Routes for Learning: Draft guidance
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Introduction

Context

Routes for Learning materials support practitioners in assessing the early communication and cognitive skills of learners with profound and multiple learning difficulties (PMLD) (see definition in Appendix 1). These materials were published in their original form in 2006 and are well-regarded both across the UK and internationally. They have been translated into a number of European languages and used as far afield as Nigeria.

*Education in Wales: Our national mission, Action plan 2017–21* (2017) makes it clear that developing equitable and transformational curriculum and assessment arrangements are crucial to our vision for education in Wales. As part of the wider reform of curriculum and assessment arrangements in Wales, the Routes for Learning materials are in the process of being updated to reflect the latest research in the field, as well as the new educational context in Wales. The updated materials therefore will support Curriculum for Wales and should be used alongside *Supporting learner progression: Assessment guidance*.

This draft guidance forms part of the Routes for Learning materials currently being updated. The suite of materials also includes:

- the Routemap which provides an overview of early cognitive development, communication and social interaction, showing the most important milestones as orange boxes
- videos showing learners with PMLD whose responses exemplify Routemap boxes and milestones
- an assessment booklet which is being updated and will reflect the feedback received in response to this draft guidance, the updated Routemap and the videos.

The process of updating the Routes for Learning materials began in 2016 with Maxine Pittaway MBE, former headteacher of St Christopher’s School, Wrexham, engaging with special schools across the country, and gathering evidence about how the original suite of materials is being used across Wales and internationally. She also established practitioner groups and an all-Wales network of schools which have played a key role in gathering and quality assuring videos to exemplify the descriptors on the Routemap. These groups also contributed to the early discussions regarding the Routes for Learning draft guidance.

The aim of the Routes for Learning draft guidance is to enable practitioners working with learners with PMLD to assess these learners and identify how to support them in developing their learning. Your feedback on this draft guidance will be essential in helping to finalise its content.

The final version of the guidance will also be consistent with the Additional Learning Needs Code.

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3 [hwb.gov.wales/curriculum-for-wales/routes-for-learning](hwb.gov.wales/curriculum-for-wales/routes-for-learning)
4 [hwb.gov.wales/curriculum-for-wales/routes-for-learning](hwb.gov.wales/curriculum-for-wales/routes-for-learning)
5 More information on providing feedback can be found on page 44 of this draft guidance.
6 [gov.wales/sites/default/files/consultations/2018-12/draft-additional-learning-needs-code-for-wales_0.pdf](gov.wales/sites/default/files/consultations/2018-12/draft-additional-learning-needs-code-for-wales_0.pdf)
A Routes for Learning Advisory Group was established to prepare this draft guidance and ensure alignment with the wider curriculum and assessment guidance. Membership includes:

- Dr Jean Ware, Bangor University (Chair)
- Aron Bradley, Ysgol Hen Felin
- Dr Jill Bradshaw, University of Kent
- Alys Burford, Ysgol Hafod Lon
- Lesley Bush, Crownbridge School
- Katy Davies, St Christopher’s School
- Dr Verity Donnelly, Advisor
- Professor Juliet Goldbart, Manchester Metropolitan University
- Michelle Hibbs, representing the South Wales Association of Special School Headteachers
- Dr Liz Hodges, University of Birmingham
- Dr Lila Kossyvaki, University of Birmingham
- Phil Martin, former headteacher of Ysgol Crug Glas
- Professor Brahm Norwich, Exeter University
- Jonathan Morgan, representing the North Wales Association of Special School Headteachers
- Bethan Morris Jones, Ysgol Pendalar
- Eleanor Phillips, Ysgol Crug Glas
- Suzi Smith, Ysgol Crug Glas
- Clive Underwood, Bangor University.

We are also grateful to George MacBride, from the CAMAU project (University of Glasgow and University of Wales Trinity Saint David) and a member of the Assessment Advisory Group leading on developing the new assessment arrangements for Wales, for his contribution in ensuring consistency with the wider assessment reforms.

**Routes for Learning Routemap**

The Routemap clearly displays that, although there are certain key milestones in development (the orange boxes) which every learner is likely to pass, there is more than one route between these. The route taken by an individual learner with PMLD will depend on a variety of factors including the nature of their impairments and the learning experiences which are offered to them.

The behaviours on the Routemap represent the earliest stages, or foundations of learning. Because it is focused on these very early stages, Routes for Learning assesses communication and cognition and the links between the two. The materials take account of typical development, but recognise that every individual will follow their own unique path.

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7 Some of the work carried out with the original version of Routes for Learning Routemap suggests that some learners, especially those with sensory impairments, may not achieve all the orange boxes in the expected order. This finding is consistent with research with learners with visual impairments which shows that these learners have particular difficulties with object permanence (Routemap box 33) (Bruce and Vargas, 2012).
pathway, and that for individuals with multiple disabilities some pathways or ‘routes’ may be very difficult, or even impossible.

Although each ‘box’ on the Routemap has a number, with behaviours which are developmentally earlier having lower numbers, these numbers do not represent an expected sequence in which behaviours are likely to be learned or in which they should be taught, rather, they provide an easy way to refer to the different behaviours. Development is not linear and insisting on all learners following the same steps despite their different abilities and disabilities is likely to be a barrier to progress for some.

**Routes for Learning principles**

The Routes for Learning materials have been developed with the following principles in mind.

- The focus is on the learner – on their abilities rather than disabilities.
- The main purpose of assessing a learner is to enable them to make the best possible progress in the development of skills, knowledge and understanding.
- The assessment is process-based and looks at the relationship between the learner and their environment.
- Learners should play an active part in the assessment process with the involvement of families and all professionals working within the support team.
- Staff undertaking the assessment should have a high regard for relationships, support interactive approaches and ensure a responsive learning environment.
- The assessment draws on many sources of information and is founded on research evidence.

The assessment should:

- empower staff and parents/carers to value all sources of knowledge about a learner and to share and feedback information in a clear and helpful format, including the learner if possible, to promote consistency between staff and others assessing the learner
- support practitioners and others in seeking evidence of learner progression, and help them to focus on next steps and priorities for future learning
- provide a whole picture of the learner and the learning process.

The learner is at the centre of this assessment which looks at the following elements:

- general information, e.g. who the learner is; how they react to certain staff, parents/carers or people who are unfamiliar to them
- specific information regarding the learner, e.g. their preferred language, barriers to learning such as medical conditions, sensory impairments, cognitive development
- environment, e.g. which type of environment the learner prefers (a quiet environment or a group situation)
- tasks and learning activities, e.g. how the learner reacts to different tasks or activities, the learner’s preferred channel of processing and means of expression
- teaching methods/resources and social teaching relationships, e.g. teaching methods that best suit the learner and the impact of relationships (i.e. does the learner respond more positively to certain members of staff?).
Assessment in the context of Curriculum for Wales

Assessment has been usefully described as ‘a process of on-going problem solving which increases participation and self-determination’ (Kefallinou and Donnelly, 2016). As such, assessment is central to responsive teaching. Learners should be involved in their learning and they should be provided with opportunities for choice and with motivating experiences. This will help to enhance their self-esteem, to support increasing independence and to empower them to gain more control over their further learning and their lives. High-quality assessment processes depend on participation and activity by practitioners who are well-informed and capable of taking professional decisions to meet the needs of their learners.

Assessment is intrinsic to curriculum design and its overarching purpose in the curriculum is to support every learner to make progress. It is the set of processes through which practitioners and learners recognise and support progress on an ongoing basis. It is integral to learning and teaching and it requires partnerships among all those involved, including the learner.

Assessment should always focus on moving learning forward by understanding the learning which has already taken place and using this to ensure that each learner is challenged and supported appropriately, according to their individual needs.

Assessment is not a ‘one-off’ event but a continuing process which involves a series of observations and gathering of a range of information about a learner’s progression over time, in different situations, with a variety of adults and peers. It is an integral part of an interactive learning process. Assessment processes involve:

- observing and collecting evidence of learning
- reflecting on and interpreting this evidence
- making, sharing and reporting judgements which reflect the broad range of curricular experiences
- planning the next steps in learning.

Assessment guidance within Curriculum for Wales

To support the progression of each learner, the Supporting learner progression: Assessment guidance (‘assessment guidance’) identifies three main roles for assessment for learners aged 3 to 16:

- supporting individual learners on an ongoing, day-to-day basis
- identifying, capturing and reflecting on individual learner progress over time
- understanding group progress in order to reflect on practice.

Further details regarding these aims can be found in the assessment guidance itself.8

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8 hwb.gov.wales/curriculum-for-wales/supporting-learner-progression-assessment-guidance
As practitioners in settings and schools make use of this assessment guidance, they should ensure that there is alignment and synergy across the aims and practice of assessment (Harlen, 2014) – with all assessment ultimately focused on providing high-quality learning opportunities and the best possible outcomes for all.

**Supporting individual learner progress on an ongoing, day-to-day basis**

It is a key principle underpinning the assessment arrangements for Curriculum for Wales that the purpose of assessment is to support the progression of each individual learner, identifying next steps in their learning and means by which these can be achieved. Used effectively for this purpose, assessment will inform all stages of planning and teaching. This includes initial planning within Curriculum for Wales, reviewing prior learning, identifying intended learning outcomes, developing stimulating learning activities, gathering evidence of learning, and planning next steps.

Supporting the progress of each individual is primarily addressed through ongoing assessment embedded in day-to-day classroom practice and in the processes of learning, which help identify learning progression, how progression has been achieved, areas for development, next steps and any support required to consolidate learning.

Wiliam (2013) has proposed that we must consider three key processes in learning.

1. Where the learner is right now.
2. Where the learner needs to be.
3. How to get there.

In so doing, he has stressed the need for practitioners to keep in mind what they will do with evidence before it is collected. The planning of effective and useful assessment cannot be separated from the planning of learning and teaching, rather it is a key aspect of this process.

As they plan learning activities, practitioners should explicitly identify clear learning intentions and focus on providing effective feedback, consistently, responsively and promptly, which will move learners forward. Practitioners should have regard to each learner’s preferred sensory channels and means of communication. Through these processes, practitioners will support learners to become more actively involved over time in their learning and ensure they have opportunities to make choices to increase their independence and self-determination.

The Routes for Learning materials are designed to support learning by helping staff to identify and gather evidence which will enable them to support each learner to move through a developmental pattern appropriate for that learner.

