

UTILITY OF INTERNATIONAL CLASSIFICATION OF FUNCTIONING, DISABILITY AND HEALTH'S PARTICIPATION DIMENSION IN ASSIGNING ICF CODES TO ITEMS FROM EXTANT RATING INSTRUMENTS

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Objectives: Firstly to investigate the utility of the International Classification of Functioning, Disability and Health's (ICF's) participation dimension when items from extant questionnaires focusing on participation were assigned to ICF codes on an item-by-item basis; and, secondly, to conduct a preliminary investigation of the theoretical assumption expressed in ICF that ICF's environment component interacts with body function and participation components.

Design: A person-based, descriptive study.

Subjects: The sample comprised students with disabilities ($n = 448$), their parents/relatives ($n = 414$), their teachers/managers ($n = 418$) and special education consultants ($n = 110$).

Methods: Items from original surveys were used. Participation of students with disabilities: a survey of participation in school activities, The Arc's Self-Determination Scale, Perceived interaction-questionnaire, Environments survey, The Abilities Index. Data were analysed with the help of ANOVA, Scheffé pair-wise comparisons, correlation analysis and cluster analysis.

Results: The study partly confirmed the utility of ICF participation dimension in assigning codes to items from extant instruments. Moderate statistical correlations between participation chapters and between items from different ICF dimensions were found. Cluster analysis resulted in groups with participation patterns not related to type of disability.

Conclusion: Items from extant instruments can be assigned to ICF participation codes, but further item analyses and a more extensive questionnaire base are needed.

Key words: ICF, translation, evaluation, utility.

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INTRODUCTION

Participation as a health-related concept has, in the last decade, been used frequently in conjunction with providing services to

persons with disabilities and in official documents concerning persons with disability, for example in *UN Standard Rules on Equalization of Opportunities for Persons with Disabilities* (1). Common to most definitions of participation is the importance assigned to engagement and self-determination (2–4). The definition of participation recently given in the International Classification of Functioning, Disability and Health (ICF) by World Health Organization (WHO) is “involvement in life situations” (85, p.18). This is further commented on in a footnote: “the definition of Participation brings in the concept of involvement. Some proposed definitions of involvement incorporate taking part, being included or engaged in an area of life, being accepted or having access to needed resources” (5, footnote 14, p. 19). An empirical question is whether it is possible to assign ICF participation codes to items from questionnaires used to measure participation-related concepts, such as autonomy, as a basis for the assessment of participation.

The overall aim of the ICF classification system is to provide a unified and standard language and framework for descriptions of health and health-related states. In the previous International Classification of Impairment, Disability and Handicap (ICIDH) system; there was more or less only a medical facet to disablement. A hierarchical order of causes was described, in which body impairment caused a disability that in some instances generated handicapping consequences in the person's interaction with the environment. The theoretical assumptions of ICF stress that the environmental component interacts with the components body function, activity and participation (5–7). The strength of the relationships between the components is not commented on in ICF and is a question open to empirical testing. The type of opportunities and resources necessary for well-being probably vary between persons dependent on life-circumstances and person-characteristics (8). Therefore, it might be more functional to use a profile approach to describe groups of subjects with the same participation profile over several life domains than to construct groups on the basis of diagnosis or type of disability, i.e. body-related concepts.

The first aim of this study was to investigate whether assignment of ICF codes to items from extant questionnaires, aimed at measuring participation-related phenomena in a reliable and valid way, was possible, as suggested by Peerenboom & Choros (2) and Cieza et al. (9). The second aim was to investigate the ICF's theoretical assumption that the environmental component interacts with the components body function,

Table I. Number of students in different age- and type of disability groups

Age	Visual disability	Motor disability	Multiple disabilities	Total
7–12 years	93	90	68	251
13–17 years	66	74	57	197
Total	159	164	125	448

and participation. Due to limitations in the empirical material the relationship between the activity component and the other components of the ICF model was not investigated. A third aim was to investigate whether groups of individuals with similar participation profiles could be identified.

