioural theories that are based on stimulus–response links might be useful for learning multiplication facts or vocabulary, while cognitive theories may be more useful for complex forms of learning, such as drawing inferences from text. Knowing what theories and practices are useful for specific learning situations could support teachers in their daily activities such as planning lessons.

Oates (2018) argued that those creating resources or curricula should explicitly outline the reasons and influences behind their decisions and should be able to explain how these have been applied to the curriculum or resources they

have designed. Oates further stated that this enables transparency and allows users of the materials to scrutinise the evidence base for decision-making. When particular learning theory principles have been used, they should be clearly and explicitly explained. Developers should set out which elements were adopted for which aspects, why such theory was used and how those who will be working with the curriculum or resource should use it to maximise learning. This reduces the risk of varying interpretations of which learning theories have influenced a curriculum, enables educators to deploy the curriculum as intended and avoids “fragmented and even contradictory applications” (OECD, 2020, p. 26). It also enables those using the materials to make informed choices about how to apply curricula and integrate resources within their activities. Curriculum design courses should also give professionals the skills to think critically about using learning theory when designing curricula. However, it must be recognised that curriculum (re)development as a whole is a high-stakes, politically charged and multi-layered process (OECD, 2020). Within this, designing a research- and evidence-based curriculum is a demanding and time-consuming activity (Haagen-Schützenhöfer & Hopf, 2020).

Additionally, curriculum-makers, researchers and teachers should work collaboratively to bridge the gap between theory and practice. Jin et al. (2026) stated that “several authors of the reviewed articles called for more support from curriculum and subject specialists for future collaborative curriculum design” (p. 15). For example, Huizinga et al. (2014, as cited in Jin et al., 2026) proposed that the Ministry of Education should provide support to teachers through expertise from curriculum specialists across all stages of curriculum design. Additionally, the OECD (2020) noted that curriculum developers should consider the users of the curriculum and how they will interpret and put it into practice. Researchers should ensure that they are not just offering abstract theories, which could take educators hours to translate into practical, applicable scenarios for the classroom. They should aim to provide multiple practical, real-life examples of using principles from various learning theories in classrooms and when designing activities, tasks and resources. Teachers can support curriculum developers and researchers through participation in stakeholder consultations and involvement in research studies or other opportunities for co-creation of materials. However, we recognise that education professionals often work with time constraints and other pressures, such as a lack of funding and resources. Therefore, any such collaborative work should directly benefit the participating teachers, for instance, by enabling them to apply theory to their own practice in such a way that real improvements in learning can be observed.

Reflection

Overall, we found that the practices associated with learning theories make a difference for learning (see Majewska et al., 2026). However, the recent work conducted in the Research Division has shown that there are still gaps that need addressing. This includes the need to draw on learning theories to inform the development of educational materials, the need to demonstrate that theory has been used to inform a product or curriculum and the need to provide guidance for curriculum developers and teachers on how to use learning theories effectively when creating curricula and educational content and activities.

Addressing these gaps can strengthen the design and application of curricula and learning resources. By including information on the learning theories underpinning curriculum and learning material design, teachers can better understand the evidence and principles behind these materials and apply the intended learning theory principles in the classroom, as well as evaluate their efficacy. Practical guidance for curriculum developers and teachers would go some way towards building the bridge between theory and practice that Schunk (2012) perceived to be missing.

The work by Ireland and Majewska (2024) and Jin et al. (2026) has provided valuable understanding of how learning theories relate to the curriculum development process. Additionally, the development of the learning theories resource (Majewska et al., 2026) is a vital step towards providing the much-needed links between learning theory and practice. Future work in this area could build on these by strengthening the link between theory and practice through deeper exploration of how learning theories can be embedded in curricula and by developing clearer guidance to help practitioners apply learning theories to boost learning outcomes.

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