**Identifying, capturing and reflecting on individual learner progress over time**

Within the framework provided in the assessment guidance, practitioners will also support individuals’ learning and progression through processes of summarising, sharing and reporting on what each learner has learned over a period of time and how they have learned, including outcomes, processes of learning and support afforded.
This will support practitioners in identifying the progress being made by an individual learner over time and will, as appropriate, incorporate information which is indicative of:

- a learner’s experience of particular learning contexts
- learner interests and motivation
- frequency and typicality of learner’s response
- the learning style and strategies of each learner
- optimum teaching approaches
- type and form of support needed by learners.

Identifying and capturing progress should not focus on a series of steps related to a single task but should look at how this learning fits more holistically into the learners’ development and its relevance to their whole life.

This will provide practitioners with the opportunity to ‘stand back’, using information gathered across several occasions to support judgements and take a longer term view of planning. Gathering and evaluating a range of relevant information will result in well-informed planning for future learning, supporting learners to progress.

This process should, as far as possible, engage the learner in identifying and selecting evidence of learning and progression.

Summarising and reporting on learning and progression is central to communicating and engaging with parents or carers and, where appropriate, advocates. This engagement through the provision of information is both an end in itself and a powerful tool for supporting learning and progression through activities at home and in other contexts outside of school. It is, therefore, important that this engagement is well-informed. Valid and reliable summaries of learning and progression will also play an important role in discussions and collaborative planning with colleagues in other professions to provide the range of support appropriate to the learner. Such information will also support transition whether from class-to-class, school-to-school, school-to-college or to other forms of supported living.

**Understanding group progress in order to reflect on practice**

Assessment should enable practitioners and leaders within the school to understand the progress made within different groups of learners. This should be used to identify strengths and areas for improvement in both the school curriculum and daily practice, considering how the needs of learners as individuals have been met.

Such practice should support practitioners in extending the range of methods used to assess learners and the range of evidence on which they draw to build a picture of individual learner progression.

Evidence gathered to report on individual progress can support professional learning and inform the refinement and further development of resources, tasks and teaching approaches, the timing and pace of learning, the means by which feedback is provided to learners, and the ways in which learners’ responses are ascribed meaning.
Assessment in the context of Routes for Learning

The Routes for Learning assessment materials cover the key learning priorities for learners with PMLD (i.e. communication, social interaction and early cognitive development).

For learners working at very early levels of development, a holistic approach to learning is needed. As part of the ongoing assessment process, developmentally appropriate objectives can be set including the basic learning skills and essential cross-curricular skills of communication, early cognitive development, health and well-being.

The areas of learning and experience within Curriculum for Wales provide vehicles to achieve these objectives in the context of a broad and balanced curriculum, appropriate to the setting in which learners are being taught. The key focus must be on developing essential skills for learning and for life. Next steps and individual learner targets and objectives should be regularly monitored, evaluated, reviewed and refined to ensure that they remain relevant for the learner as they make evident progress towards achieving these or require further support towards achieving these or is ready to move on to the next steps in their learning. Consideration should be given to how to maintain progress as well as how to support further progress.

This approach represents a continuum of possibility rather than a simple linear process; learners may follow different pathways, make detours, proceed quickly in a spurt or occasionally regress in an aspect of learning. This approach will also support practitioners in making appropriate judgements relating to learners’ progress contextually on a day-to-day basis. This should inform the most appropriate learning experiences for the learner at that time.

Many learners with PMLD who show awareness of and begin to respond to stimuli as these become familiar to them may need time, when presented with a new experience, to become familiar with this before showing the same level of response and may therefore appear not to make further progress.

Over time, learners may show increasingly consistent responses and begin to generalise these in a wider range of situations and/or with different people, although fluctuations in performance are likely to continue. Extrapolating from judgements made about the achievement of a single small step within a sequence may be misleading; the learner may show some characteristics of performance on several different levels, which vary widely at different times and in different situations.

Evidence of progress

While the information gathered for learners with PMLD will differ in its learning focus from that gathered for many other learners, the same principles and purposes apply.

For learners with PMLD, the range of information gathered and analysed to establish progress in learners’ skills and capabilities will relate clearly to learners’ development and priorities agreed for their learning.
It may be evidenced, among other sources:

- through increased awareness and a greater range of responses leading to a higher level of engagement and participation
- by moving from use of near senses (tactile, proprioceptive, olfactory) and learning through sensation and movement to increasing use of more distance senses (visual, auditory)
- by movement through the communication continuum – from concrete modes (body language and use of real objects) towards more abstract (pictures, symbols and spoken word) (see Table 2 in ‘The communication process’ on page 39)
- by movement through the interactive sequence – from resisting contact with others through tolerance, passive cooperation and supported involvement to enjoying social interactions and experiences
- through a reduced need for support – moving from coactive involvement, physical guidance through gestural or verbal prompts towards natural cues and independence
- as learners extend their repertoire of learning positions (e.g. face to face, sitting, standing in frame)
- by a reduced need for ‘artificial’ reinforcement as learners become motivated by naturally occurring events and consequences
- as learners move from dependence on a secure and predictable routine to a greater degree of autonomy
- by a reduction in frequency and/or severity of behaviour that inhibits learning and an increase in more appropriate behaviour which promotes learning
- as learners learn to cope increasingly with frustration, failure and new, challenging situations (e.g. extending to new ways of learning)
- as learners follow the same pattern as for other learners but take longer
- when learners transfer learning between different contexts or use and combine skills in different ways
- when learners demonstrate the same achievement on more than one occasion, refining skills in a range of circumstances, situations and settings
- when learners decide not to respond.

The above points highlight that, far from being straightforward (i.e. all learners taking small steps following a pre-determined hierarchy of skills at the same speed), progress for learners is complex and may move in a number of directions. Progress (or lack of progress) in any of the above must be recognised and taken into account when planning future learning.

**Using Routes for Learning to support assessment**

Assessment should take place in an environment that is familiar to the learner and be carried out by familiar staff. The involvement of parents, carers and other family members should be encouraged at all stages because the behaviour of learners may vary at home or in the presence of family members. The family will know more about their child than can be ascertained from observations in school. Their input will be essential, as will contributions from the multi-disciplinary team supporting the learner.
Assessment will reflect careful observation of the learner in a wide range of contexts in school. Staff will note a learner’s responses to the planned activities of the class, recording and then reflecting as a team on responses which seem significant when considered against the specific boxes and milestones of the Routemap. The aim should be to build up a short narrative summarising evidence about the range of responses observed to date.

There will inevitably be more evidence for some boxes and milestones than for others and the process of gathering evidence may need to become more targeted. Starting at a box known to be within the learner’s capability, staff should set up appropriate activities, moving through the pathways until well beyond the point at which the learner appears not to respond (while remembering that not all boxes and milestones need to be achieved in a hierarchical sequence). Decisions about whether a particular Routemap box has been achieved or not should remain tentative and open to adjustment until evidence is clear and robust.

This process will help staff to identify landmarks which are realistic ‘next steps’ for the learner. These may then be addressed as targets in the individual learner’s plans. A target might be set for both ‘communication’ (boxes on the left of the Routemap) and ‘cognition’ (boxes on the right and centre of the Routemap) and may specify contexts. To the extent that evidence shows a learner is progressing, targets and next steps can be adjusted after a period to encourage more independent learning and to reflect new curriculum contexts.

Learners are encouraged to achieve each box and milestone in at least four different contexts. This means that a skill will not just be demonstrated in one curriculum area and then be deemed achieved, but that the learner is also encouraged to generalise their new skill across the curriculum. This will ensure that their progress does not appear to ‘plateau’, that they continue to achieve for longer and that skills are fully embedded.

As noted, there will be times when it is appropriate to stand back and identify and record a learner’s progress over time. It is not possible to do this by providing a summary score; the Routes for Learning materials recognise that the complex behaviours of a learner with PMLD cannot be adequately described in this way. A number of schools have developed approaches to identifying and recording assessment using Routes for Learning. One such approach is shown in the case study on the next page.
Assessments to supplement Routes for Learning

Few published assessments provide enough detail for children at this early level of development. One that does provide this level of detail is the Communication Matrix (Rowland, 2013) which assesses expressive communication from 0 to 24 months of typical development. It works by asking how the learner expresses each of four communicative functions – refusing things, obtaining things, engaging in social interaction, and giving or seeking information. From this, the learner’s communication is described according to seven levels from ‘Pre-intentional behaviour’ to ‘Language’.

Although originally published more 30 years ago the Affective Communication Assessment (ACA) (Coupe et al., 1985) can also provide useful information to supplement that gathered from parents, carers and others who know the learner well. The ACA was developed by Coupe and colleagues in a school context to fulfil the need for an assessment for learners at an early stage of communicative development. Through observation, they felt that sensitive communication partners could identify consistently occurring behaviours as a basis for programmes of intervention. This would then lead learners to extend their affective communication (i.e. where adults interpret and place communicative meaning on the learner’s responses to the environment) and move towards intentional communication. Stimuli that bring out strong positive or negative responses from the learner can be observed to determine their pattern, frequency and consistency. This observation can then be used as a basis for extending affective communication. Video or joint observation may be used and stimuli may need to be presented twice in succession with a pause in between to establish the consistency of the learner’s response. Following these initial observations, the strongest responses of like, dislike, want and rejection can be noted. Stimuli can then be re-presented and behaviours further analysed. It may be possible to identify clusters of behaviours which are reliably
linked to one specific interpretation of the learner’s response (e.g. dislike). Situations can then be planned to allow the learner to communicate with staff who are alert to the behaviours and able to respond in appropriate ways. This will increase the frequency and quality of the learner’s responses and shape the development of intentional communication.
Approaches to teaching

This section provides an overview of some of the theories and perspectives that have informed the ways learners with PMLD are taught. These are not necessarily mutually exclusive and can be regarded as different lenses through which to think about learners, observe their responses and plan their teaching. Following Burton and Sanderson (1998) the focus is on developmental, behavioural and functional perspectives. As this guidance is primarily for settings and schools, their ‘ordinary living’ perspective will not be considered here, but in line with much work in the years since Burton and Sanderson’s paper, the interaction approach will be included.

These different perspectives generate different ideas for both what to teach and how to teach. Each of these approaches are considered in turn, exploring how they help understand and plan for learners with PMLD.

