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# A review of the assessment of basic motor qualifications and competencies in school

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## 1 Introduction to and definition of motor basic qualifications

Human motion is not only important for motor development. It also fosters cognitive development and social well-being. Good capacities in physical activities are prerequisites that allow children and adolescents to take part in a central area of culture and particularly in the culture of human movement and sports. Therefore, the question arises what minimum abilities, with regard to movement, children and adolescents should have at a particular age (cf. Kurz & Fritz, 2007). Our term for this minimum ability is ‘basic motor qualification’.

Basic motor qualifications are elements of physical activities that are justified and set as minimal prerequisites for the participation in the culture of sports and exercise. These basic motor qualifications give children a good chance for a successful personality development. We are neither interested in the characteristics of general motor abilities (e.g. endurance), nor in the control of specific sport motor skills and techniques (e.g. breaststroke). The term ‘basic qualification’ indicates something that lies between these two poles. In contrast to general motor skills, these qualifications are context-bound (for example, in the area of swimming the “context” is the environment water), and thus more complex. On the one hand, qualifications are more general than specific skills or techniques. Our interest lies not on the ability to perform a specific swimming stroke, but on the safe stay in water. This safe movement includes that children can swim a certain distance in prone and supine position and that they can dive and orient themselves under water. The term ‘basic motor qualifications’ also expresses simultaneously the assumption that qualifications are the basis for skills and techniques which further can be built upon. This especially applies to physical education (PE) and sport in schools. By definition, basic motor qualifications can only have a dichotomous form: They can either be “passed” or “failed”.

The MOBAQ-test instrument (derived from the German: *Motorische Basisqualifikationen*) was developed as a test of basic motor qualifications. The selection of the test items was based on the following criteria (Kurz, Fritz, & Tscherpel, 2008):

1. There is a consensus about whether the specific basic motor qualification is relevant for participation in the sport culture.

Applied to our example of swimming this means the following: There is a broad consensus in Germany that says that children should be able to swim. This qualification allows them to access valuable areas of a physically active and communicative lifestyle (e.g. a visit to a local swimming pool without parents). Thus, the ability to swim is not only a basic qualification for a healthy lifestyle. The ability also increases the options for a broad understanding of a “good life” as it opens up a new cultural participation.

2. The tasks are formulated as a function (to solve a concrete problem). They are not reduced to sport techniques and offer room for individual solutions.
3. The boundaries of the minimum standard are based on the requirements for everyday life. These criteria can also be explained using the example of swimming: One of the basic qualifications in the area of swimming is to complete a distance of 25 metres in prone and supine position. There are no expectations with regard to the swimming technique, nor is there a time limit. The children pass the task if they complete a distance of ten metres in supine position and then (after a turn in the water) complete a distance of 15 metres in prone position. The task is complex. Children who can complete the task are not scared of deep water (not even in supine position), they can switch between prone and supine position and they can master both positions in any technique to the extent that they can complete a distance of 25 metres in any time. Hence, they fulfil the prerequisite that they can move safely in a swimming pool.
4. The basic qualification can be achieved by every child in a predictable time. Everyone has access to the learning places.

Ideally, children acquire the basic qualification of swimming a distance of 25 metres at preschool age. They either learn how to swim by getting taught by their parents or taking part in one of the numerous swimming courses offered in their vicinity. Swimming pools are usually situated at a reasonable distance.

## **2 Genesis of the MOBAQ-instruments for the assessment of basic motor qualifications MOBAQ-NRW<sup>1</sup>**

The first test instrument for the survey of basic motor qualifications was developed at the University of Bielefeld in 2005 and, for distinguishing reasons, is now called MOBAQ-NRW 5 (NRW stands for ‘North Rhine-Westphalia’). The procedure can generally be used in two contexts: to monitor and to screen. Monitoring is about gaining representative data on basic motor qualifications of schoolchildren and the question of which factors represent a risk for the adequate development of their basic motor qualifications. This allows risk groups to be identified – children who lack the fundamental prerequisites for a physically active and healthy lifestyle.

In the context of screening the instrument can be used to determine the concrete special educational needs of a child. For this function we recommend to apply this instrument in schools at the beginning of an academic year in order to initiate individual special educational needs in time for those students who turn out to be at risk.

