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Is the Goal Attainment Scale a Suitable Outcome Measure for Use with Individuals with Complex Seating Needs?

Abstract

Background: Wheelchair and seating provision is a basic human need for individuals with restricted mobility, to maximise occupational performance and participation. Outcome measures are essential in measuring the effectiveness of interventions. As part of a larger study, the goal attainment scale (GAS) was identified by the clinical team at SeatTech as a measure requiring research.

Objectives: The aim of this study was to evaluate GAS as an outcome measure for use with individuals with complex seating needs.

Methods: Qualitative single case study. Recruitment from a convenience sample at SeatTech. Data collected in three stages before, during and 10 days after the wheelchair issue day, to evaluate the impact of time on goal attainment. Use of semi-structured interviews, observation and GAS. Field notes were taken and later analysed. Ethics was obtained through Enable Ireland, consent gained and pseudonyms used.

Results: GAS enabled collaborative goal setting. GAS was flexible and individualised goal were set in relation to pain reduction, posture and independence despite complexity. Weighting, defining outcomes and scoring added objectivity and sensitivity to change. The importance of a follow up period was highlighted as the participant was unable to attain goals until he had the opportunity for participation in his environment.

Conclusion: Outcome measurement is an essential part of seating and wheelchair provision in ensuring optimal outcomes. Overall GAS proved to be beneficial. However as no one outcome measure captures everything it should be considered a welcome addition but not a replacement to the interview and assessment already in place in this context.

Introduction

Wheelchair and seating provision is a basic human need for all individuals with restricted mobility (Gallahue and Ozmun 2002; World Health Organisation 2008). For individuals with complex seating needs appropriate wheelchair and seating provision is crucial in providing the postural support, comfort and tissue integrity required to maximise occupational performance (McDonald 2010) and equal opportunities to participation in the environment (United Nations 2008; World Health Organisation 2008). As specified in the philosophy of Occupational Therapy, participation in culturally meaningful and purposeful occupation is crucial for the health, well-being and quality of life of all individuals (Townsend and Polatajko, 2007; Wilcock 2006).

Outcome measurement defined as a process of assessing change (Unsworth 2000) is seen as an essential component of the Occupational Therapy process, as 'the delivery of the system marks the beginning of the time of use, and therefore signals the beginning of the evaluation of system effectiveness' (Cook & Hussey 1995, p. 182). Outcome measures are a fundamental part of evidence-based and client-centred practice in terms of informing clinician's decision making, demonstrate the effectiveness of intervention, justifying scarce resources and identifying the need for the development of resources or services (Austin and Clark 1993; Harris 2005). This is especially true in the area of wheelchair and seating provision, as clinicians must draw on a vast array of clinical reasoning to deliver complex and expensive interventions, which have the potential to cause harm to one's body functions and structures and inhibit participation in meaningful occupations (McDonald 2010; Mortenson et al 2007; Neistadt 1998). However in the context of physical disability in Ireland Occupational Therapists have identified that there is still a lack of regularity in the use of outcome measure due to issues related to time, education and training, organisational policies and the availability of suitable measures (Stapleton and McBrearty 2009).

As part of a larger study to identify the best outcome measure for use with individuals with complex seating needs, the clinical team at Enable Ireland's SeatTech posture and mobility service identified GAS as a measure requiring research. Their choice was further supported by the literature which outlined that there is a call for further research into GAS in different clinical settings (Khan et al 2008; Steenbeek et al 2007). The aim of this research study therefore is to evaluate GAS as an outcome measure for use with individuals with complex seating needs.

Literature Review

GAS was originally introduced by Kirusek and Sherman (1968) to evaluate adult mental health programs. Since this time GAS has been used with individuals across the lifespan with similar conditions to those who would attend a wheelchair and seating service, for example Cerebral Palsy (Cusick et al 2006; Steenbeek et al 2007); Multiple Sclerosis (Khan et al 2008); Spinal Cord Injury (Barclay 2002); Communication Disorder (Schlosser 2004) and Cognitive Impairment (Rockwood et al 1997).

GAS is cost free and can be sourced from a number of studies (Kirusek and Sherman 1968; Turner-Stokes 2009). Ottenbacker and Cusick (1993) talk about GAS as a flexible tool for setting individualised goals. According to the literature it can be used across a variety of clients, interventions and practice areas (Schlosser 2004) and can be applied to almost any of the International Classification of Functioning (ICF) levels and domains (World Health Organisation 2001). Bovend' Eerdt et al (2009) report that in the area of rehabilitation GAS enables specific, measurable, achievable, realistic and timed (SMART) goals to be set once the client's needs and wishes are set out. Although GAS can be developed without client involvement (Cusick et al 2006), goals are said to be more likely to be attained if the client is involved (Turner-Stokes 2009). Therefore the ability of GAS to actively encourage collaborative goal setting (Cusick et al 2006; Ottenbacker and Cusick 1993) and also input from all relevant parties is regarded as beneficial as it enables information to be shared and individually meaningful goals to be negotiated and set in a realistic manner (Ottenbacker and Cusick 1993; Turner-Stokes 2009; Mortenson et al 2007). GAS is also reported as being beneficial in terms of facilitating goal attainment (Schlosser 2004). For clients GAS is reported to act as a therapeutic tool (Fisher and Hardie 2002) with benefits of increased self-efficacy, motivation and performance (Schlosser 2004). For clinicians GAS is reported to provide a good source of communication between team members (Turner Stokes 2009), a means of recording and demonstrating change following intervention (Ottenbacker and Cusick 1990) and a more focused outlook (Schlosser 2004).