MATERIAL AND METHODS

Respondents

Students with disabilities ($n = 448$); in age groups 7–12 years ($n = 251$, mean = 10, SD = 1.56) and 13–17 years ($n = 197$, mean = 15, SD = 1.51), their parents/relatives ($n = 414$), their teachers/managers ($n = 418$) and special education consultants ($n = 110$) participated in this study. A total of 1728 questionnaires gathered from students, parents, teachers and special education consultants were included in the analysis. Special education consultants serving 4 groups of students with different identified disabilities (visual disability, motor disability, multiple disability, or adults with deaf-blindness) were asked to collect information from 10 individuals each, representing all chronological ages within the age groups served by them. The sample was otherwise a "convenience sample". Students, parents and teachers responded to 1 questionnaire each, while each consultant responded to questions regarding several students. The distribution of gender was 46% boys and 49% girls, 4% did not report gender. In Table I the number of students who participated in this study, categorized according to age and disability-group, is displayed.

Only individuals for whom the special education consultants filled in a questionnaire are represented in Table I. Therefore the total number of individuals is not equal to number of individuals for each respondent group. In 24 cases students, teachers and/or parents responded, but not the special education consultant. Attrition rates for respondent groups were 34% for questionnaires, 38% for persons and 10% for special education consultants.

Material

A set of items from questionnaires based on participation-related concepts were re-coded into ICF-codes on an item-by-item basis. The following original surveys were used:

- Availability and participation were measured by a Swedish adaptation of a questionnaire developed by Simeonsson et al. (10) to measure availability and participation in school activities. The measure consisted of 19 items on availability and 19 items on participation in different activities. Availability items categorized as environment, participation items as participation. Cronbach's alpha (7–12) $A = 0.71$, $p = 0.73$, (13–17) $A = 0.74$, $p = 0.84$.
- Three subscales from the ARC Self-determination scale; (4) were used:
 - Section 1: autonomy. A Swedish version adapted to different age groups. Scale based on Sigafos et al. (11). The Autonomous Functioning Checklist. All 33 scale items used. Scale items categorized as participation. Cronbach's alpha = 0.83 (7–12), 0.93 (13–17).
 - Section 3: psychological empowerment. A Swedish version. Scale based on Nowicki and Strickland (12) a locus of control scale for children. All 15 scale items used. Items categorized as participation. Cronbach's alpha = 0.25 (7–12), 0.57 (13–17).
 - ARC Self-determination scale (4) – Section 4: self-realization. A

Swedish version. Fourteen scale items used. Items scaled as body function (psychosocial or emotional function). Cronbach's alpha = 0.57 (7–12), 0.69 (13–17).

- Perceived interaction Granlund & Björck-Åkesson (13). Adapted version in which 8 items are rated regarding interacting with other students and 8 items regarding interacting with the teacher. Scale based on Granlund & Olsson (14). Part of scale used. Sixteen items categorized as participation. Cronbach's alpha stud-stud = 0.69 (7–12), 0.76 (13–17), teacher-stud = 0.77 (7–12), 0.84 (13–17).
- Environments survey Granlund et al. (15). Partly based on "Survey of School Environments" Simeonsson et al. (10). Whole scale used. Cronbach's alpha = 0.82–0.87. The environment is rated both by the teachers and by the counsellors. Some questions are asked about the school in general and some about the specific classroom of participating students. Altogether the following questionnaires were re-coded:
 - General School Environment containing 28 items, teacher's rating: a general assessment of school environment both social and physical environment, items such as "there is plenty of educational material" and "the principal knows the students". Cronbach's alpha = 0.86 (7–12 years) 0.88 (13–17 years)
 - Student's school environment containing 21 items, teacher's rating: this measure focuses on school environment of specific student. Themes such as "student has sufficient supply of appropriate educational material". The outdoor environment is well adjusted to the student's needs". Cronbach's alpha = 0.83 (7–12 years) 0.84 (13–17 years).
 - Specific student's school environment as rated by counsellors: 14 items. The questionnaire consists of questions such as "teacher has sufficient education about student's disability" or "student has the technical/educational aids needed". It also rates amount of time given for supervising teaching and intervention regarding assistive technology. Cronbach's alpha = 0.82 (7–12 years) 0.83 (13–17 years).
 - School demographic ratings: a rating of general school environments such as size of community and school, and the kind of support available in school. The scale is only partly used in the ICF-classification. Variables at nominal level were not used. Cronbach's alpha = 0.80 (7–12 years) 0.67 (13–17 years).
- Abilities index (16). All items used to create 7 indices. These indexes measure students' body functions, rating the student's ability from 1 to 6 in various areas such as hearing, intellectual functions and behaviour. Included is also a rating of general health which do not correspond to a specific code in ICF. Cronbach's alpha = 0.77 (7–12 years) 0.80 (13–17 years).

