Teaching and learning policy

Reviewed by Curriculum Committee

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Non-Statutory

Teaching and learning policy

1. **What is "learning"?**

Learning occurs when information is transferred from working memory (where it's consciously processed) to long-term memory (where it can be stored and later retrieved). New ideas are best learnt through their connection to previously-known ideas, and will be forgotten unless their meaning is understood.

Learning is most effective when the learner is intrinsically motivated. Being able to reflect on how they learn, and to monitor what they've learnt, will strengthen the learning process. The quality of the relationship between the teacher and the learners, and the emotional environment of the classroom, will impact upon learning.[1]

2. **Where does learning happen?**

Children learn best when they are fully involved in what they are doing. Involvement focuses on the extent to which pupils are operating to their full capabilities. In particular it refers to whether the child is focused, engaged and interested. High levels of focus, concentration and involvement[2] indicate that deep level learning is occurring.

At Hanover, we aim for our teaching in lessons to be engaging, challenging and stimulating, in order for the children to be fully involved in their curriculum learning.

We also recognise that learning occurs outside lesson time, when children are playing, spending time with peers, interacting with adults informally, etc. Children are 'hard-wired' to learn; the environment we provide for children at all points of the school day impacts upon their learning in the broadest sense. Adults in school are highly influential on the children; we expect adults to be positive and supportive role models for children at all times.

1. **Learning in lessons in years 3-6**

In order to promote high levels of involvement, we put the following in place:

- A broad and interesting curriculum, tailored to meet the needs of our cohort, as well as the demands of the statutory National Curriculum
- A focus on active learning, where children are expected to participate throughout the lesson, contributing their ideas, discussing with peers, and developing their understanding through interactions with others.
- Learning Partners are used to encourage children to articulate their ideas with a partner. Contributions from children are expected; after a chance to discuss, the teachers randomly select a name, and the chosen pair are expected to feed back on their discussion.

Children need to know the relevance of their learning. To promote this, we expect:

- a clear and shared 'learning intention' so children know what this lesson is about. The learning intention should be achievable in that lesson, so that progress against it can be evaluated.
- a clear 'learning journey' explained to the children, so they can see how the particular learning in a lesson is linked to and contributes towards a planned-for outcome (e.g. a piece of published work, a presentation, etc.). Key 'learning questions' may be used to guide the journey through some subjects.

[1] This is a summary of the definition of learning given in "The Science of Learning", included as Appendix 1 of this policy.
[2] Focus, concentration and involvement are measured using the Leuven Scale at Hanover, as included as Appendix 2 of this policy.

- teachers to model and 'talk aloud' the new skills being taught, so the children are clear about how to proceed independently.
- teachers to respond to children's contributions thoughtfully and sensitively, and to use their responses to correct misconceptions, clarify understanding, challenge the child to expand their idea, make connections to other ideas or areas of learning, suggest alternatives, etc. This may be done verbally, or through marking of work.
- planned differentiation opportunities so that all children are challenged to make progress.
- a plenary or summary of learning (usually at the end of a lesson) where children can review, extend, and further develop the learning of that lesson.

Children need to learn in an environment in which they feel comfortable and relaxed. To promote this, we expect:

- adult responses and interactions to be positive and encouraging. For example, if a child gives an incorrect response, say, 'interesting: can you tell me how you got to that?'. This enables a misconception to be addressed, and for the child's contribution to be valued as a learning point.
- an atmosphere where all children feel heard and listened to (e.g. use of 'stick picks' to randomly choose children to respond rather than 'hands-up' as the default).
- Planned paired and group talk, so children get to clarify their understanding verbally.
- teachers to promote a 'growth mindset': the concept that learning is about more than getting the 'right' answers, but that mistakes and misconceptions are necessary in the journey towards understanding.

2. Teaching and Learning for under-8s in EYFS and KS1

Children in EYFS do not have formal lessons. Rather, children may gather with an adult for short 'carpet time' sessions of singing, story-telling, phonics, sharing books, etc. Sessions in Nursery are generally short (ten minutes) and may get longer by the end of the Reception year. While a planned learning intention will not usually be shared, there should be a purpose to the session, and the aim of ensuring high levels of engagement and focus remains. Positive and constructive adult interactions remain a key feature of the successful teaching of young children. See also the EYFS Policy.