According to the literature GAS is a sensitive measure (Hurn et al 2006; Schlosser 2004) of individualised change (Kiresuk and Sherman 1968; Ottenbacker and Cusick 1993). In addition to regular goal setting there is the option of weighting goals in terms of importance and difficulty (Hurn et al 2006; Kiresuk and Sherman 1968; Ottenbacher and Cusick 1993). Also Kirusek and Sherman (1968) 5-point scale (-2 to +2) enables goal attainment outcomes

to be predicted and rated on a scale ranging from most to least favourable outcome and there is also the option of adapting this to a seven-point scale to avoid the floor and ceiling effects if there is no room for progression or regression (Cytrynbaum et al, cited in Cusick 2006). GAS formula (Kirusek and Sherman 1968) enables a single combined standardised T-score to be calculated which means actual progress in achieving goals can be compared to 50 the expected level of outcome and also a comparison of occupational performance over time can be summarised (Barclay 2002; Kirusek and Sherman 1968; Ottenbacher and Cusick 1993; Schlosser 2004; Turner Stokes 2009). However with no guidelines for training (Cusick et al 2006) GAS is perceived as complex and time consuming to administer and score (Bovend'Eerdt et al 2009; Mortenson et al 2007).

GAS is viewed by some as a valid measure of ability (Fisher and Hardie 2002) with social validity and acceptance among clinicians (Schlosser 2004). Nonetheless others report issues with internal validity such as the need for accuracy in predicting outcomes and for independent raters (Cusick et al 2006; Kirusek and Sherman 1968; Ottenbacher and Cusick 1993). Also reliability is said to depend on the experience and knowledge of clinicians (Turner-Stokes 2009). This would therefore leave some questioning whether GAS is rigorous and objective enough (Turner-Stokes 2009), particularly for measuring wheelchair outcomes (Mortenson et al 2007).

Overall the benefits of GAS outweigh the challenged and it is seen as a welcome addition to the present set of outcome measures available (Schlosser 2004). However having carried out an extensive search of the literature to date there are limited studies (Fitzpatrick 2011; Mortenson et al 2007), which explore its use explicitly in the context of wheelchair and seating provision. The aim of this study therefore is to evaluate GAS as an outcome measure for use with individuals with complex seating needs.

Methods

Paradigm of inquiry

A participatory paradigm of inquiry (Guba and Lincolm 2000) was chosen as it will guide me towards capturing both the subjective and objective reality of the participant and also my own voice as a researcher of the GAS, in critiquing this tool as an outcome measure for use with individuals with complex seating needs.

Study design

A qualitative approach and single case study design (Creswell 2007; Jupp 2006; Stein et al 2012; Yin 1994) was used to enable an extensive evaluation of the GAS to take place, by exploring in-depth its use over time with one person in the context of wheelchair and seating provision.

Participants

Participant

Recruitment took place through clinicians from Enable Ireland. A convenience sample (Robson 2002) was used to select an individual from an adult population of clients who were due to be issued with their wheelchair and seating intervention during the time frame of the project. Unfortunately the participant who initially commenced this study was unable to see it to its completion due to the cancellation of seating appointments, waiting lists and medical issues impacting on time. Therefore a second individual was selected. The participant represented the typical population of individuals who would attend a seating and wheelchair service in that there were complex seating needs. That is with a diagnosis of Cerebral Palsy with severe spastic quadriplegia, classified as Level V in the Gross Motor Function Classification System (Palisano et al 1997), there were complex motor and postural deficits present causing activity limitation in all four limbs (Rosenbaum et al 2006). Also in addition to motor impairments this individual had difficulty with communication and vision.

Clinician/Support Worker

This participant's clinician and support worker also took part in this study in accordance to the wishes of the participant. They provided the participant with support to communicate. Also the input of these individuals was important in terms of collaborative goals setting and

in defining outcomes and assigning weights (Ottenbacker and Cusick 1993; Turner-Stokes 2009; Mortenson et al 2007).

Data collection techniques

Data was collected in three stages in order to evaluate the impact of time on goal attainment, using semi-structured in-depth interviews lasting approximately 60 minutes each. An interview guide (see appendix 3) was used with only general topic areas identified in order to provide flexibility (Stein et al 2012) to explore relevant information in relation to the individuals background, the wheelchair and seating intervention and the outcome measure. Field notes were taken as a substitute to tape recording (Stein et al 2012) due to difficulties the participant had with verbal communication. Observations of seating and body language; the interview context, for example where the interview took place and who was present at each stage and a reflexive journal were used to provide accurate and rich sources of data and to ensure triangulation and trustworthiness (Creswell 2007; Yin 1994; Stein et al 2012; Hammell et al 2000). Interviews were conducted at a time and location convenient to the participant.

See table 1 below for details of the time period, location, people present and areas covered at the three stages.

Table 1 3 Stages of Research

	Stage 1	**Stage 2**	**Stage 3**
Time period	One month prior to the participant receiving the wheelchair and seating intervention.	As planned the day the participant was issued with the new wheelchair and seating system	As agreed ten days following stage 2, the participant issue date.
Location	Participants home environment.	Enable Irelands SeatTech posture and mobility service.	Participant's home environment.
Present	Participant, clinician and researcher.	Participant, support worker and researcher.	Participant, support worker and researcher.

Areas covered	1.Building a therapeutic relationship 2. Provision of education in relation to the GAS. 2. Gathering relevant background information through an initial interview and observation. 3. Administration of the GAS (see appendix 4): -Setting SMART goals -Assigning a weight (importance x difficulty) to each goal using a four point scale (see appendix 5). -Defining expected outcomes using Kiresuk and Sherman's (1968) five point scale ranging from the most to least favourable levels of outcomes (+2 to -2) for use as a follow up guide. -rating each goal on a 5-point scale -Applying the GAS formula (see appendix 6) to produce a baseline score. 4. Questions in relation to the usefulness of the outcome measure.	1.Administration of the GAS: -rating goal attainment using the follow up guide. -Calculating the 1st achieved GAS T-score. -Calculating change in GAS T-score. 2. Questions in relation to the usefulness of the outcome measure.	Administration of the GAS: -rating goal attainment using the follow up guide. -Calculating the 2nd achieved GAS T-score. -Calculating change in GAS T-score. 2. Questions in relation to the usefulness of the outcome measure.