Data analysis

Procedure for the transformation of scale items into ICF-chapter items. All items from the questionnaires described in the section "original surveys and questionnaires" were assigned to ICF-codes at the 2-digit-level by 2 independent raters. For example, the autonomy item "I clean my own home when I have the opportunity to" was assigned to the ICF-code p640 "doing house work". Adaptations for chronological age were made; some scale-items differed depending on age group, thus only scale-items for 1 age group were assigned to codes. For example the autonomy-item "I make my own snacks when I have the opportunity to" for 13–17-year-olds was for 7–12-year-olds phrased "I prepare my own sandwich in snack-time when I have the opportunity to". Raters were instructed to use the codes of body function, participation or environment for their assignments to codes. Assignment of items to activity codes was, if possible, avoided. This decision was made due to the fact that a first impression of questionnaire items indicated that items stressed involvement in life situations and self-determination rather than the performance of activities (2). In instances of disagreement of the assignments of codes a 2-step procedure was used. In the first step the second author's judgement was used, and in cases of uncertainty a third part (first author) was consulted. Ratings were compared and the degree of inter-rater agreement calculated with the formula "number of agreements divided by the total number of items rated."

Teachers' and special education consultants' responses to environmental questionnaires were aggregated together with students' responses, thereby increasing the number of items assigned codes in ICF

environmental chapters. The special education consultants also responded to questions regarding students' type of disability, i.e. items assigned to ICF body function chapter 1, 2, 3 and 7 codes. Based on the result of a literature review concerning the concept of participation (Granlund & Schosser, unpublished observation), ICF participation-chapters was in the interpretation of data divided into 2 types of participation settings, participation in settings related to the proximal environment and participation in societal settings; chapters 1–6 (learning and knowledge, general tasks, communication, mobility, self-care and domestic life) constitutes aspects of participation focusing on the actions of the individual in the proximal environment. Participation chapters 7–9 constitute societal participation, i.e. the interactions of the person in a societal context (interpersonal interactions, major life areas and community, civic life). Observe that chapter 4, Mobility, is not a part of the analysis due to lack of items covering this chapter.

Statistical analysis. Internal consistency for "ICF-chapter scales" made up from items assigned to ICF-codes was analysed with the help of Cronbach's alpha.

Correlations between "ICF-chapter scores" in the areas "body function (b117, b126, b152, b167, b210, b230, b730, b760)", "participation (index based on scores for second level item p-codes from all chapters except for chapter 4 mobility)" and "environmental factors (index based on scores for second level items e-codes from all chapters except for chapter 2 natural and human made environments)" were calculated. Statistical interrelationships on a 1% level, stronger than 0.2 are shaded grey in the Tables.

To maximize number of subjects on which to do statistical analyses, imputation was implemented. Subjects with less than 25% attrition in a specific ICF chapter were included. Mean scores for the total sample were used for imputation. Subjects with a high attrition, over 25%, in a chapter were excluded from imputation in that chapter. The pattern of attrition among subjects was analysed with help of a missing value analysis. Following this analysis subjects with a high attrition in chapter indexes were excluded manually.

Cluster analysis was made to identify patterns of participation according to ICF chapters. After trying several cluster-solutions with the help of hierarchical cluster analysis a 5-cluster solution was used in a K-means cluster analysis. The 5-cluster solution gave distinct patterns with relatively many members in each cluster group. To facilitate statistical analysis all scores from the original scales were transformed into standardized Z-scores and applied to the second level code they represented. With help of Cronbach's alpha the internal consistency was analysed for each ICF chapter represented by Z-scores. Kruskal Wallis non-parametric test was used to analyse differences in how students with different types of disabilities were distributed in the cluster groups

RESULTS

Results from correlation analyses and cluster-analysis are displayed for the 13–17 years age group only (see Tables IV–VIII). Results from the analyses of data from the 7–12 years age group are reported in text. In Table II the number of agreements of the total number of items rated for each scale as well as inter-rater agreement in percent is displayed. The original scales were used as the basis for the calculations.

Table II reveals that inter-rater agreement was good to acceptable except for "self-realization." The scale items from "self-realization" were primarily coded as "Body function, Chapter 1."