A team of scientists and teachers with high expertise developed the test items. In order to approach relevant areas of the students' culture of sports and exercise we refer to empirical data on the physical activities of young people in Germany (cf. Schmidt, Hartmann-Tews, & Brettschneider, 2003). Furthermore, we used six content areas of the curriculum of NRW as a working structure for the MOBAQ-instrument (Kurz, Sack, & Brinkhoff, 1996): (1) running – jumping – throwing, (2) swimming, (3) gymnastics, (4) dancing (5) ball sports and (6) cycling. The experts consulted existing concepts as the basis for the development of the test items, for instance the Heidelberg Ball School (Kröger & Roth, 2005) and the concept of the cycle training

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<sup>1</sup> The responsibility for this part of the review article lies with Kurz, Lindemann and Rethorst.

designed by the General German Bicycle Club. Three to six items were constructed for each content area. According to the definition of minimum qualifications, each item can be “passed” or “failed”. An important interpretation of the number of passed and failed items is the special educational need. Special educational needs in a specific content area are necessary when more than one item is not passed in one area.

The test procedure was carefully tested for standardisation and practicability in several pre-tests. The description of the instrument is available as a test manual and on DVD (Kurz, Fritz, & Tscherpel, 2007). It turned out that quite a small number of test items is sufficient in order to obtain an assessment whether a child has basic motor qualifications in each content area (Kurz & Fritz, 2008). In contrast, the instrument is not suitable to analyse the cause for the specific motor deficit due to the complexity of the task. The strength of the instruments is to gain a quick and easy (economic) overview over the basic motor qualifications of a student, a learning group or a larger population.

Two quantitative cross-sectional studies on motor basic qualifications amongst fifth graders were carried out in the years 2005 and 2006. MOBAQ-study I referred to the content areas swimming, gymnastics and ball games. MOBAQ-study II included the content areas running and jumping, dancing and cycling. Two random samples which were representative for NRW were drawn in terms of the criteria sex, school types and settlement structure type. In total, 1700 students took part in MOBAQ-study I and 943 students participated in MOBAQ-study II. All students were about 11 years old. Besides the motor test items socio-demographic characteristics, aspects of sports commitment and aspects of social support were surveyed. The results revealed for example that

- ... 82% of the children are able to run for ten minutes without a break at a pace of their own choice.
- ... 95% of the children are able to walk across an upside-down sports bench forward and backward without losing balance.
- ... 72% of the children are able to skip rope for ten seconds at a rhythm of their own choice.
- ... 65% of the children are able to walk in a clearly audible 4/4 rhythm.
- ... 95% of the children are able to cycle along a square where each side is 40 metres long.
- ... 81% of the children are able to swim 25 metres following the instructions of the already presented task.

The high percentage of children not being able to successfully solve an item - as revealed by the figures above - is extremely worrying. For the swimming items, it means that at least every fifth child in grade five in NRW lacked this qualification in 2006. The findings in the area of swimming provoked by far the most reactions in the professional public and in politics.

Being able to run one’s own age in years in minutes is one of the few precisely described minimum standards that can be found in the curriculum. In the test item, the time was set at ten minutes for all participants. It is satisfying that four out of five children were able to solve the task. However, it causes concerns (and is a rewarding aim of individual support) that at least every fifth child in NRW is unable to solve this task.

Another important result of the study is that support needs differ in terms of gender and area: while boys need support in dancing, girls are weaker in the area of ball games. From the point of educational justice, it is remarkable that the areas where girls demonstrate a better performance are often neglected in PE (Kleindienst-Cachay, Kastrup, & Cachay, 2009).

The significance of the research results increases immensely when gathering information about how each surveyed child performed at the set of tests as a whole. During the research procedure we realised that the estimation that the test items were a ‘basic motor qualification’ which every child should possess was not generally given for all test items. The tested qualifications are indeed desirable. However, the qualifications are not indispensable for cultural participation. In fact, some qualifications can either be replaced or compensated by other qualifications. Thus, it can be said – with some limitations – for the content areas: A child who cannot practice

gymnastics or who cannot swim or cycle, but who still possesses sufficient basic motor qualifications in other content areas still has other options in order to take part in the culture of sports and exercise. However, there are immense disadvantages for children who cannot demonstrate sufficient performances for several content areas. The study showed that insufficient performances in more than one content area are frequent amongst students with low social status and a migration background (Kurz & Fritz, 2008).