Data analysis

Field notes, observations and reflections were analysed a number of times for themes which emerged from the data (Hammell et al 2000). Also the GAS was critically evaluated as an outcome measure for use with individuals with complex seating needs.

Ethics

Enable Ireland's ethics application was made by the research supervisor and ethics was granted. I practiced administering and scoring GAS, including goal selection, scale developing and rating with another researcher in preparation to increase the accuracy and reliability of the results (Schlosser 2004, Steenbeek 2007).

The participant was provided with an information letter prior to commencing the study (see information letter appendix 1). Consent, confidentiality, data protection and the voluntary nature of this project were also explained verbally to the participant at the first interviews (Wengraf 2001; Silverman 2006). It was explained to the participant that although complete anonymity is not always possible due to the small community of people involved in SeatTech, all details would remain confidential and dealt with in a sensitive manner. The participant was also assured when data was finished with it would be stored in locked press (Stein et al 2012). Consent was obtained verbally from the participant and the clinician gave written consent on her behalf due to difficulties with holding a pen (see consent form appendix 2).

The research was carried out in a client-centred manner, mutual respect was upheld and professional boundaries were maintained at all times (Stein et al 2012). Attention was paid to internal validity in that the outcome measure was rated by the researcher who was not involved in the intervention (Ottenbacher and Cusick 1993). In order to protect the identity of the participant pseudonyms were used and information which could potentially be used to identify the participant such as location and age were either eliminated or changed (Stein et al 2012). A summary of the research findings was read to the participant and afterwards the information was verified as correct and an accurate representation. Another researcher also peer reviewed the findings which adds to the dependability of this study (French et al 2001).

Findings

Therapeutic relationship

When asked about building a therapeutic relationship and rapport the participant (pseudonym Martin) said "It is important to get to know someone. You feel comfortable. You can tell them things." Through observation it was clear that Martin trusted the clinician and over time it emerged that a therapeutic relationship was established between all partied, as the participant engaged openly in discussion and became actively involved in the goal attainment process.

Provision of Education

Martin did not have any former experience of goal setting. Examples of goals other people had set and also short and long term goals were provided. Martin said this was important as he then understood what was expected of him.

Background information

Martin provided information in relation to himself, his meaningful occupations and his environment (see figure 1). Interviewing Martin in his home environment also provided greater insight into Martin and his meaningful occupations as he showed me photographs of himself as a child, cards he had made and trips to the theatre with friends. This also provided a greater understanding of barriers to participation in the community (difficulty with manoeuvring his power wheelchair to the local bus stop) and in the home (difficulty with fitting the table underneath the new wheelchair).

Martin and the Clinician also spoke about the history of Martin's seating needs, the complexity of posture and seating, challenges with independence and the new wheelchair intervention (see figure 2).