Internal consistency for ICF-chapters

In Table III the number of items assigned to codes for ICF chapters is displayed, as well as the number of ICF second level codes covered by the transformed questionnaire items. Note that only ICF chapters used are displayed.

Alpha levels were good (0.80–0.70) to acceptable (0.69–0.50)

for most chapters. For participation chapter 7 (interpersonal interaction and relationships) low Cronbach's alpha indicate problems with internal consistency among items. Only items related to psycho-socio-emotional functions and traditional disability categories are rated in body function. Only a few items cover participation chapters 2 and 4. Chapters 6, 7 and 9 are extensively covered (see column "second level" in Table III). Age group 7–12 years had a lower internal consistency in participation chapters. In addition, items for the 7–12 years age group did not cover mobility and major life areas. Environmental chapter natural and human-made environments not covered by items.

In Table IV a correlation matrix based on standard scores for participation chapters for the 13–17 years age group is displayed. Interrelationships on a 1% level, stronger than 0.2 are shaded grey. Observe that the participation chapter "mobility" is not represented.

The person-proximal environment participation chapters "general tasks", "self-care," "domestic life" and "communication" were statistically interrelated. The chapter "learning and knowledge" only had a negative correlation with the chapter "major life areas." Among societal participation chapters "interpersonal interactions" was related to the chapters "self-care" and "domestic life", "major life areas" was related to all person-proximal environment participation chapters, "community, civic life" was related to all person-proximal environment participation chapters except for "learning and applying knowledge". Statistical relations between participation chapters in age group 7–12 years had the same patterns of statistically significant correlations, but were weaker than for age group 13–17. Altogether, the correlation analysis revealed that especially person-proximal environment participation chapters were inter-related.

In Table V participation chapters' correlations with body functions and environmental scores higher than 0.2 for age group 13–17 are displayed. Observe that participation chapters "mobility" as well as the environment chapter "natural and human-made changes to environment" are not represented. As shown in Table V the body function chapters "global psycho-

Table II. *Original scales reliability*

Original scale	Number of agreements of total number of items	Degree of inter-rater agreement (%)
Availability and participation	15 of 17	88
Autonomy	30 of 33	91
Psychological empowerment/LOC	16 of 19	84
Self-realization	7 of 13	54
Perceived interaction with peers	8 of 8	100
Perceived interaction with teachers	6 of 8	75
Environments survey	14 of 16	88
Abilities Index	7 of 8	75
Inter-rater agreement, total	103 of 122	84

LOC = locus of control.

Table III. Number of items covered on second level and reliability rating for ICF chapters

ICF chapters	Number of items		Cronbach's alpha		Second level
	7-12	13-17	7-12	13-17	
<i>Body functions</i>	28	31	0.69	0.79	
Mental	16	19	0.72	0.75	6 out of 19
Sensory	4	4	0.73	0.65	2 out of 13
Movement-related	8	8	0.96	0.96	2 out of 12
<i>Participation</i>	72	85	0.82	0.88	
1) Learning and applying knowledge	8	10	0.31	0.47	4 out of 16
2) General tasks and demands	5	5	0.35	0.55	2 out of 4
3) Communication	11	8	0.70	0.83	4 out of 11
4) Mobility	x	1	x	x	1 out of 14
5) Self-care	6	8	0.51	0.72	3 out of 7
6) Domestic life	7	8	0.48	0.57	6 out of 6
7) Interpersonal interactions	13	16	0.24	0.14	5 out of 7
8) Major life areas	x	8	x	0.65	6 out of 12
9) Community, social and civic life	22	21	0.67	0.69	4 out of 5
<i>Environment</i>	149	157	0.91	0.94	
Products and technology	72	69	0.68	0.84	8 out of 12
Support and relationships	51	48	0.83	0.71	6 out of 12
Attitudes	17	15	0.41	0.47	4 out of 12
Service, systems and policies	18	25	0.59	0.60	6 out of 18

x indicates that no items were rated.

