	Attention	**Activity & Movement**	**Understanding of tool use**	**Expressions & Emotions**	**Interaction & Communication**	**STAGE**
8 Expert	Attention well established and sustained Relaxed, active, not tense	**Occupation, composed of two or more activities** Fluid, smooth and precise movements. Driving is automatic. A means for doing other activities in multiple settings. Intuitively organizes and understand s the task they are encountering. Knows what to do based on mature and practiced understanding.	**Integrated Tool Use** Consciousness is focused on the other parts of the occupation. Driving more or less subconscious. Consistent precision control of powered wheelchair. Consciously deliberates a situation and performs their own judgment of how to resolve the situation. Takes care of others while driving powered wheelchair.	**Dependent on the doing of "other" activities**	**Multi-level Integrated interaction** Is able to interact with the machine, interact with the environment and interact with social partners.	**Explore performance** Extrovert stage –focus body, machine, environment & occupation
7 Proficient	Multi-channeled attention Generally focused	**Occupation for its own sake** Refinement of graded, timed movements. Driving for the sheer pleasure of driving. Navigating within the physical space.	**Fluent Precise Use of Tool.** Aware of consequences and conscious of how to control the steering with the joystick. Refining maneuvering skills to fluent use. Takes care of themselves within the powered wheelchair.	**Happiness Satisfaction**	**Concurrent Interactions** Openness to multi-level interactions - displays readiness to interact at more than one level. No longer easily interrupted by occurrences. Interacting with the machine in a playful way. Contrives interactions within the social space.	
6 Competent	Multi-channeled attention but easily disrupted Focused on using the tool goal directed	**Activity** Controlled but unrefined movements. Able to coarsely steer in a desired direction. Concentrating on getting from A to B often ignores the environment and people around them.	**Competent Use of Tool** Conscious of the need for sequencing of the acts in a certain order to reach a desired point or place. Controlled but coarse use of the tool. Regression to use body movements instead of tool use – using arm or foot to push away from obstacle.	**Serious Content Laugh Excited**	**Consecutive Interactions** One level interactions occur one after the other: interaction with the machine has to stop due to disruptive occurrences	

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	Attention	**Activity & Movement**	**Understanding of tool use**	**Expressions & Emotions**	**Interaction & Communication**	**STAGE**
5 Sophisticated beginner	Two-channeled attention Active, concentrated	**Sequences of chains of acts** Intentional more eager or violent movements. Exploring the machine. Experimenting with steering by composing effects in different patterns. Experimenting to find the pattern of the tool.	**Idea of Competent Use is Born** Conscious of the ability to cause many different effects, motion in different directions. Searching the steering pattern. Understands the use of electronic mobility guidance systems	**Eager** **Smile** **Serious** **Frustration** Periods of frustration. Knowing possibilities but not achieving desired tool use goals. Periods of blocking intertwined with short peaks of success.	**Reciprocated interaction** Directs attention by pointing to convey a message that requires the playmate to respond **Triadic Interaction** Interaction with a person on a third part – a person, an object or something else in the environment	**Explore sequencing** Difficult transition – focus body, machine & environment
4 Advanced beginner	Single channeled attention but able to shift spontaneously Attentive	**Chain of acts** Intentional but cautious, careful movements. Exploring the joystick. Explorations of different effects – drive, stop. Testing out different grips. Able to press a single switch, hold and release	**Exploration of Extended Use** Conscious of more than one effect. Motion in different directions depending on how acts are combined. Exploring the consequences of activating the tool. Understands 2 switches have different functions.	**Serious** **Smile** **Sometimes Laugh** Exhibits a desire to explore beyond the world of their tray Shift focus in between near and far	**Mutual interaction** Requests the attention of the playmate by pointing at objects or events in their close vicinity	