Figure 1 Person-Occupation-Environment

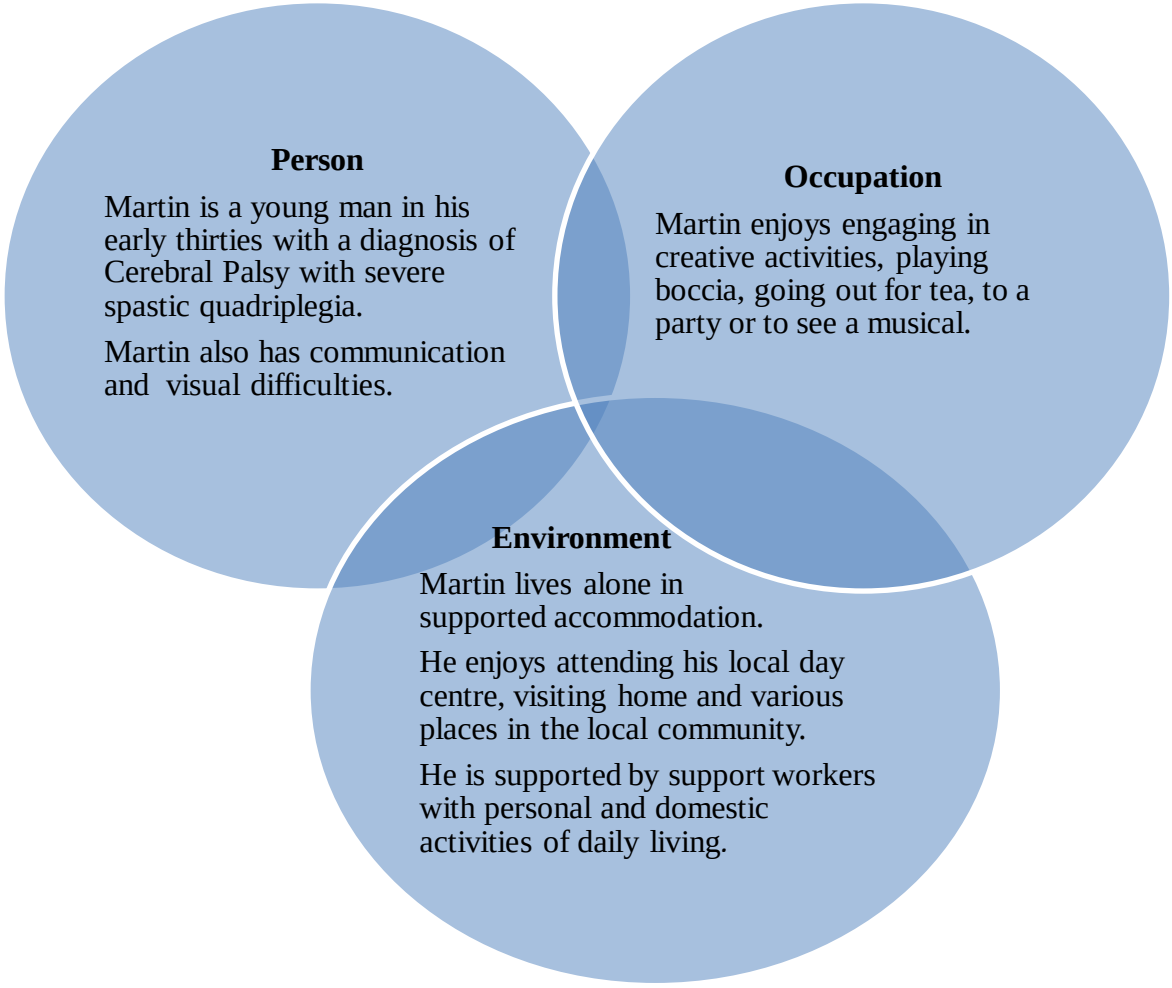
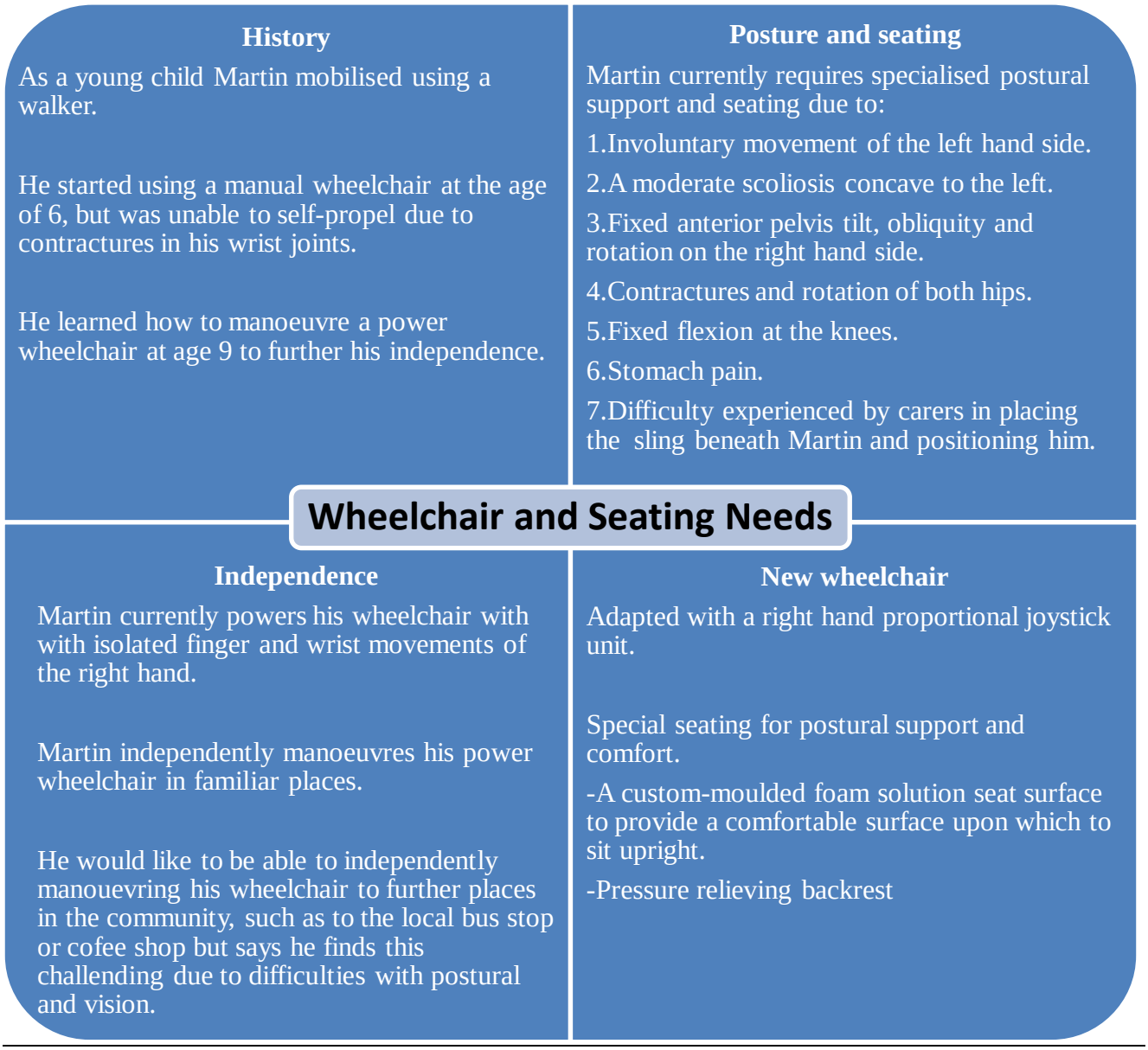


Figure 2 Wheelchair seating needs



Goal Attainment Scale

Developing the outcome measure at stage 1 took 30 minutes to set SMART goals, define outcomes, weigh, rate and score. At stage 2 and 3 it took 15 minutes to rate and score.