Developmental approaches

Developmental approaches assume that all learners progress through roughly the same sequence of stages towards an end point. Many developmental theorists draw on and extend the stages and processes described by Piaget\(^9\).

Routes for Learning, as an assessment tool, can be seen as ‘developmental’ in its assumption about progression through a series of stages. So, assessment enables practitioners to identify developmentally appropriate targets and objectives for a learner.

Developmental approaches have some key principles that underpin how we should be assessing and teaching (adapted from Hodapp, 1990).

- Learners must be active participants in their learning.
- Learners’ behaviour is evidence of underlying cognitive schemes so learners’ behaviour gives insight into their underlying thinking and understanding.
- Developmental changes can be both quantitative (e.g. fixating for longer) and qualitative (e.g. approaching a task differently).

If adhering very closely to a developmental approach, practitioners would not attempt to teach a particular concept or behaviour until they were sure the learner had mastered all precursor behaviours. Sticking to this concept of developmental readiness too closely may prevent practitioners from trying to teach a ‘next step’ that the learner could achieve with creative approaches (e.g. teaching, use of technology, changes to the environment). Therefore, as with all the approaches described in this guidance, practitioners’ judgement is important.

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\(^9\) A readable description of Piaget’s theory of child development can be found at [www.simplypsychology.org/piaget.html](http://www.simplypsychology.org/piaget.html) or in Bates (2019).
Interactive approaches

Interactive approaches are based on the idea that much of our learning takes place in a social context, in interaction with a person (parent, carer, practitioner, sibling, peer) who is at least a little more advanced than the learner is. This concept comes from the work of Vygotsky\textsuperscript{10}.

Vygotsky, like Piaget, thought about children from a developmental perspective, but with the additional concept that learning was fundamentally social.

Vygotsky first proposed the idea of a zone of proximal development (ZPD). This is the zone of learning beyond which the child can succeed independently, but where they can progress with facilitation from the more advanced person. This might involve active support from this other person, or could involve changes in the environment, or support from technology.

Vygotsky’s ideas have been developed by more recent educationalists, most notably Bruner\textsuperscript{11}, whose concept of scaffolding is very similar to the ZPD, as structured interaction between a ‘practitioner’ and a learner which aims to enable the learner to achieve a particular goal.

According to interactive approaches, learning can successfully be achieved ‘in the context of an affectively rich and engaging interaction’ (Rogers and Dawson, 2009, pp. 25–26). The theory of inter-subjectivity as the way people understand and relate to one another can be relevant here. Trevarthen (2011) studied successful interactions between newborn infants and their primary caregivers and found that the caregivers’ responsiveness to babies’ initiatives developed shared understanding (inter-subjectivity), which he regarded as the basis of all effective communication, interaction and learning.

Interactive approaches can provide a broad framework for learning and encourage practitioners to move away from the teaching of small sequential steps. Over-reliance on predetermined small steps (such as those that may typically be part of a programme devised around developmental or behavioural principles) may distort individual priorities and narrow the curriculum taught. The main principles of interactive approaches are summarised below.

- Learning depends on good interpersonal relationships with sensitivity to feedback from the learner.
- The emphasis is on respect, negotiation and participation to motivate learners without the need for extrinsic (external or artificial) rewards.
- Teaching adopts a more holistic approach which often challenges breaking skills and content into small steps.
- ‘Tasklessness’ – the teaching process is as important as the learning outcome and open-ended and experiential activities should be scaffolded and extended.

\textsuperscript{10} www.simplypsychology.org/vygotsky.html or see also Bates (2019).
\textsuperscript{11} www.simplypsychology.org/bruner.html or see also Bates (2019).
Behavioural approaches

Behavioural approaches have a long history in special education (Bates, 2019), with their origins in classical and operant conditioning. Some key principles include the following.

- Practitioners should focus on observable behaviour rather than internal processes (note the contrast with the developmental approach).
- Learners' behaviour is understood as a function of reinforcement, both positive (adding something pleasant) and negative (removal of something unpleasant) and sometimes punishment.

‘Reinforcement’ means that behaviours that are followed by something pleasant happening or which avoid something unpleasant happening are more likely to be repeated. Consider the following situation. A child stops what they are working on in the classroom and starts to cry. As a result, the practitioner comes over and helps the child. The child stops crying. What is happening here in terms of reinforcement? The child’s behaviour (the crying) is being positively reinforced as she gained help from the practitioner as a consequence of crying. Therefore, the child is more likely to cry the next time they needs help with their work. At the same time, the practitioner’s behaviour (helping the child) is being negatively reinforced (the practitioner’s behaviour resulted in the avoidance of the unpleasant crying) and therefore the practitioner is more likely to come over to the child and provide help the next time they cry. It is important to remember that learning through conditioning happens for both the ‘learner’ and the ‘practitioner’.

Strict adherence to a behaviourist approach can risk a mechanistic view of learning and teaching, with an assumption that anything can be taught if we can break tasks into small enough steps and find the right reinforcer. Behaviourism has often been criticised for teaching context-limited skills in highly structured environments, using unethical principles (e.g. very intensive intervention or punishment) and off-putting, dehumanizing language (e.g. aberrant/maladaptive behaviours), but current approaches to behaviourism have moved on in positive ways.

Behavioural approaches provide us with several techniques for teaching, such as reinforcement, task analysis, prompting, modelling and shaping (Browder et al., 2014; Cooper et al., 2007; Richman, 2001). It is very important that any teaching targets are functional and relevant to the learner.

Behaviourism also underpins two approaches which are used with children whose behaviour is challenging.

- Early Intensive Behavior Intervention (EIBI) often known as Applied Behavioural Analysis (ABA, which is its underpinning theory).
- Positive Behaviour Support (PBS).

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12 www.simplypsychology.org/operant-conditioning.html or see also Bates (2019).
EIBI is used particularly with autistic children, and involves trained staff delivering individualised function-based behaviour plans. PBS focuses on creating supportive environments, improving quality of life and teaching new skills to replace the behaviours that challenge.

**Functional approach**

The functional approach is much more practical and less theoretically based than the three just described. This approach emerged as an argument against a strong developmental approach, which implies that we have to wait for learners to be developmentally ready to learn next steps.

A functional approach suggests a focus on:

- practical support for activities that are relevant and meaningful for the learner
- teaching activities that are functional (have some use) for the individual
- all teaching, therapy or intervention taking place in a real-world setting (ecologically valid).

At early stages of learning, practitioners might want to give learners experience of trying these activities in a safe, carefully managed version of a real-world setting, in the way we might role-play activities before trying them in a real context. The focus is often on working out what practitioners need to do to ensure success in that moment and the role of the practitioner (or of assistive technology) is to ‘bridge the gap’ between what the person can currently do and the skills that are ‘necessary’ for the task (Beadle-Brown, Murphy and Bradshaw, 2017).

This approach suggests that, when identifying an objective or a target for teaching, we should always ask whether it has some value or use for the learner.

**Summary**

These four approaches to teaching – developmental, interactive, behavioural and functional – are all part of the practitioner’s ‘toolkit’. Each has strengths which support different contexts and demands, and can be used in a complementary way.

The following key points derived from these approaches are all important to consider.

- Learners’ active engagement is important.
- Responsive relationships between the learner and the practitioner support learning.
- Teaching approaches should maximise feelings of success.
- Teaching objectives or targets should have utility or value for the learner.
Use of assistive technology in teaching

The importance of ensuring that all learning targets and objectives are of value for the learner also applies to the use of technology. It is important that any technology employed supports the learner.

Assistive technology can be defined in many ways. The British Assistive Technology Association says:

Assistive technology is any product or service that maintains or improves the ability of individuals with disabilities or impairments to communicate, learn and live independent, fulfilling and productive lives.

This definition links assistive technology to broader issues in the lives of learners including those with PMLD. In this case, assistive technology should aim to help learners participate more actively and contribute to the communities in which they live. Assistive technologies, therefore, play an important role in widening access and offering opportunities for inclusion.

When using assistive technologies to address the needs of learners ‘[assistant] technological devices are expected to promote forms of adaptive responding (e.g. control of environmental events/stimulation, communication, indoor travel, and constructive activities) by bridging the gap between the person’s behavioural repertoire and the abilities required for the adaptive responding being targeted’ (Lancioni, Singh, O’Reilly, Sigafoos, Oliva, 2013).

Importantly, technology should be assistive and allow greater access for each individual learner to achieve educational and curricular goals. This may be through the use of well-designed support programmes that focus on the use of the technology to allow progress along a curricular path or through the training of practitioners and facilitators to design lessons that use assistive technology to achieve clear curricular goals.

One example of this within the context of Routes for Learning is the use of technologies such as eye-tracking devices in making progress towards Routemap milestone 22 (Contingency responding) and Routemap milestone 25 (Contingency awareness).

Along with literacy and numeracy, digital competence is a cross-curricular skill that is embedded across Curriculum for Wales\(^\text{13}\). In light of this, the role of assistive technology for learners should allow meaningful engagement with the curriculum as a whole. Techniques required in order to use the technology itself should not become the sole focus of the learning (Hayhoe, 2014; Lancioni et al., 2013).

Some researchers suggest that assistive technology and devices should be used alongside more traditional educational resources, rather than as a replacement for them.

\(^{13}\text{The National Literacy and Numeracy Framework and the Digital Competence Framework have been updated and are available as guidance to support schools when planning opportunities to develop these skills across the curriculum.}

[wb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks](http://wb.gov.wales/curriculum-for-wales/cross-curricular-skills-frameworks)
For example, if the learner’s motor skills allow for actions, such as banging on a drum, this should be used as well as generating an electronic noise of a drum by pressing a switch.

Different forms of assistive technology can be used to support learners. Examples of devices that may be used within schools can include the following.

**Communication**

- Resources that focus on access and support motor function skills and communication, including modified keyboards, electronic pointing instruments (including eye-tracking devices) and on-screen keyboards.
- Speech-generating devices that can translate gestures into verbal expressions and requests (voice output communication aids (VOCAS)).
- Text-to-speech devices and apps/software that can help to raise learners’ awareness of written text and can support the development of literacy skills.