Table IV. Correlation matrix based on standard scores for participation chapters in the 13-17 years age group

Participation	Participation							
	Learning & knowledge	General tasks	Communication	Self-care	Domestic life	Interpersonal interactions	Major life areas	Community life
Learning & knowledge	1	-0.159	-0.061	-0.168	-0.026	-0.056	-0.271	0.095
General tasks	-0.159	1	0.451	0.481	0.545	0.021	0.467	0.382
Communication	-0.061	0.451	1	0.467	0.392	0.170	0.324	0.367
Self care	-0.168	0.481	0.467	1	0.715	0.309	0.381	0.450
Domestic life	0.026	0.545	0.392	0.715	1	0.221	0.449	0.479
Interpersonal interactions	-0.056	0.021	0.170	0.309	0.221	1	0.139	0.130
Major life areas	-0.271	0.467	0.324	0.381	0.449	0.139	1	0.355
Community life	0.095	0.382	0.367	0.450	0.479	0.130	0.355	1

Table V. Statistically significant correlations between participation chapter scores and body function chapter scores as well as environmental chapter scores on second level in the 13-17 years age group

	Participation							
	Learning & knowledge	General tasks	Communication	Self-care	Domestic life	Interpersonal interactions	Major life areas	Community, life
Body functions								
<i>Mental functions</i>								
Global psychosocial functions	-0.272	0.404	0.393	0.474	0.344		0.285	0.273
Mental functions of language	-0.212	0.404	0.417	0.490	0.370		0.383	0.276
Intellectual functions		0.416	0.346	0.427	0.325		0.482	0.256
<i>Movement-related functions</i>								
Muscle tone function			0.353	0.289				
Environment								
<i>Products and technology</i>								
Daily living	0.306							
Education	0.313							
Recreation and sport			0.302					0.384
<i>Social support</i>								
Friends			-0.335					
<i>Attitudes</i>								
<i>Service, systems, policies</i>								
Communication	-0.205							0.246
Transportation				-0.262				
Political		0.319	0.300				0.243	0.372

Table VI. Statistically significant correlations between body function and ICF environmental chapter score on the second level in the 13–17 years age group

Environment	Body functions				Communication	Seeing	Intellectual function	Muscle tone
	Hearing	Motor-ability	Health	Global psychosocial functions				
<i>Products and technology</i>					–0.249			
Daily living		–0.292	–0.265	–0.257	–0.309			–0.251
Mobility		0.305						
Education					–0.215			
Recreation and sport		0.264						
<i>Social support</i>								
Immediate family				–0.256	–0.277		–0.270	
Personal care providers							–0.228	
<i>Attitudes</i>								
<i>Service, systems and policies</i>								
Transportation		–0.319						
Political				0.336	0.324		0.396	
Health services					–0.250			

social functions,” “mental functions,” and “intellectual functions” had statistically significant relations with several of the participation chapters. Students with normal “intellectual functions”, “mental functions of language” and “intellectual functions” experience a higher degree of participation in most areas except for “interpersonal interactions” and “learning and applying knowledge”. In the area of learning students with normal “global psychosocial functions” and “mental functions of language” experience a lower degree of participation than students with social and/or communication impairments. The body function chapters “hearing,” “seeing,” “movement functions” and “general health” had no significant correlations with participation in the 13–17 years age group. Students with a normal muscle tone experienced a higher degree of participation in “communication” and “self-care”. An analysis of the statistical relations in the 7–12 years age group revealed mainly the same pattern but there were more frequent statistically significant relations between body function and participation.

As shown in Table V, significant correlations between environmental factors and participation in the 13–17 years age group were primarily found for second level items in the chapters “services, systems and policies” and “products and technology”. In addition, one significant correlation between “communication” and “social support from acquaintances, peers” indicated that the higher the ratings in the participation chapter “communication” the less support from peers was rated. A higher rating in “learning and applying knowledge” was related to higher ratings in “products and technology for personal use in daily living” and for “products and technology for education.” The score in “products and technology for culture, recreation and sports” was statistically significant correlated with ratings in “communication” and “community, social and civic life”. Political “service, systems and policies” had a significant correlation with the participation chapters “general tasks and demands”, “communication”, “major life areas” and “community, social and civic life”. No significant correlations between environmental chapter “attitudes” and

participation were found. In comparison with the 7–12 years age group, the 13–17 years age group had fewer statistically significant correlations, which were also weaker.

In Table VI statistical relations stronger than 0.2 between body function and environmental scores are displayed.