Stage 1

Goals setting

Martin and his clinician collaboratively engaged in goal setting with both parties actively involved from the start. Both views were communicated openly. The main goals of Martin's seating from the perspective of the clinician were in terms of providing a stable base of support, improving Martin's midline position, preventing and accommodating deformity, providing the appropriate postural support, comfort and maximising function. Martin's priority was in terms of being able to independently get the bus; reducing stomach pain and also he recognised that he should sit out of his wheelchair more often but doesn't as his carers have difficulty getting the sling under him and in positioning him. With this in mind the clinician used his problem solving skills to make suggestions in terms of training for carers. Also short term goals were set in relation to first of all being able to manoeuvre the power wheelchair to the local bus stop with supervision, with the long term goal of being able to access transport independently to maximise participation in meaningful occupations such as the theatre. Collaborative goal setting enabled four realistic and achievable goals to be set without delay (see table 2). Martin said that setting goals together was important as they both said what they wanted from the new wheelchair. He also said that setting goals "gives you something to aim for and helps you to do things". However in writing SMART goals it was difficult to specify a time frame for the completion of the goals as the people who support Martin were not present at stage 1 to develop an action plan with time periods specified.

Table 2 Goals

Goals
1. To reduce stomach pain
2. To achieve a midline sitting posture with my new wheelchair
3. To enable my carers to be able to position me in midline in my new wheelchair through the provision of training
4. To be able to manoeuvre my power chair to the bus stop

Weighting the goals

Weighting the goals added to the sensitivity of this outcome measure for this individual with complex seating needs as it took into consideration how important the goals were to the individual and also how difficult it would be to achieve them as stated by the clinician. For example the participant identified being able to manoeuvre his wheelchair to the bus stop as very important however the clinician recognised that this would be very difficult to achieve due to postural and visual difficulties therefore by weighting the goal in accordance, it meant that the goals set were more realistic and the change determined more reliable.

See the table 3 for weights assigned to each goal.

Table 3 Weighting (Importance x difficulty)

Goal	Importance	Difficulty	Weight
1. To reduce stomach pain	3	2	6
2. To achieve a midline sitting posture with my new wheelchair	3	2	6
3. To enable my carers to be able to position me in midline in my new wheelchair through the provision of training	3	1	3
4. To be able to manoeuvre my power chair to the bus stop	3	3	9

Defining outcomes

Developing a follow up guide (see table 4) with outcomes envisaged meant that the goals set were now measurable. The expected outcome was defined first, making more and less favourable outcomes straight forward to define. Defining outcomes in numerical and observable values provided an objective measure for scoring performance at follow up.

Table 4 Follow up guide

Goal	**-2 (much less than expected outcome)**	**-1 (less than expected outcome)**	**0 (most likely outcome)**	**+1 (more than expected outcome)**	**+2 (much more than expected outcome)**
1. To reduce stomach pain	Pain score 10/10	Pain score 7/10	Pain score 5/10	Pain score 3/10	Pain score 0/10
2. To achieve a midline sitting posture with my new wheelchair	Sitting posture of 30 degrees	Sitting posture of 20 degrees	Sitting posture of 10 degrees	Sitting posture of 5 degrees	Sitting posture of 0 degrees
3. To enable my carers to be able to position me in midline in my new wheelchair through the provision of training	Carers position me in my new wheelchair with 50% accuracy	Carers position me in my new wheelchair with 75% accuracy	Carers position me in my new wheelchair with 100% accuracy when prompting is provided	Carers independently position me in my new wheelchair with 100% accuracy most of the time	Carers independently position me in my new wheelchair with 100% accuracy all of the time
4. To be able to manoeuvre my power chair to the bus stop	Dependent on someone else to manoeuvre my power chair to the bus stop	Able to manoeuvre my power chair to the bus stop with support	Able to manoeuvre my power chair to the bus stop with supervision	Able to manoeuvre my power chair to the bus stop independently	Able to manoeuvre my power chair to the bus stop and also to the local coffee shop independently

Stage 1, 2 & 3

Rating the GAS

Stage 1: Martin rated the baseline score at the less than expected outcome of -1.

Stage 2: Goals related to pain and positioning were rated at the expected level. The goal related to community participation however was unable to be attained on the issue day as Martin had not had the opportunity to use his new wheelchair in the community; therefore this goal was again scored at the less than expected outcome.
The day of issuing the new wheelchair took four hours in total. Martin said "It was hard to do it all on the one day. It would be good to come back another day so that you know if there are any problems."

Stage 3: Carrying out the outcome measure 10 days after Martin's issue day meant that he had the opportunity to use his new wheelchair in his home environment and community enabling all goals to be achieved either at or above the expected outcome.

See table 5 for the rates applied to goals at the 3 stages.

Table 5 Rating the GAS

Goal	**Stage 1 (Baseline)**	**Stage 2 (Outcome 1)**	**Stage 3 (Outcome 2)**
1. To reduce stomach pain	-1	0	+1
2. To achieve a midline sitting posture with my new wheelchair	-1	0	0
3. To enable my carers to be able to position me in midline in my new wheelchair through the provision of training	-1	0	+2
4. To be able to manoeuvre my power chair to the bus stop	-1	-1	0

Calculating the standardised score

The GAS formula appeared complex initially however by following a worked example step by step I was able to apply the formula and calculate a score.

Stage 1: A baseline GAS T-score of 35.8 was calculated which was as expected below the expected level of 50.

Stage 2: A GAS T-score of 44.7 was calculated, which is below the expected outcome. However a change in GAS T-score of 8.9 indicated that Martin made some progress in goal attainment.

Stage 3: A final GAS T-score of 55.3 was calculated, which is above the expected outcome. An overall final change score of 19.5 was also calculated which shows that over time Martin made significant improvement in goal attainment.

See table 6 for the calculated GAS T-score and changes achieved.

Table 6 GAS T-score

Stage 1 (Baseline T-score)	**Stage 2 (Achieved T-score-outcome 1)**	**Stage 3 (Achieved T-score outcome 2)**	**Change in GAS T-score**
Stage 1: 35.8	Stage 2: 44.7	Stage 3: 55.3	Stage 2 (Outcome 1): 8.9 Stage 3 (Outcome 2): 19.5

Discussion

This study provides some insight into GAS as an outcome measure for use with individuals with complex seating needs, through its use with an individual with Cerebral Palsy and a range of complex needs typical of this context.