**Cognitive**

- The use of switches or micro-switches and micro-switch clusters help learners to influence aspects of their environments through small gestures, allowing development of contingency awareness and interaction in the form of noticing and reacting to cause and effect.
- Devices that guide exploration of the learners’ environment, e.g. interactive tiles in sensory rooms can help learners to develop their spatial awareness.
- Devices that can display pictures and sounds (e.g. via touchscreens) can be used in supporting decision-making and completing multistep activities.
- Mobile devices, e.g. tablets, can offer opportunities for learners to interact with a screen from a variety of positions, e.g. when sitting or lying down.

The above examples are not exhaustive and, due to the rapidly changing nature and availability of technology, may constantly be replaced by newer, cheaper and more accessible hardware, software and supporting educational programmes. The recent advances in mobile technology have greatly expanded opportunities for inclusion offered by mobile devices and tablets (Hayhoe, 2014).

Some of the transformative effects of using assistive technology in supporting progress

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**Case study**

A learner (age 6) suffered multiple profound injuries including brain damage as a result of a road traffic accident. After living in hospital for over a year, the learner moved to a new house with his family and began attending the local special school.

It was extremely difficult to ascertain the level of his understanding. He was unable to move any part of his body other than his eyes. It was presumed by many that he had extremely little receptive language skills.

The special school held a multidisciplinary trial day for a new piece of eye-controlled assistive technology. After problem-solving with many positioning issues, for both the equipment and the learner, school staff managed to get the computer to recognise where he was looking.
towards specific learning goals can be seen in the following case study.

Further examples of practical suggestions for the use of assistive technology within classrooms include the following.

- In order to allow for learners to explore issues related to cause and effect (linked with Routemap milestone 22 (Contingency responding) and Routemap milestone 25 (Contingency awareness)), technologies such as eye-tracking devices, touchscreens, tablets, switches and sound bars can be used to encourage learners' exploration of, their interaction with, and effect upon the environment. Practitioners will be aware of the need to consider the accessibility of these devices to learners, and will plan for a variety of means by which the learners can use them. This may include the use of feet rather than hands, by tilting plasma screens to allow for head movement to activate device features or by the use of sound bars in order to facilitate the progress of visually impaired learners.

- In order to allow for learners to show clear choices between more than one option (Routemap milestone 35 (Selects from two or more items)), switches can be positioned on the learner's tray, or, for learners with mobility issues, alongside each cheek so that head turning or movement can activate the switch. In this way, the technology allows the learner to respond to 'Yes'/'No' questions by activating the switches, providing evidence of progress towards achieving Routemap milestone 35.

- Providing that the learner has achieved Routemap milestone 33 (Object permanence), assistive technology can offer learners the opportunity to express a preference for an object not present via symbolic means (Routemap box 40), again by the use of switches. Rather than simple 'Yes'/'No' switch responses, the devices can be programmed to present an image or noise related to something that the learner likes and, alternately via the other switch, something that they dislike. By closely watching the learner as they activate the switches, practitioners can make judgements regarding issues related to object permanence, whether meaning has been attached to the noises and images activated by the learner choosing and activating the switch, etc. These can be explored further by swapping the positions of the switches and watching the learner's reaction to the effect of the switch in the new position. Success in achieving this goal will be demonstrated by the learner selecting the object or stimulus that they prefer following the changes to positioning of the switches. This activity can be replicated by using a variety of technologies, including touchscreens, apps on tablet
devices, etc., and can be expanded upon by offering more than two options, e.g. within a variety of images on tiles presented on touchscreen devices.

- Interactive tiles in sensory rooms, or on sensory flooring, can support the exploration of cause and effect, leading to understanding of the contingency upon the environment, by means of technology and responses to physical movement.

The aims and intended consequences of the use of assistive technology in classrooms are to reduce reliance on practitioners and supporting adults for care and stimulation and move towards a greater degree of autonomy by learners. This can be gained through the use of devices that allow learners to influence their environment, e.g. by controlling some features of their input into interactions, by exercising decision-making, and by enhancing and adapting communication (Lancioni et al., 2013). Use of the Routemap to support specific planning of the use of these technologies, and for the subsequent recording of achievements facilitated by these devices, allows learners to make progress in their learning.
Curriculum for Wales

The Curriculum for Wales Framework has four purposes at its heart, designed to support all learners to develop as:

- ambitious, capable learners, ready to learn throughout their lives
- enterprising, creative contributors, ready to play a full part in life and work
- ethical, informed citizens of Wales and the world
- healthy, confident individuals, ready to lead fulfilling lives as valued members of society.

The four purposes have been elaborated in terms of their key characteristics\(^\text{14}\).

In developing their vision for their curriculum, schools and practitioners should consider what the four purposes mean for their learners and how their curriculum will support their learners to realise them. Making progress in relation to these purposes will be a challenge to some learners, for example those with chronic health and/or life-limiting conditions. Therefore, schools should discuss with parents/carers and other members of the multi-disciplinary team, realistic ambitions that reflect the needs, interests and aptitudes of learners.

It is important that learners are given the opportunity to overcome barriers and low expectations caused by societal attitudes and beliefs. They should be supported to take part in a range of age-appropriate activities with other learners – and with family – to achieve valued outcomes.

The Curriculum for Wales guidance will support schools in Wales to design their curriculum. This guidance, along with the proposed statutory framework, has been developed to provide broad direction at a national level, while enabling flexibility for schools’ curricula that are appropriate to specific contexts and each learner. This enables schools to focus on the communication, cognitive skills and sensory abilities which are fundamental for many learners with more complex needs. The six areas of learning and experience provide the context for such learning.

The Curriculum for Wales guidance supports all learners to progress along a continuum of learning, although some may progress more slowly or quickly than others. It is recognised that learners with additional learning needs (ALN) may face particular barriers to their learning, some highly complex, which lead them to take different routes and detours in their learning journey. Some learners may progress within the Routes for Learning Routemap for the majority or all of their curriculum learning journey.

The progress of all learners should be shared, acknowledged and celebrated. Some learners will have conditions which mean that, for them, progress consists of maintaining skills which might otherwise be lost as their medical condition(s) changes. Success for these learners may sometimes consist of being supported to continue participating in a favourite activity, despite the loss of skills. These achievements, and the part that skilled practitioners have played in enabling them, should be acknowledged.

\(^{14}\) hwb.gov.wales/curriculum-for-wales/designing-your-curriculum
A school’s curriculum should be based upon evidence of how learners (in particular those with multiple disabilities/sensory impairments) progress in their learning and how to move them forward, overcoming any particular barriers that they might experience.

**Curriculum design and planning**

Learners with complex needs can acquire skills that will allow them to participate in a variety of environments and activities – but they will need support and adaptations to do so. This principle has been termed ‘partial participation’ (Baumgart and colleagues, 1982). They also point out that the following ways of planning for learners with complex needs can limit expectations and participation:

- the developmental age model when the curriculum is planned for learners as if they were much younger
- the ‘all or nothing’ model when practitioners need assurance that a learner can acquire skills in an activity before undertaking instruction
- the independent performance model which requires the teaching of ‘steps’ leading to a skill that should be performed independently without assistance/supervision – or simpler skills selected as the target
- the pre-requisite skill model which says that certain skills must be mastered before others are taught or access to certain environments allowed.

Ferguson and Baumgart (1991) highlight that learners should be supported to take an active role in their learning and that decisions about their participation should consider the views of learners and their families. They note that schools should ensure that curriculum experiences are coherent and do not become fragmented. Finally, they should always be open to the unexpected.
A focus on learning

Learning to learn at the earliest stages of development

Learners with PMLD working at the earliest stages of development may be using one of the following approaches to learning.

Habituation

This occurs when a regularly presented stimulus eventually fails to gain a response as the learner grows used to it. A small change in the stimulus will again trigger the response. This provides evidence of learning as the learner shows sensitivity to and memory of the properties of the stimulus (e.g. sound and movement patterns). It is useful to note how quickly the learner responds again – and how the features of the stimulus were changed to recover their attention (see Routemap box 4.)

Early associative learning

This occurs when learners learn to anticipate a significant event through an earlier cue, which can be reliably associated with it. For example, the learner hears a minibus arriving and gets excited knowing that they will be going home. This again shows sensitivity to events and indicates the possibility of prediction developing at a later stage.

Operant learning

This occurs when the consequences of an action alter the probability that it will be repeated. For example, a learner hits a toy, which plays a tune. This increases the likelihood of the learner hitting the toy again as they begin to make the link between the stimulus and the response. A learner may also stop an action to prevent a negative consequence (e.g. touching a toy triggers a loud, frightening noise, so the learner doesn’t touch it again).

If learners are observed closely during these learning processes, practitioners will be able to gather evidence about the learners’ level of awareness of events around them. The way learners respond can provide us with further knowledge and understanding about their memory, preference for different sensory stimuli, ability to associate cues with events, the ability to anticipate and predict and, finally, the ability to influence events in their immediate environment.

Early responses may include ‘stilling’ (a momentary ‘freeze’), a change in breathing pattern, tensing or relaxing, pupil dilation or eye movements, change in facial expression, vocalisation or movement of mouth, hands or feet. If learners are being filmed, staff need to ensure that these often small and barely perceptible responses are visible (Routemap box 1).

As responses become more pronounced and more consistent and learners begin to act independently in their environment, greater accuracy should be expected, as learners begin to refine their actions and become more specific in their intentions. This could, for example, be a learner moving from an accidental swipe at a toy to a more focused aim (Routemap box 18).
It is important to establish:

- that a response is intentional and not reflexive, e.g. a startle
- that a response is directly linked to the stimulus and not a response to staff actions
- exactly what qualities of the stimulus lead the learner to respond.

It is essential to involve the learners and follow their lead. Any preference (e.g. for a certain type of music) expressed by the learner should be incorporated into the learning opportunities. It is equally important to notice and respond to behaviour that may signal rejection or the learner’s wish to stop an activity (Routemap box 10).

Haring, Liberty and White (1981) described the following hierarchy of skill development.

- **Acquisition** – in which learners learn correct new responses through demonstration, modelling or physical prompting with an emphasis on developing accuracy. At this stage learners need a great deal of support.
- **Fluency** – in which learners, through repeated opportunities, reach a level of mastery combining speed and accuracy. The action still takes time to complete.
- **Maintenance** – in which learners consolidate and maintain a high level of competency and fluency over time by learning through repetition and familiarity. They will remember how to do the task after a break.
- **Generalisation** – in which learners develop and achieve mastery in different settings or contexts, with different stimuli or materials, or with different staff.
- **Application or adaptation** – in which learners recognise similarities and differences between key elements of new situations and select appropriate responses, adapting their established skills and understanding to new problem-solving opportunities.