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	Attention	**Activity & Movement**	**Understanding of tool use**	**Expressions & Emotions**	**Interaction & Communication**	**STAGE**
3 Beginner	Single channeled attention but able to shift attention Alert	**Act** Distinct targeted movements. Activates joystick to get the effect of motion. Applying force. Able to press a single switch.	**Basic Use** Conscious of how one act can cause one effect. Act starts motion. Change position within the room e.g. circling. Regression to using body movements to try and move the machine.	**Serious** **Contented** **Smile**	**Initiates interaction** Keeps or responds to eye-contact Facial signaling	**Explore functions** Introvert stage – focus body & machine
2 Curious novice	Single channeled At times more alert Passive	**Pre-act** Diffuse vague multi-directed movements. Touches or hits different parts of the chair. In between sitting still. Touches or hits a switch – experimenting with exerting a force.	**Idea of Basic Use is Born** Pre-conscious of how a self-initiated act can cause the effect of setting the chair in motion.	**Contented** **Curious** **Anxious** **Angry**	**Responds to interaction** Gets in eye-contact Physical contact Behavioral mirroring Joint focusing on activity	
1 Novice	Extreme distractibility No response to interaction (focus on the novel tool or novel situation) Passive or anxious	**Excited** Interested in looking at and touching the tool **Non-Act** No specific intentional movements. May accidentally activate the joystick. Is still for long periods Protective withdrawal body language **Rejection** Displays stereotyped or rejecting behaviors, wanting to get out of the powered wheelchair.	**No or Vague Idea of Use** No or very limited consciousness of how own activity can cause an effect.	**Open** Shows joy in experiencing guided motion **Neutral** Displays minimal facial expressions Whole body displays motionlessness **Anxiety** Worry, fear, annoyance, crying	**No response** May be aware of others attention. Perceptive Physical proximity – close in, draw back **Avoidance** Avoidance of touch from social partner. No wish for interaction Wants to get rid of the social partner	

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ALP – Assessment of Learning Powered mobility use Facilitating Strategies

Introduction to strategies

These facilitating strategies have been developed during a rigorous analytical grounded theory process and as part of the ALP assessment tool; they are intended for use together with the ALP instrument (Durkin, 2006; Nilsson 2007; Nilsson & Durkin, 2014).

In our research work we embraced the following belief system: to be user led; to work in partnership and to empower the learner. Each individual has their own learning dynamic and will demonstrate their own unique learning pattern. We also view the use of a powered wheelchair and the learning process as being a therapeutic tool in its own right. Many powered mobility learners may not need to be powered mobility users as a final outcome of undertaking this experience.

The following bullet points describe the inclusive approach established within the strategies and the skills required by the facilitator:

- Learner-led activity
- Building Partnership
- Facilitator activity is adjusted to the just right level of challenge for the learner to encourage their own initiatives for doing and interacting
- Empowering approach – it is all about facilitation of an oscillating learning process
- As a facilitator you need to know your learner and adapt the strategies to meet their specific learning needs; the following are suggestions for you to use and build on
- In devising your own strategies you need to constantly explore plausible ways to facilitate the learning process – this can be achieved through the appropriate and well-timed use of allowing trial and error to occur; introducing increases in speed of the machine and taking the learner into more challenging and unpredictable environments
- Working as the facilitator you are building understanding with your learner through dialogue and mutual interaction and you therefore require the appropriate observation and listening skills
- As the facilitator you need to be aware of your own language skills in order to provide each learner with a language dialogue which has the appropriate words, content, volume, tone and emphasis
- Of equal importance is your awareness of how you are communicating visually through the use of your body language. The learner will be interpreting gestures of your face, hands, shoulders and posture.
- The facilitator also needs an understanding of group processes when working with two or more learners together in a session

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In the document there are facilitating strategies for each stage - the key factors for the facilitator to be aware of are:

Strategies for Exploring Functions – learner & machine (Introvert stage)

Quiet
Vigilance
Attention to slow pace activity

Strategies for Exploring Sequencing – learner, machine & environment (Difficult transition stage)

Need to allow trial and error to occur
Involve the learner in the process of reflecting on outcomes

Strategies for Exploring Performance – learner, machine, environment & occupation (Extrovert stage)

Tendency is to act protectively in order to keep up an acceptable level of safety
Sharper observational skills are needed
Attention to multi-varied fast pace interaction in all senses has to be given

The ALP assessment tool can be used with any powered mobility vehicle and associated accessories. Consideration needs to be given to the use of a joystick first before trying other methods of access for example hand switches.