Similar to the findings of Barclay (2002), this study found that once a therapeutic relationship was established, education provided and information exchanged, the scene was set for developing GAS. Carrying out this outcome measure in the individual's environmental context at baseline and follow up was imperative in gaining an understanding of the individual's meaningful occupations and barriers to participation in the environment. Assessing the person-occupation-environment interaction is a primary role of the Occupational Therapist (McDonald 2010) and a central part of the seating process as the manner in which each individual uses their wheelchair is extremely individualised (Mortenson et al 2007). Also this is essential in terms of moving beyond the technical components of the intervention towards looking at the individual's occupational need (McDonald 2010).

GAS was found to be client-centred in that through the use of this tool the participant was empowered to become actively involved in expressing his needs and wants and to set goals in collaboration with the clinician. This was important in terms of both the service provider and client expressing their priorities (Hammel 2012). Also this had a positive impact on the participant's engagement in occupation and there was therapeutic value with the participant saying goal setting gave him something to aim for. According to the literature this is seen as a positive feature of the GAS (Cusick et al 2006; Ottenbacker and Cusick 1993). Collaboration with relevant supports is also seen as important in order to share information, set SMART goals (Bovend' Eerdt et al 2009) and facilitate participation in occupation (McDonald 2010). This however was an issue encountered in this study as without the participants support worker present at the initial stage it was difficult to put a plan in place for the completion of goals. Nonetheless through collaboration with this support network at later stages this was quickly resolved.

The GAS proved to be a sensitive measure of change in the area of wheelchair and seating provision, which is comparable to other studies (Hurn et al 2006; Kirusek and Sherman 1968; Ottenbacher and Cusick 1990; Schlosser 2004). GAS was flexible and adaptable to the ICF domains and levels (World Health Organisation 2001) in that it enabled individualised goals to be set which were specific to the participant's needs despite the complexity of the impairment, activity limitations and participation restrictions (Schlosser et al 2004). Weighting the goals (Kirusek and Sherman 1968) took into consideration how important each goal was to the participant and also how difficult it was to achieve each goal due to complex seating needs. Developing a follow up guide (Kirusek and Sherman 1968) with outcomes determined meant that goals were objectively rated in the follow up stage. Also calculating a single combined standardised T-score and change score (Kirusek and Sherman 1968) enabled the client's actual progress in achieving goals to be compared to 50 the expected level rather than simply giving a numerical value, which took into consideration the level at which goals were achieved and also the accuracy of the clinician in predicting outcomes. Administration of GAS at three points in time illustrated the importance of a follow up period as goals were unable to be attained until the participant had the opportunity for activity participation in his environment.

Nonetheless there was also some limitation in sensitivity as GAS did have the capacity to capture information in relation to the service provision process, for example the individual's experience of waiting times between each stage of the seating process and issues such as transport and support required to access the service. Also it did not explicitly ask about issues directly related to the individual's body functions and structures such as skin integrity which is something that prescribers in the area of seating and wheelchair provision say they like included (Mortenson et al 2007).

GAS required an additional investment of time over the regular goal setting process (Khan et al 2008; Mortenson et al 2007). However as clinicians want an outcome measure that is quick and easy to use (Mortenson et al 2007) and as time is reported in the literature as an obstacle to the use of outcome measures in practice (Stapleton and McBrearty 2009) it is important to discuss alternative ways of managing this. For example due to the time consuming nature of defining outcomes, it may be more practical in practice to define only the expected level of outcome, from which it is believed, that through experience and clinical

knowledge (Turner-Stokes 2009) it would be possible to identify at what level the goal was over or under achieved. To have a tool such as the GAS as an intrinsic part of the initial assessment rather than a separate entity would also work towards ensuring that this becomes a part of the process and not an additional task perceived as time-consuming. Also it may be necessary to have a standardised follow up period. Four week is said to be the minimum time frame required for change to take place for individuals with complex needs when there are goals that require new learning (Bovend' Eerdt et al 2009) so maybe this could be built into the seating process with the option to adapting the time frame depending on the need of each individual. Also as the participant's ability to achieve predicted outcomes was slightly underestimated in this study, team training, familiarity in the use of the GAS (Cytrynbaum et al 1979, cited in Ottenbacher and Cusick 1993) and avoiding goal setting which is too easy (Ottenbacher and Cusick 1993; Becker et al 2000), could be used as strategies to improve reliability.

Overall the qualities of the GAS make it a potential outcome measure for use in the area of seating and wheelchair provision. GAS should be considered a welcome addition to the interview system and assessment already in place in wheelchair and seating service. However as highlighted in this study GAS does not capture all information. Therefore to be used effectively in the area of wheelchair and seating provision it should be integrated into the interview and assessment system already in place and used as an additional component rather than a replacement.

Methodological Limitations

The outcome measure was identified by SeatTech therefore there was not the option of selecting an outcome measure based on the evidence.

Due to the small sample size of this study the results cannot be generalised to all wheelchair and seating services.

The awareness of the participant that he was involved in a research study could have influenced his answers to questions and therefore the results of this study.

Future areas of research

Further case studies could be carried out in the area of complex seating needs using the same methods to form a comparison.

A larger study with a variety of outcome measures carried out with individuals in the area of seating and wheelchair provision would enable the best possible outcome measure to be chosen.

Research could be carried out with clinicians following use of the GAS in practice to take into account their perspective of the GAS for use in the area of complex seating needs. It would be beneficial to find out if the GAS provides a good source of communication between professionals; if it is beneficial for recording therapeutic change and to show clinical accountability (Kirusek and Sherman 1968; Ottenbacker and Cusick 1990) and if it provides clinicians with a more focused outlook (Fisher and Hardie 2002; Schlosser 2004), as according to the literature there are some of the benefits of using the GAS in practice.