The application of skills developed and consolidated in this way in different situations can support problem-solving and self-directed learning. Moreover, learners must be given carefully planned opportunities to move through this sequence with each new skill, without losing spontaneity and creativity.

**Some key principles for effective learning**

Work in the neurosciences (Organisation for Economic Co-operation and Development (OECD), 2007) has provided us with a clearer insight into how people of all ages learn.

Although there appears to be no neuroscientific research which specifically examines learning for learners with PMLD, some important general principles for effective learning have emerged.

- The quality of social environment including interactions, nutrition, physical exercise and sleep all contribute to the functioning of the brain.
- Learners need to be in an alert state in order to be in the best position to learn.
- There is a close link between the emotions and cognitive performance.
- Learners need to feel secure with the people around them. They must feel safe and be positioned comfortably.
The quality of the environment is important for brain functioning.

The importance of the role of social interactions in the education of learners with PMLD is hard to over-estimate. However, other environmental factors are also important. Learners with PMLD may experience poor sleep patterns for a variety of reasons, and physical disabilities often mean that participation in physical activity is extremely difficult. Similarly, eating difficulties may make the provision of adequate nutrition difficult for some individuals. The learners’ immediate surroundings must also be considered to ensure that they are not overloaded with too many stimuli at any one time. Physical factors (e.g. thirst, hunger, fatigue) and factors affecting emotional state (e.g. attending respite care) should also be recognised so that learners are emotionally and physically ready to learn.

Learners need to be in an alert state in order to be in the best position to learn.

The best times for learning are when the individual is alert or focused on the environment (Guess, Roberts and Guy, 1999; Munde, Vlaskamp, Ruijsseenaars and Nakken, 2009). At times of very high or very low arousal, learning will not be effective. A wide range of factors impact on the level of arousal of the individual (Munde, Vlaskamp, Ruijsseenaars and Nakken, 2009). These include internal factors (such as hunger, tiredness, discomfort and state of health) and environmental factors (such as noise, light, temperature and movement). Learners’ ability to attend and learn may also differ with the time of day due to biorhythms. Levels of hormones, such as cortisol and adrenalin, vary throughout the day and affect learners’ states of alertness. Blood sugar levels may also have an effect. For some tube-fed learners, it may be necessary to select optimum times for learning around feeding routines. Other learners may have conditions (e.g. epilepsy) which could require them to take medication with side-effects such as drowsiness or mood swings.

Learners’ receptiveness to stimulation may depend, at least in part, on their bio-behavioural state. The term ‘bio-behavioural state’ refers to the level of arousal of the central nervous system. There are several different ways of talking about levels of arousal; however, that used by Vlaskamp and colleagues has been devised specifically for learners with PMLD.

They describe four main levels of alertness:

- active, focused on the environment
- inactive, withdrawn
- sleeping, drowsy
- agitated, discontented.

(Vlaskamp, Fonteine, Tadema and Munde, 2010)

Recent research suggests that learners with PMLD may cycle through different states of alertness quite rapidly in some circumstances and that different types of stimuli (visual, tactile, auditory, vestibular) may affect learners’ patterns of alertness in different ways (Munde, Vlaskamp, Maes and Ruijsseenaars, 2012). It is important to observe learners closely to determine their pattern of responses, and the factors that affect these in order to recognise and capitalise on the best times for working with each learner, and to stimulate alertness where possible.
The link between emotions and learning

An appropriate level of demand can lead to better cognition and learning, but beyond a certain level it has the opposite effect. In situations of excessive stress or intense fear both social judgment and cognitive performance suffer. On the other hand, the brain responds very well to ‘the illumination which comes from the grasp of new concepts’ providing strong motivation for learning (OECD, 2007 p.2.). This experience of enlightenment may be part of the reason why acquiring contingency awareness is such a critical step.

Over time, staff will begin to take all these factors into account in order to recognise and capitalise on the best times for working with each learner.

Sensory stimulation and the brain

For learners with PMLD, the level of stimulation will need to be more carefully controlled than for other learners. Some may find difficulty in responding to stimuli through competing sensory channels. For example, a learner may be unable to carry out a tactile (touch) search while listening to the practitioner talking. In the early stages of development, it may be appropriate to limit input to one sense only.

Seven major types of sensory input to the brain have been identified. In addition to auditory, visual, tactile (touch), olfactory (smell) and gustatory (taste), Rosen (1997) adds the vestibular sense (a sense of balance, speed and direction) and the proprioceptive sense (a sense of the position of the body in space). Proprioception and kinesthesis are often used interchangeably. Proprioception describes the sensations received by proprioceptors within the body – in the muscles, tendons, joints, inner ear – which inform us about the movement of our body and relative position of individual body parts. Kinaesthesia describes how we sense the position of our body when moving through space or the movement of individual body parts in relation to one another.

Brown, McLinden and Porter (1998) also include sensory input to the homeostatic system. The homeostatic system relates to the maintenance of internal equilibrium within the body (e.g. regulation of body temperature) but it also has a role in maintaining a stable state when, for example, we are stressed, or even under-stimulated.

Stimuli to any of these senses should be carefully selected according to purpose. Orelove and Sobsey (1996) divide stimuli into ‘alerting’ stimuli, which raise levels of arousal (but risk fear/anxiety), and ‘discriminating stimuli’, which prepare learners to notice similarities and differences (see section entitled ‘Learners need to be in an alert state in order to be in the best position to learn’ on page 26). To avoid ‘overload’, staff should use simple communication strategies at the appropriate level. Environments such as light and dark rooms should be used with care and with a clear focus on the purpose and complexity of activities. Care is also needed in the use of equipment to encourage interaction with the environment, such as little rooms and resonance boards.
Input needs to be carefully structured and linked to prior learning and experience.

Learners must be helped to build the concepts that are fundamental to early learning (shown in orange boxes on the Routemap). The following are of particular importance.

- Contingency responding – the learner realises that performing a particular action causes an effect but has not yet made the 1:1 association (i.e. one switch press = one response).
- Contingency awareness – the learner knows that one action will cause one particular response to happen.

Contingency awareness is also referred to as the development of cause and effect, or the development of a sense of agency.

In order to achieve contingency awareness, learners need something that they find rewarding, an action that they can perform and an ability to repeat this action while they can still remember the effect it had on the previous occasion. At this stage, the learner’s memory is likely to be shorter than seven seconds and staff should take this into account in their planning.

When contingency awareness has been achieved, as stated above, the learner will associate a particular action (e.g. switch press) with a single reward. It is also likely learners who have achieved contingency awareness will show signs of pleasure or excitement indicating that they are aware that it is their action which has caused the reward. For example, a learner hitting the switch more frequently in an attempt to gain more responses/rewards (and continuing to hit the switch while the reward is still operating) is probably demonstrating contingency responding and not contingency awareness (see videos for Routemap milestones 22 and 25).

For learners who have achieved contingency responding and who hit a switch frequently (with a physical action that they find relatively easy), the development of contingency awareness may be helped by using a switch that is harder to operate. This slows down the rate of responding and increases the effort or cost involved.

A further key concept is that of object permanence, the understanding that an object continues to exist even when it is out of reach of the learner’s senses (vision, touch, hearing). Once achieved, the learner has a mental perception of the object and will, for example, search for it in places it may have fallen to if it is moved out of reach or sight.

When introducing new areas of learning, experiences should be carefully planned to build on those that are familiar to the learner. The various aspects of the learning experience can then be gradually and systematically changed or extended.

To help learners distinguish, stimuli will need to be made more salient (obvious), increasing differences between them. Ware (2003) suggests opportunities of how to provide a more responsive environment for learners with complex needs.

As these learners are often slow to respond to stimuli, parents/carers and practitioners need to allow adequate ‘waiting time’. If such time has not been provided, the learner may have missed some of the experiences that foster early development.
Learners need immediate and consistent feedback on their responses.

Many learners with complex needs will have had limited feedback from their activities and may be in a state of ‘learned helplessness’ arising from their lack of control over their lives. This in turn may lead to the development of stereotyped behaviours.

Suggestions for teaching, which include ways of sharing information with the learner, are included in the Routes for Learning videos\(^\text{15}\). Such strategies may include using structure and cues to help prediction of regular events, providing opportunities for negative responses or a choice of whether to stop an activity. It is essential that responses which may signal rejection are responded to appropriately.

Some early reflexes may still be present even in older learners.

Reflexes such as the asymmetric tonic neck reflex, moro or startle reflex may be present. Reflexes for sucking and swallowing may be affected in some learners, leading to feeding difficulties. Different approaches may be necessary to take account of these reflexes; specialist advice should be taken from physiotherapists, speech and language therapists, parents, carers and others with close knowledge of the learner. Learners will learn best when the inputs from the trans-disciplinary team, parents and carers are coordinated to ensure a cohesive synthesis between education, therapy and care to meet their individual needs.

Transfer or generalisation of skills often requires specific attention.

Skills taught in one setting or context or by a particular member of staff may not readily transfer to other settings or people. It may be necessary to re-teach a behaviour or skill in the same way in all settings, with various staff/resources to ensure that the learner is able to use the skill more widely. The ability to generalise skills will represent real progress for many learners.

Attention should be paid to early affective, spiritual and emotional development.

Staff may notice learners responding to naturally occurring stimuli, such as sunlight shining onto their face. Learners may show ‘awe and wonder’ or what has been described as a ‘whole-body smile’. Learners may also respond to family or community events (such as displays of lights at Christmas, or the special atmosphere of celebration at Eid). It is not always possible to plan for such responses – they occur unexpectedly – but they do show the importance of providing opportunities for inclusion and time for exploration in a range of environments, including natural environments.

\(^{15}\) Examples of these videos can be found at [hwb.gov.wales/curriculum-for-wales/routes-for-learning](http://hwb.gov.wales/curriculum-for-wales/routes-for-learning).
Barriers to learning

Many learners with complex needs will have difficulties with vision and hearing, or both\(^{16}\). Discussing these difficulties as secondary to a 'main presenting need' of profound learning disability diminishes their significance for the learner because they may indeed ‘compound, exacerbate or even cause physical, cognitive or social problems’ (Hodges and McLinden, 2015, p.153). For others no diagnosis may have been made. Specialist assessment and advice can help to explain the complications and mitigate the impact of sensory impairments. For learners with PMLD, vision and hearing function is also highly likely to be dependent on their internal state, and the suitability of the environment (e.g. lighting and noise), as well as fluctuating in relation to the condition itself (cerebral vision impairment, middle ear conditions). It may therefore vary widely from hour to hour and day to day.