In KS1, whole class 'carpet times' gradually extend and may include more elements of a lesson (ie shared learning intention, learning partner talk and work, teacher modelling of a skill, etc.). Thereafter, direct adult-led teaching is mostly in small groups. Adults also teach through their interactions with the children during their chosen activities. Adults in both EYFS and KS1 observe, wait and listen (OWL) to see 'teachable moments' where a prompt, suggestion, question, or the provision of resources, may extend a child's learning.

Outdoor learning is particularly important for young children. Children in EYFS and KS1 have access to learning outside for most of the day. Their outside areas are resourced for learning across the curriculum, with an emphasis on active, collaborative learning through play. Adults working outside continue to support children's learning through their positive interactions and in teachable moments.

3. Teaching and learning outside lessons

Children learn from all their experiences in school, not only in lessons. Some examples of things we do to promote positive learning experiences for children are:

- we use assemblies to support our broader curriculum, provide performance opportunities for children, celebrate success, and to develop a positive whole-school ethos.
- We ensure all children have regular (at least termly) trips, outings or visitors to enrich the curriculum
- We provide stimulating play opportunities for break and lunchtimes

- Staff are expected to engage positively with children in their play, joining and encouraging them as well as supervising.
- We have established peer-to-peer support with play (Lunchtime Play Assistants) and learning (reading buddies)
- We provide A Place to Talk to support children to learn how to manage friendship issues, or other social and emotional difficulties.

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Appendix 1: The Science of Learning

DEANS FOR IMPACT

THE SCIENCE OF LEARNING

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About
THE SCIENCE OF LEARNING

The purpose of *The Science of Learning* is to summarize the existing research from cognitive science related to how students learn, and connect this research to its practical implications for teaching and learning. This document is intended to serve as a resource to teacher-educators, new teachers, and anyone in the education profession who is interested in our best scientific understanding of how learning takes place.

This document identifies six key questions about learning that should be relevant to nearly every educator. Deans for Impact believes that, as part of their preparation, every teacher-candidate should grapple with — and be able to answer — the questions in *The Science of Learning*. Their answers should be informed and guided by the existing scientific consensus around basic cognitive principles. And all educators, including new teachers, should be able to connect these principles to their practical implications for the classroom (or wherever teaching and learning take place).

The Science of Learning was developed by member deans of Deans for Impact in close collaboration with Dan Willingham, a cognitive scientist at the University of Virginia, and Paul Bruno, a former middle-school science teacher. We are greatly indebted to the reviewers who provided thoughtful feedback and comments on early drafts, including cognitive scientists, teacher-educators, practicing teachers, and many others.

The Science of Learning does not encompass everything that new teachers should know or be able to do, but we believe it is part of an important — and evidence-based — core of what educators should know about learning. Because our scientific understanding is ever evolving, we expect to periodically revise *The Science of Learning* to reflect new insights into cognition and learning. We hope that teachers, teacher-educators, and others will conduct additional research and gather evidence related to the translation of these scientific principles to practice.

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About
DEANS FOR IMPACT

Founded in 2015, Deans for Impact is a national nonprofit organization representing leaders in educator preparation who are committed to transforming educator preparation and elevating the teaching profession. The organization is guided by four key principles:

- Data-informed improvement;
- Common outcome measures;
- Empirical validation of effectiveness; and
- Transparency and accountability for results.

More information on the organization and its members can be found on the Deans for Impact website.

www.deansforimpact.org

DEANS FOR IMPACT

1 HOW DO STUDENTS UNDERSTAND NEW IDEAS?

COGNITIVE PRINCIPLES / PRACTICAL IMPLICATIONS FOR THE CLASSROOM

Students learn new ideas by reference to ideas they already know.[1]

- A well-sequenced curriculum is important to ensure that students have the prior knowledge they need to master new ideas.[2]
- Teachers use analogies because they map a new idea onto one that students already know. But analogies are effective only if teachers elaborate on them, and direct student attention to the crucial similarities between existing knowledge and what is to be learned.[3]

To learn, students must transfer information from working memory (where it is consciously processed) to long-term memory (where it can be stored and later retrieved). Students have limited working memory capacities that can be overwhelmed by tasks that are cognitively too demanding. Understanding new ideas can be impeded if students are confronted with too much information at once.[4]