Concerning relations between body function and environment, especially environmental chapters “products and technology” and “services, systems and policies” were related to body function. Students with more severe disabilities in “motor-ability”, “general health”, “social functioning and behaviour”, “communication” and “muscle tone” had statistically significant higher ratings in “products and technology for daily living”. “Social support from immediate family” is rated higher when students’ function in “social functioning and behaviour” and “communication” is rated more severely. Students with normal “muscle tone” had higher ratings in support from health professionals. No statistically significant correlation existed between the environmental chapter “attitudes” and body function chapters. Students with more severe “motor ability” problems had higher ratings in “transportation services, systems and policies” and students with a more severe “communication” disability had higher ratings in “health services, services, systems and policies”. Students with normal “visual” had higher ratings in “education and training, services, systems and policies”.

A comparison between age groups revealed that the 13–17 years age group had more frequent statistically significant correlations between body function chapters and environment (see Table VI) than the 7–12 years age group.

Cluster group analysis

To investigate whether differences in participation were related to type of disability a cluster analysis was performed. Results of the analysis are displayed in Table VII. In the analysis standardized participation chapter scores were used to form cluster groups. In Table VII cluster group scores close to the sample mean are assigned a 0, higher than average scores are

Table VII. Cluster analysis in age-group 13–17 years – participation profiles and number of persons with different disabilities

	Cluster group ratings									
	Cluster									
	0	1	2	3	4	5				
<i>Participation variables</i>										
Learning and applying knowledge	0	-0.12	0	0.14	0	-0.08	+	0.50	0	-0.07
General tasks and demands	+	0.31	-	-0.51	+	0.36	-	-1.77	-	-0.29
Communication	+	0.21	+	0.25	+	0.25	-	-1.41	-	-1.03
Self-care	+	0.49	0	-0.05	0	-0.14	-	-1.01	-	-0.33
Domestic life	+	0.46	0	-0.09	-	-0.16	-	-1.12	-	-0.27
Interpersonal interactions	0	0.13	0	0.04	0	-0.03	+	0.15	-	-0.19
Major life areas	+	0.38	-	-0.36	0	0.10	-	-0.77	-	-0.27
Community social and civic life	+	0.24	0	-0.07	0	-0.06	-	-0.62	-	-0.37
<i>Number of persons with disabilities</i>										
Visual disability	22		10		18		0		4	
Motor disability	19		8		20		0		5	
Multiple disabilities	9		12		4		4		8	
Total number of persons in cluster	50		30		42		4		17	

A total of 143 persons are included and 42 are outliers (did not fall into clusters), 7 visual disability, 17 motor disability and 18 multiple disability.

assigned a plus and scores lower than average are assigned a minus. Statistical comparisons between cluster groups in terms of body functions and environmental factors were performed with the help of analysis of variance (ANOVA). Results are displayed in Table VIII. Kruskal Wallis non-parametric test was used to investigate if individuals with different types of disabilities were unequally distributed in the groups. Significant differences between cluster groups in environmental factors were investigated with the help of Scheffe's pairwise comparisons of groups (see Table VIII).

Cluster group 1 is the largest cluster-group, containing 50 subjects who perceive their participation as more positive than average, except in the areas learning and applying knowledge and interpersonal relationships where they rate average.

Members in cluster group 2 rated their participation in different areas as average, except for "general tasks and demands" that they rated lower than average, and "communication" that they rated higher than average.

Cluster group 3 rated higher than average in participation chapters "general tasks and demands" and, "communication", lower than average in "domestic life", the other 5 participation chapters are rated average.

Members of cluster group 4 rated higher than average in the

participation chapters "learning and applying knowledge" and "interpersonal interactions". Otherwise ratings rated lower than average ratings concerning participation.

The 17 members of cluster-group 5 rated their participation lower than average in all areas except "learning and applying knowledge" where they rated average.

The Kruskal Wallis test revealed differences between cluster groups in number of members with different types of disabilities. $\chi^2 = 16,453$, significance 0.002). In cluster-group 4 all 4 members (the smallest group) display multiple disabilities. For all other cluster groups all types of disability categories are represented. No significant differences in distribution of members related to type of disability were found in the 7–12 years age group.

Significant differences between cluster-groups in "Body function" and "Environment" for the 13–17 years age group are displayed in Table VIII.