For all learners it is important to discover and then use their most effective learning channel – the kind of materials, activities and events that they are most responsive to, and whether these relate to sound, visual stimuli, tactile stimuli or movement. For learners with sensory impairment, it is not necessarily true that the impaired sense is the least effective; learners may still find it the most useful. Learners who have remaining vision or hearing will also need staff to provide structured programmes to help them learn to use their senses and experiences in a way which widens their understanding of sensory information in their daily lives. Learners with PMLD who at first appear to have no useful vision or hearing can sometimes learn to respond to new sensory input.

Learners with sensory impairments may develop in different ways to learners without sensory impairments – or may miss certain key developments. Visually impaired learners may not be aware of the wider world, e.g. they never see things being taken out of and returned to cupboards. Things put into their hands come from ‘nowhere’ for them and so they may throw them back into that empty space. Specialist techniques such as tactile search may need to be introduced. Hearing impaired learners may not ever see adult models of communication such as they use; if staff do not use symbols, signs or objects in their own communication. Sense of self and sense of agency are also slower to develop when the results of their own actions may not be easily perceived – they cannot hear the sound of the object they have dropped or see the movement of the toy in their hand.

Aitken and Buultjens (1995) have provided an enduring framework for levels of responsiveness to sensory stimuli.

- **Awareness** – an inconsistent response to a stimulus which indicates a change in the environment but no specific response to that stimulus.
- **Attending** – a more specific response which shows the beginning of some discrimination between stimuli and to attend to them.
- **Localising** – (not necessarily about being able to ‘find’) a consistent response to the stimulus such as turning towards it.

\(^{16}\) A short summary of vision and hearing impairments can be found in Appendix 2.
- Recognising – understanding some consistent features of the stimulus and having a mental representation such that this carries over from event to event.
- Understanding – recognising the stimulus and linking it to the features or activities of the event.

**Tactile learning**

Many learners with PMLD may find learning through touch and movement an effective and efficient learning channel, however this needs to be carefully managed. While it is not possible to ensure that a learner ‘looks’ or ‘listens’ their hands can be manipulated, and thus it appears that they must be learning. This however is not effective perceptually (it is extremely difficult to learn through having hands manipulated by someone else) (Nielsen, 1996; Miles, 2003) and can create additional barriers because learners find this manipulation unpleasant and in fact learn instead to resist or withdraw their hands (‘tactile defensiveness’).

Instead, learners need to be encouraged to be tactile tolerant, taught to explore tactually, using their own hands and provided with multiple opportunities to use their senses, including touch, to find out about the world. Using hand-under-hand techniques (Miles, 2003) is the recommended way of helping learners to develop tactile techniques at their own level, without the practitioner taking control of the learner’s hands. For some learners with physical disabilities these techniques will need to be adapted to support the learner, e.g. with support at elbow to release hands.

Learners at early stages will need to develop skills, including the tolerance of using touch in different situations, while developing discrimination between touch sensations which allows them to decide whether to touch or not.

Some learners will use their mouths to help them discriminate, as the lips and tongue have many tactile receptors. It is important to understand why the learner may put something in their mouth and not simply discourage all exploration using the mouth as ‘mouthing’ (of course, taking into account health and safety issues). Other learners may learn to tolerate using their feet or other body parts which are less intrusive on their control before they can use their hands.

Tactile senses are close senses and may be more developed at an early age, and so more accessible for learners with profound disabilities. They may be an effective way of promoting responses. Tactile perception is divided into active touch and passive touch – that is, touch learning which is based on being touched and touch learning which is based on actively touching, usually with hands (but also with feet, or mouth for example).

Where a learner is able only to have an object touch them, they will get limited information about its properties, e.g. temperature, movement and wet/dry. Unsupported holding (feedback on muscles from holding or lifting an object) gives information about weight, and squeezing about hardness. Moving fingers over an object gives information about texture, and holding it in a hand gives information about size. The ability to follow the contours with a hand or finger maps size and shape. The use of both hands together allows the synthesis of different sections and the ability to make a whole (McLinden et al. in press).
In order to provide meaningful touch experiences and to promote learning it is important to consider how the learner experiences touch given their current ability to manipulate objects. For example for learners who cannot move their own hands, tactile discrimination between experiences which are cold and warm, wet and dry, and moving or not will be the most appropriate and for those who have some movement, texture and size can be included. Attempts to discriminate based on shape and detail (e.g. recognising objects) will be limited to those with good independent hand movements.

To ensure good access to learning through the senses, learners need to be appropriately positioned and supported, thus enabled to attend to using their senses. The sensory properties of the items and activities need to be matched to the learners’ needs, in terms of what they are able to perceive (e.g. sound levels, manipulation abilities, colour and size). The presentation of items and activities needs to be appropriate for the learner; some will need quiet to discriminate sounds, some will need items presented to their left hand for long periods to encourage response, some will need shiny, moving objects.

In the table below (Table 1), McLinden and McCall (2002) outline the following exploratory procedures and the sensory information acquired through them.

<table>
<thead>
<tr>
<th>Lateral motion (rubbing finger across surface of object)</th>
<th>Texture</th>
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</thead>
<tbody>
<tr>
<td>Pressure (squeezing, poking)</td>
<td>Hardness</td>
</tr>
<tr>
<td>Static contact (fingers resting on surface)</td>
<td>Temperature</td>
</tr>
<tr>
<td>Enclosure (holding/grasping)</td>
<td>Shape/size/volume</td>
</tr>
<tr>
<td>Unsupported holding (holding in hand)</td>
<td>Weight</td>
</tr>
<tr>
<td>Contour following (tracing along contours of object)</td>
<td>Global shape, exact shape</td>
</tr>
</tbody>
</table>

(Learning through touch: supporting children with visual impairment and additional difficulties (2nd edition) Mike McLinden, Stephen McCall and Liz Hodges. Copyright © Mike McLinden, Steve McCall and Liz Hodges. Routledge CRC, reproduced by permission of Taylor & Francis Books UK.)
Stereotyped behaviours

Stereotyped behaviours or repetitive gestures should be closely observed to try to find out the purpose that they serve. They may have originally been communicative or exploratory but they may have become habitual. They may also be used to block out confusing stimuli and may provide clues to the learner’s emotional state.

Lee and MacWilliam (2002) suggest that when children start to use these gestures to communicate there is less likelihood of them becoming obsessive or ritualistic as they will have acquired meaning.

These behaviours may be extended and linked to similar movements or objects. For example, for a learner who waves his hands to get a visual effect from bright light, a spinning toy may be attractive; for a learner who rocks, a swing may provide similar sensory feedback. Stereotyped movements can be used as the basis for interaction as adults can join in with the movement or use the rhythm to interact by tapping the learner or using musical instruments.

Motor impairments

Many learners with PMLD will have significant motor impairments which create substantial barriers to their learning. Traditionally, early developmental checklists assume that infants’ physical development will proceed smoothly enabling them to reach, grasp and manipulate objects, mobilise to explore their environment and to develop control of speech musculature. However, conditions such as cerebral palsy present enormous challenges in all of these areas.

Muscle tone in cerebral palsy may be very high, low or constantly fluctuating, making it extremely difficult for a learner to keep head (and body) in a stable and appropriate position for learning. They may be unable to extend their arms or open or close their hands to grasp objects. Furthermore, primitive reflexes may interfere with any voluntary movements and the learner may perceive sensations as unpleasant (see the reference to tactile defensiveness in the ‘Tactile learning’ section on page 31). Learners’ interactions with their environment are therefore likely to be less predictable as well as severely limited in number. Being unable to mobilise independently further reduces their scope for learning about the world. Conceptual development relies on learners having repeated, predictable experiences and is therefore likely to be adversely affected by all of these factors.

In their communication, learners may have great difficulty controlling vocalisations, facial expressions, gestures and pointing, making their communicative attempts very difficult to interpret. Experiencing less success may in turn cause learners to make less attempts at communication.

A team approach to planning is essential if these barriers to learning are to be addressed. Planning should aim to ensure that equipment is always suited to the current needs of the learner and that physical and learning needs are as integrated as possible. Learners with complex physical impairments are likely to have a postural management programme involving a range of seating and other postural supports. Good team planning will ensure that a specific position prescribed in the postural programme (e.g. lying on a prone wedge) is matched to a curricular task facilitated by that position (e.g. exploring the shape and texture of tactile materials placed in a large tray and anchored in front of the wedge). It is
equally important at other times to ensure that learners are positioned so as to maximise social interactions with their peers.

For any activity, issues of physical access should be carefully considered. These include:

- the number and layout of materials, ensuring that the learner is able both to scan and to reach everything without undue effort
- the fixing of materials (containers, switches, etc.) so that they always remain in a predictable position
- consistency of support and opportunities for the learner to repeat responses in a predictable way
- ensuring that plenty of time is allowed for learners to make their responses
- personalised environments constructed to bring materials close to a learner (e.g. by hanging objects above them)
- a consistent approach to communication based upon the learner’s most reliable means of responding, including a specific method for the learner to confirm whether they have been understood
- use of assistive technology, where appropriate, including a personalised switch or switches, a suitable method for using the switch or switches to control software, use of eye-gaze technology, and opportunities for wheelchair and environmental control.
The challenges of inclusion

One of the design principles of the term ‘inclusive’ incorporates a position which values and respects all people regardless of characteristics such as ability or disability, gender, ethnic group, etc. Curriculum for Wales is designed to be ‘inclusive’, encompassing an entitlement to high-quality education for every learner, which takes account of their views. This is grounded in the United Nations Convention on the Rights of People with Disabilities (UNRPD) and the related United Nations Convention on the Rights of the Child (UNCRC).

Historically, people with PMLD have been among those most at risk of exclusion from society. Many of the barriers to learning for learners with PMLD (identified in the section ‘A focus on learning’ on pages 24–34) are also barriers to inclusion both in the culture, curriculum and community of schools and also in society more generally. Including learners with PMLD should, therefore, be acknowledged as a particular challenge.