- Teachers can use "worked examples" as one method of reducing students' cognitive burdens.[5] A worked example is a step-by-step demonstration of how to perform a task or solve a problem. This guidance – or "scaffolding" – can be gradually removed in subsequent problems so that students are required to complete more problem steps independently.
- Teachers often use multiple modalities to convey an idea; for example, they will speak while showing a graphic. If teachers take care to ensure that the two types of information complement one another – such as showing an animation while describing it aloud – learning is enhanced. But if the two sources of information are split – such as speaking aloud with different text displayed visually – attention is divided and learning is impaired.[6]
- Making content explicit through carefully paced explanation, modeling, and examples can help ensure that students are not overwhelmed.[7] *(Note: "explanation" does not mean teachers must do all the talking.)*

Cognitive development does not progress through a fixed sequence of age-related stages. The mastery of new concepts happens in fits and starts.[8]

- Content should not be kept from students because it is "developmentally inappropriate." The term implies there is a biologically inevitable course of development, and that this course is predictable by age. To answer the question "is the student ready?" it's best to consider "has the student mastered the prerequisites?"[9]

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[1] Bransford, Brown, & Cocking, 2000
[2] Agodini, Harris, Atkins-Burnett, Heaviside, Novak, & Murphy, 2009; TeachingWorks
[3] Richland, Zur, & Holyoak, 2007
[4] Sweller, 1988
[5] Pashler, Bain, Bottge, Graesser, Koedinger, & McDaniel, 2007; Kirschner, Sweller, & Clark, 2006; Atkinson, Derry, Renkl, & Wortham, 2000; Sweller, 2006
[6] Chandler & Sweller, 1992; Moreno & Mayer, 1999; Moreno, 2006
[7] Kirschner, Sweller, & Clark, 2006; TeachingWorks
[8] Flynn, O'Malley, & Wood, 2004; Siegler, 1995
[9] Willingham, 2008

2 HOW DO STUDENTS LEARN AND RETAIN NEW INFORMATION?

COGNITIVE PRINCIPLES	PRACTICAL IMPLICATIONS FOR THE CLASSROOM
Information is often withdrawn from memory just as it went in. We usually want students to remember what information means and why it is important, so they should think about meaning when they encounter to-be-remembered material.[10]	• Teachers can assign students tasks that require explanation (e.g., answering questions about how or why something happened) or that require students to meaningfully organize material. These tasks focus students' attention on the meaning of course content.[11] • Teachers can help students learn to impose meaning on hard-to-remember content. Stories and mnemonics are particularly effective at helping students do this.[12]
Practice is essential to learning new facts, but not all practice is equivalent.[13]	• Teachers can space practice over time, with content being reviewed across weeks or months, to help students remember that content over the long-term.[14] • Teachers can explain to students that trying to remember something makes memory more long-lasting than other forms of studying. Teachers can use low- or no-stakes quizzes in class to do this, and students can use self-tests.[15] • Teachers can interleave (i.e., alternate) practice of different types of content. For example, if students are learning four mathematical operations, it's more effective to interleave practice of different problem types, rather than practice just one type of problem, then another type of problem, and so on.[16]

[10] Morris, Bransford, & Franks, 1977
[11] McDaniel, Hines, Waddill, & Einstein, 1994; Rosenshine, Meister, & Chapman, 1996; Graesser & Olde, 2003; TeachingWorks
[12] Peters & Levin, 1986
[13] Ericsson, Krampe, & Tesch-Römer, 1993
[14] Cepeda, Pashler, Vul, Wixted, & Rohrer, 2006; Pashler, Bain, Bottge, Graesser, Koedinger, & McDaniel, 2007
[15] Agarwal, Bain, & Chamberlain, 2012; Pashler, Bain, Bottge, Graesser, Koedinger, & McDaniel, 2007
[16] Pashler, Bain, Bottge, Graesser, Koedinger, & McDaniel, 2007; Rohrer, Dedrick, & Stershic, 2015