Why is a joystick a magic tool?

- No shift between tools
- One tool used from simple to complex operations
- Able to explore with a limited range of physical ability
- No displays to attend to and to understand
- Operation can be easily understood at a more concrete level (physical exploration)
- Physical exploration can be enough; learning can be achieved without verbal instruction
- No verbal instructions are needed from the facilitator in order for the learner to explore and find out how the joystick tool works

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General strategies

- Be aware of the necessity to maintain high levels of energy and focus as the responsive and facilitating partner

- Provide the learner with the just right challenge for their level in the learning process

  If Low – too easy, learner will get bored, loose interest/curiosity
  If High – continuous failure, learner will find it too difficult, loose interest/curiosity

  Explore Functions - Introvert Stage - focus on body & machine – challenges
  Persistence with interactive approaches and physical demands such as touch and manual guidance

Explore sequencing - Difficult Transition Stage – focus on body, machine & environment – challenges

Low level achievement/little success can be observed
Important to simplify the challenge to allow the learner success and thereby minimize their level of frustration

Explore performance - Extrovert Stage – focus on body, machine, environment & occupation – challenges

Higher speed
More complex interactive context – physical and social

- Look for learner's signs of overload

  Signs of overload: Shutting down and closed or glazed eyes
  Cold sweating, paleness
  Signs of exhaustion

- Be aware of the possibility that the learner oscillates over phases in different ways at different points of the learning process

Oscillation over phases

A rising and falling pattern can often be observed and looks the same for both the introvert and extrovert stage. This oscillation is due to many factors including a drop in energy, motivation and attention. The difference is the rate of recovery, the tempo for restoration or retrieval will take longer in the lower stage compared to the higher one.

Explore Functions – Introvert Stage

Short periods at highest level
After drops there will be low retrieval back to highest level
Easy to give too low a challenge

Explore Performance – Extrovert Stage

Long periods at highest level
After drops there will be quick restoration to highest level
Be aware it is easy to give too high a challenge
Look at causes for dropping performance

Observe!!! At phase 6 Competent tool user

A low setting of speed may provide a false impression of proficiency as the learner may be working in only one-range of fine graded adjustment movements offered by the joystick control i.e. in the outer physical boundary felt when operating the joystick.

This can be checked by increasing the speed setting, if the learner does not master grading then, their grading is not multi-ranged.

Use of Group Work

Establishing a group for the learner to operate within needs careful consideration and ongoing reflection. The number of learners and facilitators working within the group at any one time will have an effect on the dynamics of the learning environment. Each learner needs to be assessed individually as to how they cope with a multi-level interaction environment.

Learners in the Exploring Performance Stage
Learners need to have reached level 6 (Competent) before they can operate within a group setting, as their main activity focus at this level is getting from A to B and often ignoring the people around them. A group work environment can be used to gradually introduce the development of multi-level interaction and awareness of others.

Facilitators need to be aware that a multi-level interaction environment cannot be readily controlled and learners may display intensive emotions particularly in respect to developing their own judgments towards their peers and learning to take care of others.

Learners in the Exploring Sequencing Stage
Learners at level 4 (Advanced beginner) and 5 (Sophisticated beginner) can benefit from being part of a parallel group where the learners and facilitators are working within the same environment but there is no expectation for multi-level interaction and the space is large enough to allow areas of tranquility. The learners in this group will need time out and can benefit from spending some of this time observing other peer learners.