Being ‘inclusive’ within an educational context has been interpreted in a number of different ways. One response is to define inclusion as being about everyone being involved in the endeavour to learn, as Mary Warnock did, wherever this takes place and so long as what is learned is personally relevant (Warnock et al., 2010). Another response is to ground inclusion in mainstream schools and put the onus on these schools to accommodate diversity; but this approach often fails to spell out what this means in practice or to examine the consequences of doing so. In a special school, in a related approach, inclusion for learners with PMLD may be interpreted as ensuring that these learners share activities with their (age) peers rather than being part of a special class within a special school.

A third approach is to adopt a continuum view of shared humanity and frame inclusion in terms of maximising participation while recognising that for some this participation may be partial in nature (Baumgart and colleagues, 1982; which was also discussed in the ‘Curriculum design and planning’ section on page 23).

These approaches are not necessarily mutually exclusive, and research suggests that each of them may have something to offer learners with PMLD, depending on the specific needs of the individual. Learners with PMLD are likely, for example, to experience more interaction with their peers in a mainstream class. More able peers in either a special or a mainstream setting may be well-placed to help learners with PMLD meet some objectives and targets. However, some learners need a distraction-free environment for at least part of the time, and this is more likely to be available in a specialist setting.

Learners with PMLD (or other ALN) are not the only ones for whom inclusion is a challenge. Learners for whom the language(s) and culture(s) of the school are not the language(s) or culture(s) of their home can also face particular challenges. To be fully included, learners need to feel that they belong to the school and wider community. In trying to work out what good practice in providing for this group of learners might look like, the tensions and complexities involved need to be acknowledged.
Through consideration of the context of Wales and the international perspective, Curriculum for Wales acknowledges the importance of both the languages and the cultures of the learners’ homes and of the Welsh language and cultures of Wales, and the roles both have to play in enabling every learner to be fully included in a variety of communities.

There is limited evidence about how learners with ALN are impacted when they are educated through a language which is not the language of their home, and may not be the language of the community in which they live, and none which relates specifically to learners with PMLD. Suggestions as how to provide appropriately for these learners, therefore, have to be extrapolated, from what evidence is available in relation to typically developing learners at the early stages of communication development and other groups of learners with ALN.

Research supports the view that different languages have different rhythms and use a different range of sounds. Typically developing babies are believed to be able to recognise differences between languages at a very young age, and babies who hear different languages themselves make different ranges of sounds. However, it is probably not until around 13 months of developmental age that typically developing infants become aware that speakers of different languages use different words to name the same object. It is recommended that all learners start their learning journey with their home language; and there is clear evidence, that, where possible, learners should initially, at least be supported through their first language.

Research with learners with less severe ALN suggests that learning a second language does not have a negative impact on an individual’s first language, and awareness of the commonalities between languages is likely to be helpful.

However, some literature from the field of deaf education suggests that deaf children whose first language is sign language may feel marginalised/excluded, lonely and with few/no friends in mainstream environments. The fact that they don’t share the same language with their peers in mainstream settings is one of the reasons for feeling that way. This research does not map directly onto the situation of learners with PMLD from Welsh-speaking homes in an English-medium school, those from English-speaking homes in a Welsh-medium school, or those with home languages other than Welsh or English. However it does suggest that schools should provide, as far as possible, opportunities for learners to be part of a group which uses their first language, and use this as a foundation to become familiar with the language and culture of the community in which they live.

Being ‘inclusive’ has become the international signal of a humane and respectful value position. Few people would be willing to argue against it, but as a complex idea and value, it has several meanings that give rise to disagreements – about what is taught and learned and how learning is assessed, and where learning takes place and with whom. These signify whether people are valued and related to respectfully. If inclusion is about all participating in the culture, curriculum and community of schools, does this imply mainstream and not specialised school and does it mean participating in mainstream academic curricula and not basic life skills programmes? Some see issues with a simple unexamined concept of inclusion for learners identified as having PMLD.
For learners with PMLD, the challenge of inclusion is about both curriculum design and using assessment to support learner progression. Progressing in learning requires ongoing assessment to move onto the next steps of learning. A continuum view involves realising that some move more slowly, while others more rapidly, as well as realising that what is relevant to learners varies according to their different starting points. In the same way that curriculum design can be inclusive, as Graeme Douglas has suggested, so can assessment in relation to ‘who is assessed, how they are assessed and what is assessed’ (Douglas et al., 2016).

From this perspective, assessment practices can embody these three assessment features:

- including all
- being accessible and appropriate
- assessing areas of relevance.

The design of the Routes for Learning approach for learners with PMLD reflects these three features.
The communication process

When we think about learners with PMLD, it is helpful to have a definition of communication that is inclusive, taking into account the challenges these learners experience. For example, ‘Communication is about two or more people working together and coordinating their actions in an ongoing response to each other and the context’ (Grove et al., 1999).

This description from the American Speech and Hearing Association is also very relevant: ‘Communication may be intentional or unintentional, may involve conventional or unconventional signals, may take linguistic or non-linguistic forms, and may occur through spoken or other modes’.

Communication partners support learners’ communication by close observation and sensitive responding to learners’ behaviours, using the context and the knowledge of the individual (either gained directly or from others, e.g. family) to support their understanding. Communication is a joint effort, and the cues we get from the context and our experiences of communication are very important.

Early communication: how and why we communicate

As can be seen from the Routemap, communication develops from both cognition and social interaction. Learners need to have plenty of experience of exploring objects as well as experience of positive interactions with other people. To achieve this, classroom staff need to plan learners’ seating and other positioning during the course of the day, so learners have opportunities to interact with staff and other learners around them and also opportunities to engage with a wide range of objects.

The stages of development of communication are visible in the Routemap and in Table 2 on the next page.

Although it is unlikely that learners with PMLD will achieve abstract symbols and language, these have been included to illustrate the possible progression. In both these sources, contingency awareness and intentionality have been emphasised. This is because the learner’s gradual realisation that they can make things happen can be seen as leading into the realisation that they can make things happen through other people. For example, when a piece of apple they wants is too far away, the learner reaches towards the apple and looks alternately between the apple and their teaching assistant making urgent noises.

As skilled communicators, we use our interaction skills for a wide range of purposes; greeting people, requesting information, teasing, lying, entertaining and many more. The earliest of these purposes, or reasons, for communicating are social (e.g. a smile that brings other people over to interact) and functional (a look or reach towards something wanted), although at reflexive and reactive levels these actions are not yet intentional communication.

Table 2: Levels of the development of communication

<table>
<thead>
<tr>
<th>Levels of communication development</th>
<th>Learner’s communicative behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Pre-intentional – Reflexive</td>
<td>The learner’s limited repertoire of mainly reflex behaviours can be interpreted by familiar people. They will be predominantly reflex or other early responses to internal as much as external stimuli.</td>
</tr>
<tr>
<td>2. Pre-intentional – Reactive</td>
<td>A wider range of voluntary behaviours are treated as meaningful by caregivers. The range of likely interpretations widens a little and the learner is more responsive to emotional messages from the caregiver.</td>
</tr>
<tr>
<td>3. Pre-intentional – Proactive</td>
<td>The learner’s behaviours are goal directed. The behaviours act as signals to others who assign both communicative intent and meaning to them. The learner extracts meaning from other people’s intonation and facial expression.</td>
</tr>
<tr>
<td>4. Intentional – Primitive</td>
<td>The learner has learned to affect the environment by acting on another person. Interpreting ‘primitive’ communicative acts relies on the context. The learner understands other’s non-verbal communication and starts to show situationally cued understanding.</td>
</tr>
<tr>
<td>5. Intentional – Conventional</td>
<td>The learner has acquired a range of semantic roles which can now be communicated to others using more conventional forms, including single signs, symbols and words. These are easier for others to understand and less context-dependent. The range of communicative functions expands and the learner will comprehend many single words.</td>
</tr>
</tbody>
</table>


At early stages of communication, learners are likely to have some inconsistent and idiosyncratic ways of communicating. It is important that learners are given time and space to communicate within a consistent routine and that staff respond and give meaning to pre-intentional sounds/movements (even when it is difficult to work out intent). By consistently responding to and interpreting a signal as if it is a communication of a need or request, the learner will have the opportunity to learn how to influence other people/the environment, using these signals. Every day and care routines can be used as opportunities to develop communication, with partners pausing and then responding to any attempt by the learner to communicate. Learners are likely to need many, many opportunities to make links between what they do and the responses of others (in a way that might feel quite repetitive for communication partners).
As learners develop a wider range of responses, staff could work towards becoming more selective about the behaviours they respond to thereby shaping communication about objects/people present or nearby. It is important to remember that communication skills and abilities are likely to fluctuate and so it is always important to be guided by the interactions at that moment.

As consistent and sensitive responding is key, communication passports which document a learner’s responses and possible meanings can be a useful tool for sharing information with family and all staff working with the learner.

**Assessments to supplement Routes for Learning**

When reading this section, please see the discussion regarding the Communication Matrix and the Affective Communication Assessment on pages 12 and 13 of this guidance.

Approaches to the process of communication that we describe below broadly align with the lenses or approaches we described earlier (‘Approaches to teaching’ section on pages 14–17). For example, the developmental approach leads us to establishing contingency awareness and cognitive intentionality as a precursor, or developmental step, on the way to intentional communication.

The behaviourist approach explains how reinforcement strengthens the associations learners make between their actions and the consequences. It also explains the ways in which behaviours might be shaped in order to be used as a means to communicate.

The interactive approach underpins intensive interaction and other communication approaches that are grounded in the interaction between learners with PMLD and more skilled communicators.

The functional approach informs cueing and related approaches which exploit naturally occurring associations that are meaningful to the learner in real-world settings, such as the link between smells and events.

In practice, however, the links and distinctions are not quite so clear-cut. We need to be creative and flexible and to use our knowledge from a diversity of approaches and the range of support provided through assistive technologies.

**Approaches to communication**

Starting with supporting the development of intentionality, this section will outline a range of approaches to communication which build on the stages in the Routemap.
**Cause and effect: Intentionality**

To acquire intentionality, learners need opportunities to affect and control their environment. These can be both:

- early, low or no tech – playing with water or other responsive media, making a mobile move, hitting a drum or gong, etc.
- high tech – micro-switch operated toys, fan, music, etc.; piano keyboard apps; specialised software.