3 HOW DO STUDENTS SOLVE PROBLEMS?

COGNITIVE PRINCIPLES	PRACTICAL IMPLICATIONS FOR THE CLASSROOM
Each subject area has some set of facts that, if committed to long-term memory, aids problem-solving by freeing working memory resources and illuminating contexts in which existing knowledge and skills can be applied. The size and content of this set varies by subject matter.[17]	• Teachers will need to teach different sets of facts at different ages. For example, the most obvious (and most thoroughly studied) sets of facts are math facts and letter-sound pairings in early elementary grades. For math, memory is much more reliable than calculation. Math facts (e.g., 8 x 6 = ?) are embedded in other topics (e.g., long division). A child who stops to calculate may make an error or lose track of the larger problem.[18] The advantages of learning to read by phonics are well established.[19]
Effective feedback is often essential to acquiring new knowledge and skills.[20]	• Good feedback is: ▪ Specific and clear; ▪ Focused on the task rather than the student; and ▪ Explanatory and focused on improvement rather than merely verifying performance.[21]

[17] Glaser & Chi, 1988; TeachingWorks
[18] National Mathematics Advisory Panel, 2008
[19] National Reading Panel, 2000; EU High Level Group of Experts on Literacy, 2012
[20] Ericsson, Krampe, & Tesch-Römer, 1993
[21] Ericsson, Krampe, & Tesch-Römer, 1993; Shute, 2008; TeachingWorks; Butler & Winne, 1995; Hattie & Timperley, 2007

4 HOW DOES LEARNING TRANSFER TO NEW SITUATIONS IN OR OUTSIDE OF THE CLASSROOM?

COGNITIVE PRINCIPLES

PRACTICAL IMPLICATIONS FOR THE CLASSROOM

The transfer of knowledge or skills to a novel problem requires both knowledge of the problem's context and a deep understanding of the problem's underlying structure.[22]

- Teachers can ensure that students have sufficient background knowledge to appreciate the context of a problem.[23]

We understand new ideas via examples, but it's often hard to see the unifying underlying concepts in different examples.[24]

- Teachers can have students compare problems with different surface structures that share the same underlying structure. For example, a student may learn to calculate the area of a rectangle via an example of word problem using a table top. This student may not immediately recognize this knowledge is relevant in a word problem that asks a student to calculate the area of a soccer field. By comparing the problems, this practice helps students perceive and remember the underlying structure.[25]
- For multi-step procedures, teachers can encourage students to identify and label the substeps required for solving a problem. This practice makes students more likely to recognize the underlying structure of the problem and to apply the problem-solving steps to other problems.[26]
- Teachers can alternate concrete examples (e.g., word problems) and abstract representations (e.g., mathematical formulas) to help students recognize the underlying structure of problems.[27]

[22] Bransford, Brown, & Cocking, 2000; Pellegrino & Hilton, 2012

[23] Pellegrino & Hilton, 2012; Day & Goldstone, 2012

[24] Richland, Zur, & Holyoak, 2007; Ainsworth, Bibby, & Wood, 2002

[25] Richland, Zur, & Holyoak, 2007; Gentner, et al., 2015

[26] Catrambone, 1996; Catrambone, 1998

[27] Goldstone & Son, 2005; Botge, Rueda, Serlin, Hung, & Kwon, 2007

5 WHAT MOTIVATES STUDENTS TO LEARN?

COGNITIVE PRINCIPLES	PRACTICAL IMPLICATIONS FOR THE CLASSROOM
Beliefs about intelligence are important predictors of student behavior in school.[28]	• Teachers should know that students are more motivated if they believe that intelligence and ability can be improved through hard work.[29] • Teachers can contribute to students' beliefs about their ability to improve their intelligence by praising productive student effort and strategies (and other processes under student control) rather than their ability.[30] • Teachers can prompt students to feel more in control of their learning by encouraging them to set learning goals (i.e., goals for improvement) rather than performance goals (i.e., goals for competence or approval).[31]
Self-determined motivation (a consequence of values or pure interest) leads to better long-term outcomes than controlled motivation (a consequence of reward/punishment or perceptions of self-worth).[32]	• Teachers control a number of factors related to reward or praise that influence student motivation, such as: ▪ whether a task is one the student is already motivated to perform; ▪ whether a reward offered for a task is verbal or tangible; ▪ whether a reward offered for a task is expected or unexpected; ▪ whether praise is offered for effort, completion, or quality of performance; and ▪ whether praise or a reward occurs immediately or after a delay.[33]
The ability to monitor their own thinking can help students identify what they do and do not know, but people are often unable to accurately judge their own learning and understanding.[34]	• Teachers can engage students in tasks that will allow them to reliably monitor their own learning (e.g., testing, self-testing, and explanation).[35] If not encouraged to use these tasks as a guide, students are likely to make judgments about their own knowledge based on how familiar their situation feels and whether they have partial – or related – information. These cues can be misleading.[36]
Students will be more motivated and successful in academic environments when they believe that they belong and are accepted in those environments.[37]	• Teachers can reassure students that doubts about belonging are common and will diminish over time.[38] • Teachers can encourage students to see critical feedback as a sign of others' beliefs that they are able to meet high standards.[39]