As shown in Table VIII only 1 statistically significant difference in environmental factor scores between cluster-groups was found when tested with ANOVA and Scheffé pairwise comparison of groups. Cluster group 1 (positive ratings in most participation-chapters) has statistically higher scores in "products and technology for culture, recreation and sport" in

Table VIII. Significant differences in ICF for environment and body function chapter scores related to cluster group membership in the 13–17 years age group

Environmental factors, body function factors	Significant differences		
	F	Sig.	Cluster membership differences
Products and technology for culture, recreation and sports	F = 4,328	p = 0.003	Cluster group 1 has significantly higher ratings in comparison with cluster group 5
Social skills and behaviour	F = 7,756	p = 0.000	Cluster groups 1 and 3 have higher ratings in comparison with cluster-group 4
Mental functions of language	F = 8,780	p = 0.000	Cluster-group 1 has higher ratings in comparison with cluster-groups 4 and 5
Intellectual function	F = 10,373	p = 0.000	Cluster-groups 1 and 3 have high ratings in comparison with cluster group 4

comparison with group 5 (few positive ratings of participation). However, 3 differences between cluster-groups in body function were revealed. The differences in severity of impairments in the functions, global function between clusters, indicate that these body functions are important for positive ratings of participation. The same pattern was observed in the 7–12 years age group.

DISCUSSION

Students with disabilities report that conceptions of participation contain subjective feelings and perceptions about their own behaviour and a sense of belonging (17). These feelings and perceptions are dependent on the functional integrity of the body, ability to perform activities as well personal and environmental factors. The factors exist in patterns that differ from person to person. ICF is a multidimensional classification-system well-suited for organizing information concerning involvement in life situations for persons with disability.

The aim of this study was to investigate whether assignment of ICF-codes to items from extant instruments in a reliable and valid manner was possible. The result indicates, as other authors (2, 9) have suggested, that assignment of ICF-codes to items from extant instruments is possible with a fairly good inter-rater agreement. The area of “self-realization” was an exception, and exhibited a low inter-rater agreement. This set of items may reflect more of a person-factor than a body factor, and therefore these items were not as easily assigned to codes into the ICF system, which lack classification categories for person-factors (5). A strategy for how to consider such factors in relation to the ICF system needs to be developed since it seems to be of importance when evaluating participation (Almqvist & Granlund, unpublished observation). Problems with internal consistency in the scales constructed from items assigned to specific ICF chapters were revealed in this study. Due to the large sample sizes the alpha coefficient might be inflated. Thus caution should be exercised when interpreting the alpha values. This fact does, however, affect all scales equally. Most difficulties with reliability were found in the participation-chapters, especially for the 7–12 years age group. It is possible that younger children are less consistent in their responses to self-rating questionnaires than are adolescents and adults (18). A related reason for the low reliability estimates may be that some chapters contained only a few items assigned codes and covered few parts of the chapter; chapters with a good coverage of second level classifications had a good reliability. A third reason might be difficulties with the material from which items were assigned to participation codes. A material that covers all the participation chapters more extensively, especially mobility, is needed since participation is a construct focused on person-unique person-context interactions (2).

Due to the content of the extant questionnaires no assignment of ICF’s activity codes to questionnaire items was possible. This is a weakness that has to be dealt with in future studies.

A second weakness of the study is that the new “ICF scales”

developed from the assignment of codes to items from extant questionnaires was not followed by a content analysis in which items that lowered internal consistency were removed (9). Considering the fact that such analysis not was performed, the moderate internal consistency indicate the utility of using extant questionnaire items in measuring participation with the ICF participation dimension.

Important for the utility of the ICF classification for intervention purposes is the way in which the collected information is analysed. Even though there is a tendency for person-proximal types of participation to be interrelated, our result indicates that perceived participation in different life domains mostly have low-to-moderate statistical relations. Thus, it is difficult to predict participation in a specific setting from a composite participation score. It also indicates that a profile approach (8, 10) is needed if the aim of assessment is to identify groups of individuals who perceive the same pattern of participation restrictions.

The result of the correlation analysis confirms the theoretical assumption of ICF that “body function,” “participation” and “environment” are phenomena that interact (5). It also indicates that participation cannot be explained by 1 or 2 isolated factors in a single domain (6, 4). Factors within the dimensions tend to occur in patterns or profiles that vary between persons also within the same disability group.

To conclude, ICF seems to be useful in describing involvement in life situations for students with disability. The moderate-to-low statistical relations within the participation dimension as well as between items from different dimensions indicate that a person-based participation profile approach to assessment (8) is preferable to a diagnostic group approach in describing participation.

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