Things to consider before introducing outdoor driving

- Learner needs to build their spatial relationships indoors before going outdoors.
- Learner needs to be able to experience driving on even smooth surfaces before driving on uneven undulating surfaces.
- Learner has to learn about spatial relationships in narrow spaces. Indoors there are structured and framed contexts. Boundaries indoors are more defined and easier to spatially relate to than outdoors where there are undefined and more distant boundaries.
- Scarier world outdoors - not tangible
- Less distinctive framing in natural context outdoors compared to the framing with walls doors ceiling indoors.
- Synchronizing body movement with machine movement needs to be established before driving on uneven surfaces.

Strategies for introvert level – (1 Novice; 2 Curious Novice; 3 Beginner)
Learner Explores Functions
Focus is on body & machine

Use a gentle approach to establish a safe and secure relationship

Focus the learner's attention to tool function and close vicinity

Strategies oriented at tool function and tool interaction
Build awareness of body use for tool use

Encourage exploration of tool parts and tool function

Assist the learner to enable them to shift their attention back to the tool

Offer manual guidance, adjusting the amount of input according to the learner's needs to achieve the actions of gripping, pushing, pulling, maintaining grasp. Provide a range of strong deep pressure to a light guiding touch, working from proximal to distal

Constantly shift between withdrawing and re-entering the learner's space, displaying you are on your own, it is you that make things happen. Withdraw from the learner's space and provide silence and give time for learner to act and react. Re-enter the learner's space offer manual guidance and give physical gestures or verbal prompts.

Facilitate the learner to enable them to synchronize their body to tool function - observe the learner during motion and allow the learner time to adapt to the movement and effects of external forces.

Frustration
Accept the learner's rejection, anxiety or passivity and acknowledge there may be signs of basic frustration at this stage. The learner may display annoyance that they are unable to repeat a pleasant sensation of using the tool e.g. body sensation from circling in a powered wheelchair.

Strategies oriented at social interaction
One-to-one interaction
Structured variation of physical and social interaction

Language
Imperative but gentle language

Labeling of body parts, tool parts, acts and effects
Attaching words to the acts being performed in order to offer labels for objects and doing; thereby providing opportunities for guidance from a distance

Slowly paced and deliberate language
Precise and condensed language

Shift between periods of silence and verbal input

Suppress your reflex reactions such as shouting or increasing your volume of speech in conjunction with any collisions or at unexpected successful events.

Body language used in a concrete, physical way.

Explain the functions of the tool through the use of your body language and manually guiding the learner.

Encourage own initiatives to act – to look, to touch all aspects of the tool

Facilitate the learner's development of own initiatives by using manual guidance to initiate their explorative acts and then gently release guidance while encouraging the learner to continue on their own

Allow the learner to explore the tool in their own way

Allow the learner to have the opportunity to experience extreme tool use – offer variable speed levels and allow controlled collisions

Allow the learner to constantly repeat explorative acts to reach their own level of satisfaction as part of storing and retrieving the experiences from their memory

Allow the learner to do trials in their own way

Allow the learner to direct the exploration – not led by facilitator

Phase 1 - Novice

Establish rapport with the learner
Increase arousal and curiosity through the experience of motion
Provide a bodily experience of movement in the machine by manual guidance from the social partner (facilitator)
Repeat bodily experiences
Reduce anxiety; to give way for curiosity and exploration
Arrange for accidental activation
Provide deep proprioceptive input through manual guidance at the most acceptable body part to the learner – could be the part at the furthest distance i.e. could be the feet to start with

Phase 2 – Curious Novice

Encourage reaching out to explore just as an act of its own
Allow the learner to explore all aspects of the machine within bodily reach
Allow periods of apparent non-activity by being present and staying silent
Assist the growing insight of basic tool use through provision of manual guidance and short direct verbal prompts. Provide the encouragement when the learner completes the act. Nurture and reinforce all changes in the learner's use of the tool.
Facilitate the idea of movement through manual guidance.