[28] Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013
[29] Burnette, O'Boyle, VanEpps, Pollack, & Finkel, 2013; Yeager, Johnson, Spitzer, Trzesniewski, Powers, & Dweck, 2014
[30] Mueller & Dweck, 1998; Blackwell, Trzesniewski, & Dweck, 2007; Kamins & Dweck, 1999
[31] Elliott & Dweck, 1988; Smiley & Dweck, 1994
[32] Davis, Winsler, & Middleton, 2006
[33] Deci, Koestner, & Ryan, 1999; Levitt, List, & Neckermann, 2012
[34] Koriat, 1993
[35] Pashler, Bain, Bottge, Graesser, Koedinger, & McDaniel, 2007; Karpicke, Butler, & Roediger, 2009
[36] Koriat & Levy-Sadot, 2001
[37] Yeager, Walton, & Cohen, Addressing achievement gaps with psychological interventions, 2013
[38] Walton & Cohen, 2011; Yeager, Walton, & Cohen, Addressing achievement gaps with psychological interventions, 2013
[39] Yeager, et al., 2014; Cohen, Steele, & Ross, 1999

6 WHAT ARE COMMON MISCONCEPTIONS ABOUT HOW STUDENTS THINK AND LEARN?

COGNITIVE PRINCIPLES

- **Students do not have different "learning styles."[40]**
- **Humans do not use only 10% of their brains.[41]**
- **People are not preferentially "right-brained" or "left-brained" in the use of their brains.[42]**
- **Novices and experts cannot think in all the same ways.[43]**
- **Cognitive development does not progress via a fixed progression of age-related stages.[44]**

PRACTICAL IMPLICATIONS FOR THE CLASSROOM

- Teachers should be able to recognize common misconceptions of cognitive science that relate to teaching and learning.

[40] Pashler, McDaniel, Rohrer, & Bjork, 2008
[41] Boyd, 2008
[42] Nielson, Zielinski, Ferguson, Lainhart, & Anderson, 2013
[43] Glaser & Chi, 1988
[44] Willingham, 2008

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Appendix 2: The Leuven Scale for Involvement, as used at Hanover

Involvement focuses on the extent to which pupils are operating to their full capabilities. In particular it refers to whether the child is focused, engaged and interested in various activities.

The Leuven Scale for Involvement

1) Low Activity

Activity at this level can be simple, stereotypic, repetitive and passive. The children are absent and display no energy. There is an absence of cognitive demand. Children characteristically may stare into space. N.B. This may be a sign of inner concentration.

2) A Frequently Interrupted Activity

Children are engaged in an activity but half of the observed period includes moments of non-activity, in which children are not concentrating and are staring into space. There may be frequent interruptions in concentration, but Involvement is not enough to return to the activity.

3) Mainly Continuous Activity

Children are busy at an activity but it is at a routine level and the real signals for Involvement are missing. There is some progress but energy is lacking and concentration is at a routine level. Children can be easily distracted.

4) Continuous Activity with Intense Moments

Children's activity has intense moments during which activities at Level 3 can come to have special meaning. Level 4 is reserved for the kind of activity seen in those intense moments. This level of activity is resumed after interruptions. Stimuli, from the surrounding environment, however attractive cannot seduce children away from the activity.

5) Sustained Intense Activity

Children show continuous and intense activity revealing the greatest Involvement. In the observed period not all the signals for Involvement need be there, but the essential ones must be present: concentration, creativity, energy and persistence. This intensity must be present for almost all the observation period.