Conclusion

Mobility is a basic human need for all individuals, necessary to avail of equal opportunities to performance and participation of meaningful occupations and positive health and well-being (Gallahue and Ozmun 2002; United Nations 2008; World Health Organisation 2008; Wilcock 2006). Therefore within the area of wheelchair and seating provision outcome measures are an essential tool to measure the effectiveness of interventions (Austin and Clark 1993) which have the potential to cause harm to one's body functions and structures and inhibit participation in meaningful occupations (McDonald 2010). Nonetheless there is still a lack of regularity in the use of outcome measures due to issues such as time, education and training, organisations policies and the availability of suitable measures (Stapleton and McBrearty 2009).

GAS was identified by the clinical team at SeatTech as an outcome measure with potential for use with individuals with complex wheelchair and seating needs and according to the literature there is also a call for further research to explore its use in other clinical settings (Khan et al 2008; Steenbeek et al 2007). Therefore this study set out to evaluate GAS as an outcome measure for individuals in the area of seating and wheelchair provision.

A review of the literature showed that there are many benefits of GAS reported. It is flexible; adaptable to almost any of the ICF levels and domains; it is client-centred and enables

collaborative goal setting both with the client and all individuals involved in his or her care; it is objective; a sensitive measure of goal attainment and there are therapeutic values both for the client and the clinician (Fisher and Hardie 2002; Kirusek and Sherman 1968; Ottenbacker and Cusick 1993; Schlosser 2004; Turner-Stokes 2009; World Health Organisation 2001). Challenges reported include its lack of rigour for the area of wheelchair and seating provision and its complexity and time consuming nature (Mortenson et al 2007; Turner –Stokes 2009).

Having carried out an in depth qualitative case study where GAS was administered at three points in time, many of these points were validated in the context of wheelchair and seating provision. Through use of GAS the participant was empowered to set goals in partnership with his therapist in order to communicate what was important to him. Goals were set which were related to his needs of pain reduction, posture management and independence, despite the complexity of these needs. These goals were made realistic by weighting them in terms of difficulty and importance (Kirusek and Sherman 1968). Developing a follow up guide (Kirusek and Sherman 1968) also meant that goals were objectively rated at baseline and follow up. The score was effectively calculated by applying the GAS formula (Kirusek and Sherman 1968) and demonstrated the importance of time for goal attainment and therefore the importance of a follow up period after a wheelchair has been issued. Challenges in this practice area include practicalities such as having all members involved in supporting a client present at the initial stage of developing GAS, lack of sensitivity to measuring the impact of the service provision process and the implication of time for its non-use of in practice.

Overall this study shows that GAS is beneficial, however no one outcome measure is perfect and GAS is no different in this respect. Therefore it should be considered a welcome addition but not a replacement (Schlosser 2004) to the interview and assessment already in place in a seating and wheelchair service. Based on the findings further research would be beneficial in order to evaluate further the GAS as an outcome measure used in practice.

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Appendix 1:

PARTICIPANT INFORMATION SHEET

UNIVERSITY of LIMERICK

OLLSCOIL LUIMNIGH

Study Title

The evaluation of the Goal Attainment Scale and the Wheelchair Outcome Measure outcome measures for use during seating/wheelchair provision in SeatTech Enable Ireland.

Would you like to take part?

This information sheet is about a study which is taking place with SeatTech and Enable Ireland. It wishes to invite people who are due to be provided with wheelchair and seating to take part. The study will examine if a questionnaire can be used to see if the seating assessment and equipment provided meet the needs of the person. Before you decide to participate, it is important for you to understand why the research is being done and what your participation will entail. Please take time to read the following information carefully. Please ask about anything that is not clear or if you would like more information.

What is the purpose of the study?

This study is being completed as part of masters and postdoctoral research at the University of Limerick

- The purpose of this study is to review the way that seating services are provided and to see if a standardised questionnaire can be used to determine the outcome.
- The lead researcher will work in partnership with SeatTech and Enable Ireland to connect with participants.
- Participants will complete an interview before, during and after they receive their seating/wheelchair- this interview will incorporate a standardised questionnaire.

What will I have to do?

If you agree to participate, the lead researcher, Rosie Gowran, will invite you to participate in three interview/questionnaire sessions which will be carried out by Masters Students from the MSc Occupational Therapy (Professional Qualification) programme at the University of Limerick.

Each meeting will include an interview about your experience and a standardised questionnaire. Information about both of these aspects of the meeting is below.

Interviews

- Interviews will be conducted at a time and place of convenience to you- the second interview will be conducted on the day of your SeatTech appointment.
- The interview will last a maximum of 90 minutes
- You will be asked questions about your seating/wheelchair.
- The interview will be recorded using audio equipment and later transcribed by the researchers
- Transcriptions will be returned to you to read so that you can make sure that they accurately reflect what you have said and allow you to make any changes.
- Your interviews will be analysed by the researchers to see what your experience of your wheelchair and seating is like.
- The results of the interviews will be used with the results of the standardised questionnaire to see if the questionnaire is effective.
- If you decide not to participate in the study at any time you can on request that the information that you provided to the researcher be removed from the study.

Outcome Measures (the questionnaire):

- As part of the interview, you will be invited to complete a standardised questionnaire with the researchers. These questionnaires are used to measure what the outcome of something is- in this case the provision of wheelchairs/seating to meet your needs- thus they are called outcome measures.
- The researcher will go through the standardised questionnaire with you and will write down your answers to the questions.
- Your answers to the questionnaire will be analysed. The results will be compared to what you said in the interview to see if the questionnaire accurately represents your experience.

- The answers that you give in the interview and in the questionnaire will be confidential.

What are the risks and benefits?

