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Development and validation of a test instrument to assess Basic Motor Qualifications in primary school

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ECCS

EDUCATION,
CULTURE, COGNITION
AND SOCIETY

Institute of Applied Educational Sciences (IAES)




UNIVERSITÉ DU
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1. Introduction

MOBAQ-LUX3 - Project aim¹

(1) Elaboration of competence-oriented test items following the approach of Basic Motor Qualifications (MOBAQ/Motorische Basisqualifikationen) in order to evaluate the elementary motor qualifications of third-graders

- Based on a consensus of the minimal requirements for third-graders to be able to participate in the culture of human motion in the sense of cultural participation
- The MOBAQ-approach fixes normatively basic motor competencies as minimal requirements for students
- They are codified in a binary way

(Kurz & Fritz, 2007; Kurz et al. 2012)

(2) Implementation of the validated test battery to establish a diagnosis for pedagogical purposes on a mandatory basis in the class level 3 in Luxembourg

- The results should help to identify students with remediation needs on school and classroom level, in order to be able to suggest specific services and offers to those students and to their parents.

¹ funded by the Ministry for Education, Childhood and Youth

1. Introduction

Project phases	Objectives	Topics	Timeline
Preparation	<ul style="list-style-type: none"> How must test items be constructed according to the MOBAQ approach? Which qualifications should 8 year-old children accomplish? 	<ul style="list-style-type: none"> 1. Expert Meeting Teacher questionnaire 	01-04/ 2012
Conception of the test instrument	<ul style="list-style-type: none"> Development of test items Substantial validation by experts 	<ul style="list-style-type: none"> 1. phase pre-tests 2. phase pre-tests incl. feedback from teachers and students 2. Expert Meeting 	05/2012- 08/2013
Study I	<ul style="list-style-type: none"> Scientific validation of the test instrument: Item analysis 	<ul style="list-style-type: none"> Pre-test on a sample of n = 112 students Adaptation of the test instrument 	09/2013- 03/2014
Study II	<ul style="list-style-type: none"> Scientific validation of the test instrument: Factor analysis / Latent class analysis Testing of the influence of control variables Advancement and optimizing of the test instrument in practical conditions 	<ul style="list-style-type: none"> Instruction of the teachers Supervision of the executing schools Feedback by teachers Improvement of the test instructions Final report on Study I and II 	04-09/ 2014
Implementation on a national level	<ul style="list-style-type: none"> Familiarization with the implementation of MOBAQ-LUX8 	<ul style="list-style-type: none"> Instruction of the teachers Supervision of the executing schools Systematic study of data and feedback to schools 	Start 09/2014

1. Introduction

29 test items in 6 test dimensions,
based on the curricular concept of “*Movement fields*” in the PE curriculum in Luxembourg



BAG: Moving on equipment
(5 items)



BIW: Moving in water
(5 items)



LUS: Running and jumping
(5 items)



RUF: Rolling and riding
(5 items)



SKG: Playing with small devices
(4 items)



SPB: Playing with balls
(5 balls)

Study I: Item analysis

Realization of a pre-test to validate the MOBAQ-LUX3 test items empirically and to develop an adequate test design (including a test manual and materials for teacher training)

- Sample of $n = 112$ students in 8 classes in 4 schools
- Empirical validation (Validity / Reliability / Objectivity)
- Item selection and item revision
- Revision of test instructions

1. Introduction

15 test items in 5 test dimensions,
based on the curricular concept of “Movement fields” in the curriculum in Luxembourg



BAG: Moving on equipment
(3 items)



BIW: Moving in water
(3 items)



LUS: Running and jumping
(3 items)



RUF: Rolling and riding
(3 items)



SKG: Playing with small devices
(3 items)



SPB: Playing with balls
(3 balls)

2. Methods

Study II: Validation

Test procedure

- Test period: May-July 2014
- 24 classes in 9 schools
- 17 involved teachers
- Implementation of the test tasks in the regular teaching time in class
- Standardization: teacher training for the teachers/test instructors
- Instruction by the test instructor and several trials for the students
- 2 attempts per test item: the test is passed, when one of the two attempts was successful