Phase 3 - Beginner

Point to and tap the tool to draw the learner's attention back to the tool.
Refresh the learner's idea of basic tool use
Enable the learner's volitional acts by withdrawing and waiting for the learner to respond in their own way. Minimize manual guidance and use short direct verbal prompts from an extended distance.
At this point words are also used to connect acts with labeling actions of the learner and objects being used.
Provide periods of silence to allow the learner to integrate their sensations and experiences.
Give the learner long periods of time to carry out their actions in order to achieve reciprocal shortening of time, married with a decreasing amount of encouraging input.

Strategies for difficult transition – (4 Advanced Beginner; 5 Sophisticated Beginner)
Learner Explores Sequencing
Focus is on body, machine & environment

Focus attention to tool function and external tool use goals

Strategies oriented at tool use interaction
Encourage exploration and experimentation with pattern building

Non-interference intertwined with manual guidance and verbal prompts or instructions

Introduce speed variation
Introduce the concept of gentle use of the tool – just push a little - in conjunction with attaining slower more graded motion with the joystick

Facilitate learner's understanding of vertical spatial relationships by directing focus below the tray height

Confirm success, difficulties and failure of patterning details

Provide external motivators to convey the idea of a goal for tool use

Frustration
Accept the learner's expressions of frustration
Calm and reassure the learner to reduce their frustration to a level where it no longer interferes with learning
Take a step back and build up again to give short successful experiences to the learner

Strategies oriented at social interaction
Extend interplay distance

Entice and challenge interplay of tool use with social interactions one-to-one, one at a time, back and forth increasing the distance and range of the interactional space

Introduce simple playful one-to-one interactive activities and then gradually upgrade the complexity

Language use
Dialogue using simple verbal language, body language and guiding

Labeling and explaining tool function and tool use outcome

Explaining function of the tool through simple verbal language, body language and manual guiding
Facilitate judgment skills learning to take care of self as they move within the environment

Encourage own initiatives and trials – find out how it works, give it another try, try another way

Allow the learner to explore use of the tool in their own way
Allow the learner to make their own mistakes
Allow the learner to develop their own strategies (not led by facilitator)
Ask if the learner wants help or stand back and wait for requests for help

Phase 4 – Advanced Beginner

Offer the learner manual guidance to encourage their own exploration of the tool
Provide repeated attempts to bring the learner back to task when distracted, intertwined with periods of non-interference
Offer the learner quiet periods in low stimulation environment interspersed with a busier environment
Facilitate the learner's attempts to mutual interaction

Phase 5 – Sophisticated Beginner

Offer the learner co-operative manual guidance to achieve desired results of tool use working proximally to distally.
Read the learner's level of energy and adjust the speed to an acceptable level of challenge in co-operation with the learner
Give the learner the choice of the speed they wish to use
Connect tool use to the learner's personal frame of interest
Include tool-use in interaction
Fuse interaction such as turn-taking with tool use

Consider alternative devices
It may be appropriate to consider introducing additional electronic mobility guidance systems such as the track guidance system or the sensor collision avoidance device or to review methods of access in order to address the learner's frustration from elongated efforts of using equipment which consistently fails them. Ask the learner what they would prefer as they will now have reached a stage of understanding about how the machine operates, specifically in relation to sequencing of functions to spatial circumstances.

It is important to wait until the learner has reached the stage of "difficult transition" before considering additional electronic mobility guidance systems. If this type of electronic equipment is provided to the learner at an earlier stage they will not be given the opportunity to explore the machine and to build up their understanding of the need for sets of sequences.

Use of the track guidance system means that the learner will not have the opportunity to circle and to bang and bump into walls and objects, the only sequences they will have control over is stopping and going and choosing left or right at a junction. They will not be able to experience unexpected sensory impact and feedback of their body reacting and moving within the machine when there is a collision or contact with objects in the environment.