- There are no apparent risks in participating in the study.
- As with any interview process questioning may trigger issues that may cause an emotional response – if at any stage you wish to take a break from the interview and return to it later, you will be able to do this. If at any stage you wish to withdraw from the study and not participate any more, you will be able to do this.
- The direct benefit to you from taking part in this study is active participation in the development of SeatTech seating services.
- The information you provide will be very valuable in developing the service provided by SeatTech.

What will happen to the results? Confidentiality

- All the information you provide will be kept confidential at all times.
- The results of the study will be reported to the University of Limerick and Enable Ireland and presented as part of Master's thesis'
- The results will potentially be published at a later date.
- In order to maintain your confidentiality, your personal details i.e. your name, address and any other obviously identifiable information about you will be removed from all reports.
- Pseudonyms will be used, however given the nature of the small community involved in this area complete anonymity is not always possible.
- All audio tapes will be destroyed after information has been transcribed. Transcriptions will be stored on a password secured computer and hard copies will be stored in a locked cabinet.

Do you have to take part? Refusal or Withdrawal

- Taking part in this study is completely voluntary.
- You are entitled to refuse to participate in the interviews and you are free to withdraw at any time during the study.

- You may do so without fear of prejudice, this will not affect your relationship with Enable Ireland or SeatTech.

If you wish to take part or request for further Information

- If you wish to take part please sign the attached consent form and return it in the stamped addressed envelope provided.
- Should you require further information about this study please feel to contact Rosie by phone 061-202959

- The Department of Occupational Therapy at the University of Limerick is also supervising this research on an ongoing basis.

Lead Researcher

Rosie Gowran

Department of Occupational Therapy

Faculty of Education and Health Science

University of Limerick

e-mail: rosie.gowran@ul.ie

Appendix 2

CONSENT FORM

UNIVERSITY of LIMERICK

OLLSCOIL LUIMNIGH

STUDY TITLE:

The evaluation of the Goal Attainment Scale and the Wheelchair Outcome Measure for use during seating/wheelchair provision in SeatTech Enable Ireland.

I _____ am aware that I am being invited to participate voluntarily in a research study about my perspective of an outcome measure that can be used during seating/wheelchair provision.

- I have read and understand the Information Sheet.

- I have been informed by the researcher that:

  The purpose of this study is to explore the experience of using these outcome measures and to see if the outcome measure really reflects the user's experience of seating and wheelchair provision.

  The findings will be used for master's thesis, for service change, for educational purpose and published in a variety of research journal.

My participation will involve:

The Interview and Outcome Measures :

The three interviews will involve a discussion with the researcher about my involvement with and perspective of the seating/wheelchair provided by SeatTech Enable Ireland and will last for up to one hour and thirty minutes.

The interview will be recorded with handwritten notes and an audio device.

I will get the opportunity to review and comment on all transcripts and analyses of the interview before the findings are disseminated.

I am aware of the risks and benefits associated with the research.

- My participation and responses will be kept confidential at all times. I will not be identified nor will any identifying information about me to the organisation or be reported in any publications arising from this research.

- I am aware that pseudonyms will be used, however given the nature of the small community involved in this area complete anonymity is not always possible.

- My participation in this research is **completely voluntary** and I am free to refuse to participate.

- If I agree to participate, **I can withdraw at any time, without any negative consequences.**

I UNDERSTAND THAT BY SIGNING THIS FORM, I AM GIVING MY CONSENT TO PARTICIPATE IN THE STUDY DESCRIBED ABOVE.

Please complete the statements below to ensure fully informed consent:

- I am aware that I am volunteering to take part in a study that will explore:

- If at any time I was to feel unable to take part in the study I could:

_____

I have received two copies of this form, one for me to keep and one to return to the researcher.

_____ _____

Signature of Participant Date

_____ _____

Printed Name of Participant Date

_____ _____

Signature of Witness Date
(Staff/Family/Friend)

_____ _____

Signature of Researcher Date

Appendix 3

Interview Guide

Introduction

Thank you for taking the time to meet with me today. First of all I will tell you about my research project.

In order to identify areas of goal setting, we can then look at things you like to do but are having difficulty with or would like to be able to do more often.

Background information

What things do you like to do in your free time?

How do you spend your time during the day and at the weekends?

Are you in education/employment? What are the things you do there?

Do you like to spend time in the community?

Are you able to do the things you enjoy?

Does your disability cause you problems in any areas?

Would you like to be able to do any of these activities more often?

Who do you like to do things with (family, friends, independently)?

Demographics: What age are you? Do you live independently or with family/friends? How long have you lived with your disability?

Goal Attainment Scale

Did you have previous knowledge of goal setting?

Do you think education in relation to goal setting e.g. short and long term goals or technical terms would be important for the individual prior to goal setting?

Having set goals using the GAS what are the things you like about it? What do you dislike about it?

Do you think the relationship between the two people in the goal setting process has an impact and why?

What do you think are the benefits of being actively involved in the goal setting process?

Do you think it is important that the therapist and individual work together in setting and achieving goals?

Appendix 4

GAS Form

Goal	**Importance**	**Difficulty**	**-2** **much less than expected outcome**	**-1** **less than expected outcome**	**0** **most likely outcome**	**+1** **more than expected outcome**	**+2** **much more than expected outcome**
1.							
2.							
3.							
4.							
Scores:	**Baseline GAS T-Score**:		**1st Achieved GAS T-Score:**		**2nd Achieved GAS T-Score**:	**Change in GAS T-Score**	

Appendix 5

Weighting- importance x difficulty (Turner-Stokes 2009)

O= not at all important / difficult

1= a little important / difficult

2= moderately important / difficult

3= very important / difficult

Appendix 6

GAS formula (Kirusek and Sherman 1968)

$$\text{GAS score} = 50 + \frac{10\Sigma(w_i x_i)}{\sqrt{(.7\Sigma w_i^{\,2}) + .3(\Sigma w_i)^2}}$$