2. Methods

Studie II: Sample

■ $N_{\text{all}} = 399$ students

$N_{\text{boys}} = 193 / 50.4\%$

$N_{\text{girls}} = 201 / 48.4\%$

■ Age: $M = 8.3$ $SD: .52$ $Min: 7.3$ $Max: 10.3$

■ Nationality $N_{\text{LUX}} = 201 / 50.4\%$

■ First language: $N_{\text{LUX}} = 139 / 34.8\%$

■ BMI: $N = 287$ students

$N_{\text{NW}} = 230 / 80.1\%$

$N_{\text{OW}} = 40 / 13.9\%$

$N_{\text{Ob}} = 17 / 5.9\%$

2. Methods

Study II: Scaling

- Study I: Dichotomous Scaling 0 = „fail“, 1 = „pass“
Study II: advanced 2nd level 2 = „2nd level pass“ (except RUF)

Ordinal scale level 0 – 1 – 2

- Test items „Catching and throwing“ and „Throwing in a target“:

Number of successful attempts:

0, 1, 2 out of 6 -> 0

3, 4 out of 6 -> 1

5, 6 out of 6 -> 2

- Level 2 only possible, when level 1 passed

2 levels = 2 different test items

10 Items: BAG2; BAG3; BIW2; BIW3; LUS2; LUS3; SPB2; SPB3; SKG2; SKG3

3. Results

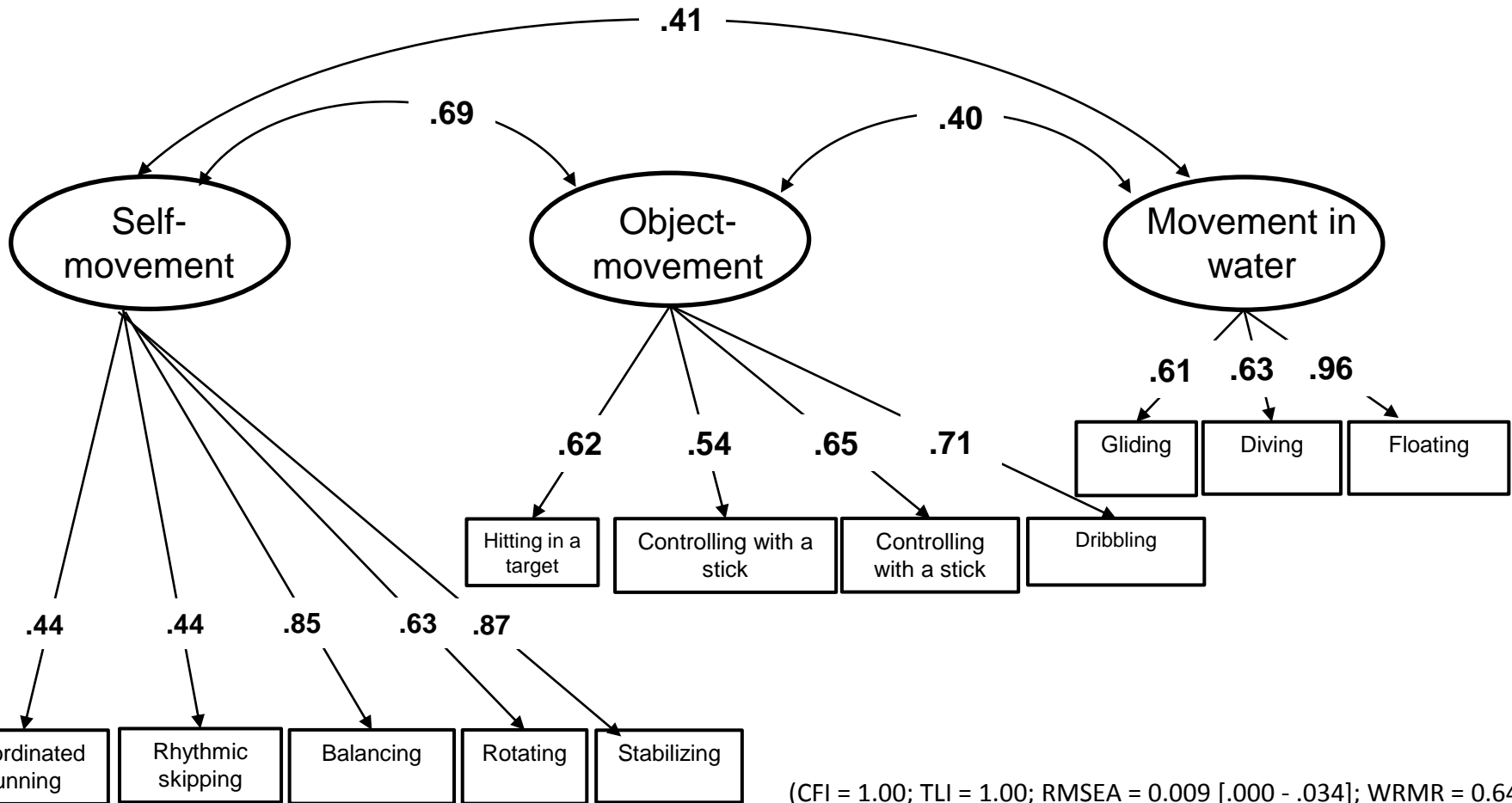
Descriptive statistics: Item difficulties