A sensor collision avoidance device again limits the important early learning sensory impact experience of banging and crashing into walls and objects and allowing the learner to work out what sequences are needed to achieve control of goal-directed operation. It can be very confusing for the learner to suddenly have the machine take over navigation and steering which will then reduce their opportunity for developing more complex navigation and problem solving competencies.

Additional electronic mobility guidance systems can assist the learner who becomes too frustrated at their consistent low level of success when trying to navigate within more complex environments or who needs an electronic mechanism to assist with the preservation of their energy levels.

Strategies for extrovert levels – (6 Competent; 7 Proficient; 8 Expert)
Learner Explores Performance
Focus is on body, machine, environment & occupation

Focus learner's attention to competent tool use and physical and social environment

Strategies oriented at tool use interaction
Encourage exploration of tool use in everyday environment
Facilitate the synchronization of movements of body parts with tool use to achieve precision.

Frustration
Facilitate the learner's development of strategies to release blocking and decrease frustration

Strategies oriented at social interaction
Unstructured variation
Group interaction
Free play or games with rules at a complex level

Language use
Verbal dialogue

Labeling the learner's expressions of emotions with regard to the outcome of tool use
Reasoning language
Sophisticated language
Body language used in an abstract, symbolic way
Rapid and spontaneous language with variable tempo

Give instructions for the learner to carry out

Make mutual agreements of how the session should be structured

Facilitate the learner's development of judgment skills by making them aware of how to anticipate and forward plan in new and more complex environments.

Facilitate the development of higher judgment skills as the learner attains the importance of taking care of others in different environments

Promote the learner's own initiatives
Encourage development of the learner's own desires, goals – what would you like to do
Encourage own initiatives – try on your own, do it the way you would like

Allow the learner to explore use of the tool in their own way
Allow the learner to make their own mistakes
Allow unsafe operations to a certain extent
Allow the learner to take the lead (not led by facilitator)

Phase 6 - Competent

Allow the learner to pause and have periods of rest in order to be able to refocus and retain energy.
Facilitate development of fine precise generation of force and grading and timing of movement as part of working towards smooth and fluent tool use.
Facilitate and challenge the learner's development from gross to fine smooth motor performance by intermittently increasing the speed setting.
Encourage exploration of undefined boundaries within the tool use in relation to the physical environment.
Encourage short expeditions on their own.
Offer tasks that don't involve complicated use, such as navigation through doors.
Encourage bimanual activities, driving with one hand taking an object with the other.

Phase 7 - Proficient

Offer the learner tasks in everyday environments that extend their tool use skills in conjunction with navigation and interaction. Speed, play, and everyday tasks can be deliberately changed and added in order to provide the learner with higher challenges.
Start with simple navigation tasks and gradually add complexity by asking the learner to perform navigation in spaces which range from large and small, open and narrow, confined and full of activity, indoor and outdoor. The performance can also be made more complex by adding interactions which range from silence; background noise; imperative directions; verbal instruction, general chit-chat, simple routine questions, in depth specific questions.

Examples of gradual progression from lower to higher challenges:
Ask the learner to:

- drive into another room and find their way out on their own while keeping silent
- drive into another room and provide the learner with interactive distractions from the task while they are driving out again
- drive into a room and then reverse immediately out of the room
- drive into a room move around the room and then reverse out of the room
- drive into different sized furnished rooms and navigate in a circle around furniture using forward and reverse in clockwise and anti-clockwise directions

Allow and encourage playful tool use (free play and play with rules) and discovery
Facilitate reflection of experiences to build understanding of consequences as a result of trying new things – what did you learn?
Encourage longer expeditions on their own including other tasks

Phase 8 - Expert

Offer opportunities to exercise tool use skills in a wide variety of contexts and environments both indoor and outdoor. Integrate automated tool use in everyday activities, lifestyle and culture.

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