Cause and effect activities, including the use of assistive technology, such as switches, have a good evidence base in terms of research (Lancioni et al., 2006a and b; 2009, Roche et al., 2015) but seem to be used less in practice, so it can be difficult to know how well these approaches work in classrooms and other everyday settings. Switches, which can be activated by actions or sounds, can be used by the child to operate a music player, a fan or toy; to make or to convey a choice; to take part in a classroom group activity; or to gain social contact.

**Interaction-based approaches**

The challenges experienced by learners with PMLD mean that they require consistent and skilled communication partners. Parents/carers and other family members will have a great deal of experience in communicating. Practitioners, therapists and other school staff will all have the opportunity to be communication partners.

Intensive interaction aims to promote social communication, enjoyment of interaction and enhance the learner’s sense of agency. The emphasis in training and in practice is on what are described as the ‘fundamentals of communication’, e.g. taking turns; sharing personal space; understanding and using eye contact, facial expression, physical contact, non-verbal communication and vocalisation. There have been some good evaluations of intensive interaction, though more research is needed (Hutchinson and Bodicoat, 2016).

The core principle of the Hanging Out Programme is that everyone deserves at least ten minutes a day of uninterrupted positive attention. The programme, like intensive interaction, focuses on the quality of interactions and a positive way of thinking about the person. Interaction partners are expected to adapt their language and interaction style to match the communication of the person with a disability and what is meaningful to them.

**Cueing as a communication strategy**

The term ‘cues’ is usually used to mean a way of indicating to the learner what is about to happen. Ideally cues are an established part of a routine and are natural, that is, they occur within it. These cues can be across the range of sensory inputs and through other means as shown in the table on the next page.
Many cues can be usefully paired with key words (e.g. ‘lunchtime’) to give specific signals to help attention, recognition and understanding.

It is important that means of communication match both the learner’s cognitive development and sensory abilities. For example, using pictures and symbols is ineffective for a learner not at a symbolic level of understanding. Similarly, attention needs to be paid to the learner’s comprehension skills. For example, introducing a cue for a very abstract concept (e.g. emotions) will be ineffective for a learner who is not able to understand abstract concepts. Graphic media (pictures of any kind) need to be suitably presented for learners with visual impairment, as do visual signs. For signing with learners who cannot see, hand under hand (where the learner places their hands over the signer’s) is the recommended approach (Deuce and Rose, 2019).

**Objects of reference**

Objects of reference are frequently used with learners with PMLD. However, despite their widespread use, there is little evidence base for their use or success (Hodges et al., Welsh REA MSI). Objects of reference can relate directly to the learner’s experience (sometimes because this association has been taught) but come to represent it outside the immediate context, such as presenting an object to indicate where a learner needs to go next (Hodges and Pease, 2002; McLinden et al. in press). Objects need to be within the learner’s perceptual understanding and therefore will often be (at least in early stages of introduction) individual to the learner. One may use a plate to indicate lunchtime because he sees lunch being put on that plate, while another, who cannot see, may hold a spoon to show that lunch is coming. To use objects in this way, learners need to have an understanding of object permanence, one-to-one correspondence and the basis of shared attention.

<table>
<thead>
<tr>
<th>Sensory</th>
<th>Visual</th>
<th>Showing a coat for going out.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Auditory</td>
<td>Rattling keys for car ride.</td>
</tr>
<tr>
<td></td>
<td>Tactile</td>
<td>Holding a spoon for dinner.</td>
</tr>
<tr>
<td></td>
<td>Smell</td>
<td>Smelling jam for toast.</td>
</tr>
<tr>
<td></td>
<td>Proprioceptive (position)</td>
<td>Using standing frame for messy play.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Other</th>
<th>Routine</th>
<th>Following a set timetable.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Verbal</td>
<td>Words/intonation signifying next action.</td>
</tr>
<tr>
<td></td>
<td>Person–place related</td>
<td>Physiotherapist for exercise.</td>
</tr>
<tr>
<td></td>
<td>Gesture/movement</td>
<td>Swinging in a hammock before physical education.</td>
</tr>
</tbody>
</table>
**Multisensory and creative approaches**

A diversity of creative approaches has been used to support and enhance communication, including music therapy, aromatherapy, animal therapy, multisensory stories and storytelling among others. Some of these approaches have a somewhat limited evidence base (in terms of there being good quality research) but some are reported by practitioners to have good outcomes.

In multisensory stories, language and multisensory props are used to construct a narrative. Multisensory stories aim to provide the learning opportunities and pleasure of engaging with a story, without the need to understand the language used. There is evidence that learners show increased attention in multisensory story. Story sacks and other resources are familiar to practitioners and there are several books (e.g. Grove, 2009) which support this approach.

**Summary**

Learners with PMLD will have complex communication challenges. Success in communication involves skilled communication partners who create opportunities for communication and interaction, using their knowledge of the individual and a variety of approaches. Communication partners support the learner to maximise their skills and to help the learner to make sense of their experiences. Knowledge about communication and interaction is shared with others so that the learner experiences consistently good support.
Conclusion

Learner progression in the context of the four purposes of the curriculum is central to Curriculum for Wales. Assessment is an integral part of the learning process, helping identify each learner’s strengths, areas for development and next steps.

The Routes for Learning materials draft guidance aims to enable practitioners to assess learners with PMLD and to identify how to support them in developing their learning.

We are seeking your views on the work completed to date in updating this guidance. Your feedback is integral to help us finalise it, along with the rest of the Routes for Learning materials, ready for publication in summer 2020. The relevant feedback form can be found at hwb.gov.wales/curriculum-for-wales/routes-for-learning.
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[hw.gov.wales/storage/ea1b956b-7b77-45cc-9b95-af7c3e7a1e26/dcf-routes-for-learning.pdf](http://hw.gov.wales/storage/ea1b956b-7b77-45cc-9b95-af7c3e7a1e26/dcf-routes-for-learning.pdf)

Further reading


Goldbart, J. and Caton, S. (2010) *Communication and people with the most complex needs: What works and why this is essential*. MENCAP.


[www.oecd.org/education/ceri/understandingthebrainthebirthofalearningscience.htm#B5](http://www.oecd.org/education/ceri/understandingthebrainthebirthofalearningscience.htm#B5)


Appendix 1: Who are learners with PMLD?

There is no universally agreed definition of profound and multiple learning difficulties (PMLD) (Bellamy et al., 2010); indeed other countries in Europe use a different term – profound intellectual and multiple impairment (PIMD).

The working definition of learners with PMLD published in 2006 in the original *Routes for Learning: Additional Guidance Booklet* (Welsh Government) was compiled by a General Teaching Council for Wales network group. The dangers of labelling learners are recognised and flexibility is required to avoid limiting expectations. However, a working definition is considered essential for ensuring sufficient provision (including planning and monitoring). An updated version of the original working definition is therefore included here. This definition takes into account the changes in legislation and terminology currently underway in Wales\(^{18}\).

Learners with PMLD will have a profound cognitive impairment/learning difficulty, leading to significant delay in reaching developmental milestones. Such learners will be operating overall at a very early developmental level and will display at least one or more of the following:

- significant motor impairments
- significant sensory impairments
- complex health care needs/dependence on technology.

The inter-relationship of these disabilities increases the complexity of need, in turn affecting all areas of learning.

Learners with PMLD are likely to be working on the behaviours shown on the Routes for Learning Routemap for most or all of their school life. Staff will almost certainly find it difficult to establish reliable and consistent methods of communicating with them. Moreover, owing to high levels of dependency for basic self-care (such as dressing, toileting and feeding), they are also likely to require extra resources such as:

- specialist staffing and substantial support
- adapted curriculum and individual learner plans
- mobility aids and therapy programmes
- frequent assistance and medical support.

Under the new additional learning needs (ALN) system, to be introduced by the Additional Learning Needs and Education Tribunal (Wales) Act 2018 on a phased basis from September 2021, these learners will have an individual development plan (IDP). This is a single statutory plan that replaces the existing variety of statutory and non-statutory special educational needs (SEN) plans.

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\(^{18}\) This definition does not include those whose difficulties are believed to result from autistic spectrum disorders (ASD) unless this is also combined with a profound level of general learning difficulties.
Appendix 2: A short summary of vision and hearing impairments

Vision impairment can be caused by a wide range of issues, many of which are related to conditions causing other disabilities. It is much more frequent in learners with learning disabilities (Emerson and Robertson, 2011). An extremely short and simple summary follows.

Some vision impairments are caused by problems in the eye and can relate to the clarity of vision (acuity), the field of vision (how far round can be seen) and eye movements. Some vision impairments are caused by problems in the processing of visual stimuli and can make it hard to discriminate features from the background and recognise unfamiliar items, as well as having acuity and field difficulties. Factors which need to be considered to compensate include lighting, contrast, size, movement, background, where items are presented and colour. Most vision impaired learners will have remaining vision and be able to use their vision for learning in carefully structured activities, possibly helped by the use of glasses.

Hearing impairment is also much more common in people with learning disabilities (Kerr et al., 2003). An extremely short and simple summary follows.

Hearing impairment is related to the intensity (volume, loudness) of stimuli and their frequency (pitch). The measurement of hearing impairment relates to the volume needed to perceive different pitches. Most sound signals have multiple factors, meaning that learners may appear to hear speech but not be able to discriminate the different pitches, and therefore leading some to assume that they can ‘hear when they want to’ (Murdoch, 1994). Most hearing impaired learners will have remaining hearing and be able to use their hearing for learning, likely supported by hearing aids or implants, and by careful structure of the listening environment.

Deafblindness (dual sensory impairment) occurs when a learner has combined vision and hearing impairment. It has a profound effect on the ability of the learner to respond to communication, to learn to move and travel, and to interact with the environment. Some learners may need high levels of sensory stimulation in order to learn to respond (e.g. bright lights in a darkened room) but others will find such high levels too demanding and may withdraw or become passive. Some learners may benefit from using sound in conjunction with visual stimuli or touch but many others will manage only one stimulus at once, and may shut their eyes if listening.

Responding to sensory stimuli is hard work for all learners with PMLD but especially those with sensory impairments. To do this effectively they need to have appropriate positioning support and to be comfortable and secure. They may respond best to sensory stimuli when not engaged in any other effortful activity – and sitting, standing, or walking may well need to be considered as effortful activities for learners with PMLD. When asked to look or listen the learner needs to be alert, and able to attend to the stimulus presented.