	Persistent running		Coordinated running		Rhythmic skipping		Balancing		Rotating		Stabilizing		Throwing in a target		Hitting in a target	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	70	18.1	21	5.7	42	11.4	20	6.2	17	5.3	15	4.4	13	3.8	127	36.1
1	71	18.4	130	35.5	48	13.0	55	17.0	45	13.9	53	15.7	71	20.6	90	25.6
2	245	63.5	215	58.7	278	75.5	248	76.8	261	80.8	270	79.9	261	75.5	135	38.4
Σ	386	100.0	366	100.0	368	100.0	323	100.0	323	100.0	338	100.0	345	100.0	352	100.0

	Controlling with a stick		Throwing and catching		Bouncing		Dribbling		Gliding		Diving		Floating	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%
0	52	14.9	42	11.2	30	7.9	49	13.0	44	14.5	38	13.1	37	13.2
1	111	31.9	41	11.0	38	10.0	74	19.6	140	46.1	15	5.2	103	36.8
2	185	53.2	291	77.8	312	82.1	255	67.5	120	39.5	237	81.7	140	50.0
Σ	348	100.0	371	100.0	380	100.0	378	100.0	304	100.0	290	100.0	280	100.0

3. Results

Confirmatory factor analysis (WLSMV-estimator, FIML, standardized)



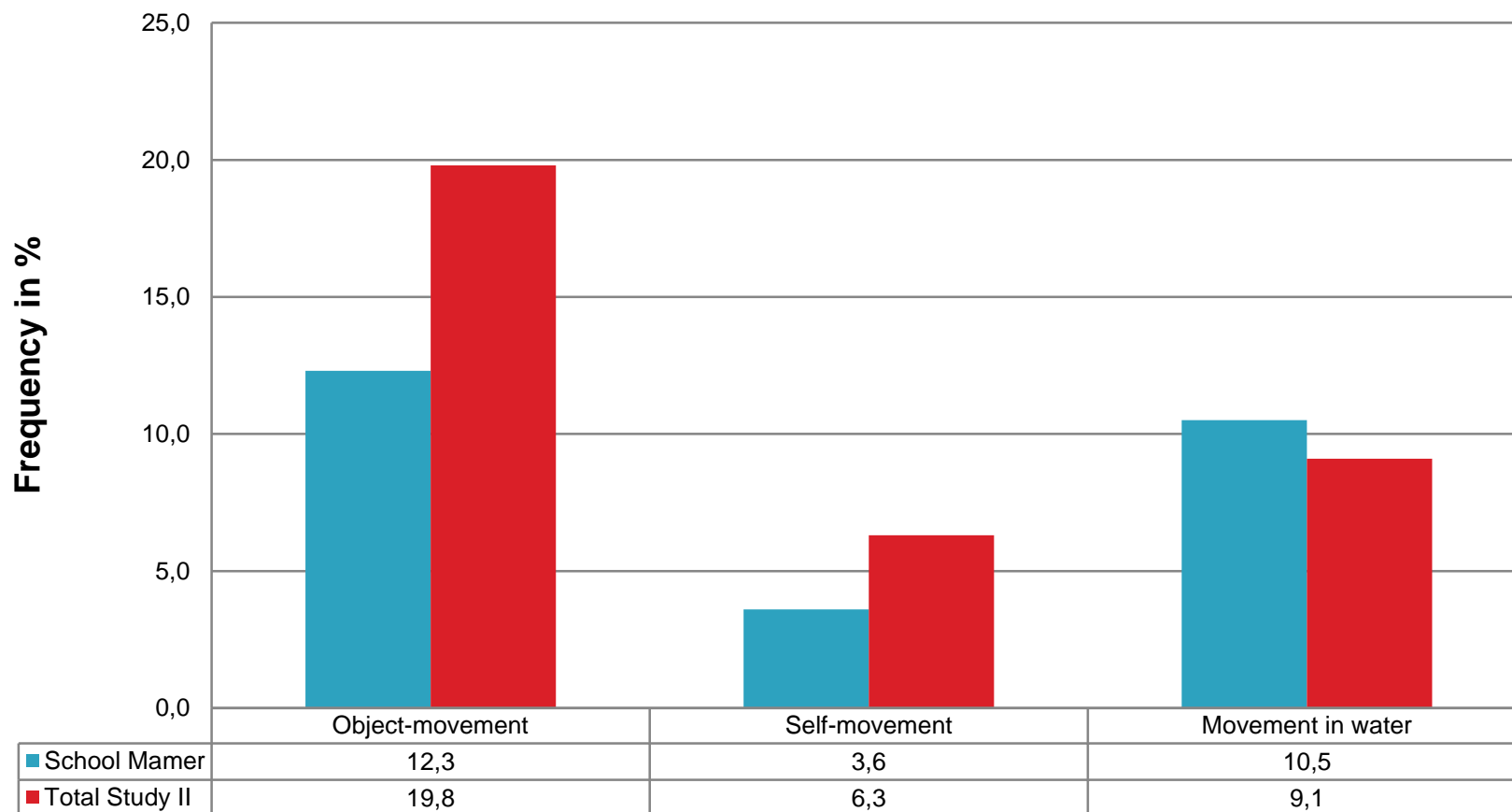
3. Results

Definition „Special needs“

- If **at least two thirds of the tasks** in a test area are passed, we assume that the student has the basic requirements for participation in the competence area.
 $\geq 2/3$ passed -> minimal requirements achieved
- Students who pass **less than two thirds of the tasks** in a test area, should practice specifically in this competence area – support is needed.
 $< 2/3$ passed -> minimal requirements not achieved
-> The student needs support
- If **at least two thirds of the tasks** in a test area are passed **on level 2**, we assume that the student has advanced requirements for participation in the competence area.
 $\geq 2/3$ level 2 passed -> minimal requirements exceeded

3. Results

Special needs in the competence areas



3. Results

Basic Motor Qualifications MOBAQ-LUX3

Results of the survey in 2014:

School : Elementary school XXX

Class : 3.1 A

Erin Gerlach

Self-movement:

Minimal requirements exceeded

Object-movement:

Minimal requirements achieved

Movement in water:

Minimal requirements not achieved

4. Conclusion

■ MOBAQ-LUX3

- has partly similar structures as the MOBAK-instruments – self-movement & object-movement – and as existing movement skill assessments – locomotor & object control (Herrmann, Gerlach & Seelig, 2015; Burton & Miller, 1998).
- The developed test battery mostly satisfied the psychometric criteria and is a suitable instrument to identify students with support needs in PE.

5. Outlook

■ MOBAQ-LUX

- Development and implementation of a support framework based on support measures on school and classroom level
- Linking to national educational monitoring in 3rd grade in mathematics and languages undertaken by LUCET (Luxembourgish Centre for Educational Testing)
- Development of age-specific tests for the 1st grade (based on MOBAK-CH1 and connected to MOBAQ-LUX3)
- Development of age-specific tests for the 5th grade (based on MOBAQ-LUX3)

Thank you very much!

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5. Outlook

■ MOBAQ/MOBAK Overview

Used for what?	Diagnosis	Evaluation
Acquisition	Basic Motor Qualifications (MOBAQ/BAMOQ)	Basic Motor Competences (MOBAK/BAMOC)
Intern (practice in schools)	Learning assessment (MOBAQ-LUX)	Description of learning paths (MOBAQ-CH)
Extern (research)	Monitoring (MOBAQ-NRW)	Impact research (MOBAK-CH)

3. Results