### **3 MOBAQ-LUX 7<sup>2</sup>**

In 2011 the Ministry of Education in Luxembourg commissioned the MOBAQ research team from NRW to develop a test instrument to survey the basic motor qualifications of seventh graders<sup>3</sup>. This mandate was part of Luxembourg's national action plan "Eat healthy – move more". The instrument was supposed to be psychometrically sound and easy to handle by PE teachers in school. In Luxembourg and Germany students move to secondary school at different grades. In Luxembourg secondary schools start with the seventh grade, when students are about 13 years old, while in Germany they start with the fifth grade with eleven year-old pupils. Despite of this and other differences in terms of living conditions, MOBAQ-NRW 5 (designed for grade 5) was used as the basis for the development of MOBAQ-LUX 7 for the seventh grade. Four classes were tested on five days with the MOBAQ-NRW 5 in July 2011. In order to check the objectivity of the instrument, about 40 students were videotaped in performing each item. The recordings were presented to PE teachers from Luxembourg. The teachers were asked to evaluate the students using the test manual. In order to control the retest-reliability, one class followed the procedure twice at an interval of four days. The validity MOBAQ-LUX 7 was verified by the criteria of content validity, criterion and construct validation. Inappropriate items were eliminated. New items were developed in a multilevel procedure and tested, whether this new version was practical for application in PE, all over Luxembourg. Special attention was paid to simple material that is available in every gym. Furthermore, additional hints in order to facilitate the organisation of the testing procedure in PE were elaborated and a "MOBAQ-LUX-Box" was developed which contains all special material needed for testing (Lindemann, Maatmann, Rethorst, Scheuer, Schroer, & Kurz, in preparation).

Nine of the MOBAQ-NRW 5 test items were substantially modified or newly constructed in order to meet the demands of the quality criteria and the suitability for students at a higher age. Hence, the MOBAQ-LUX 7 instrument consists of five areas (running and jumping, swimming, motion arts, ball sports and cycling) with three test items each; consequently there are 15 items in total (in contrast to the 28 items in MOBAQ-NRW 5).

As is the case in the MOBAQ-NRW 5 version, each of the three items is evaluated dichotomously with either "pass" or "fail". The assumption about the special needs was also maintained: A student has special educational needs in an area if he or she failed in more than one item in this area. At the end of 2012 a pilot study was carried out for MOBAQ-LUX 7 with the aim to test the new items under school conditions. Feedback was gathered on the manual, and experiences regarding the local implementation were gained. The teachers of the participating schools took part in training for the usage of the instrument before the pilot study was initiated. Following the training, the colleagues of the participating schools planned the implementation of the instrument in order to adapt it to the conditions of each school. The seventh graders were tested in the period from September to November 2012. The feedback from the schools led to a revision of the material and of the instructions for organising testing. A total of 769 students was tested in the pilot study of which 47% were girls.

The results of the study on the basic motor qualifications showed that

- ... 61% of the students are able to throw and catch a ball safely,

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<sup>2</sup> The responsibility for this part of the review article lies with Rethorst, Lindemann and Kurz.

<sup>3</sup> In cooperation with C. Scheuer and W. Becker from the University of Luxembourg.

- ... 42% of the girls were unable to solve the item of passing a ball with their feet
- ... 83% of the seventh graders are able to swim a distance of 100 metres where 25 metres were completed in a supine position.
- ... 29% can slow down and stop safely with their bicycles.

The significance of the data is restricted due to the fact that not all students have carried out all items and the schools in the pilot study were interested in the study and took part on a voluntary basis. Thus, the results might be biased positively. This means that the results cannot be generalized for Luxembourg. However, they can be used as a basis for the hypothesis, which should be tested using a representative sample. Following this procedure, a detailed picture of the characteristics of basic motor qualifications amongst students from Luxembourg at the point of admission for secondary schools can be obtained.

#### **4 MOBAQ-LUX 3<sup>4</sup>**

Between 2011 and 2014, the University of Luxembourg conducted the MOBAQ-project with the aim to elaborate competence-oriented test items according to the MOBAQ-approach (Kurz & Fritz, 2007) and according to quality criteria of standardized tests. The resulting battery of test items allows PE teachers to evaluate for pedagogical purposes the motor status and potential deficiencies of students at an average age of eight years in third grade of elementary school. The results help to identify students with remediation needs in order to be able to suggest specific services and offers at school and classroom level to students and their parents.

The development of the test items for the assessment of basic motor qualifications took place on the basis of normative pedagogical considerations in several expert discussions<sup>5</sup>. The central question was: What should a child at the age of eight years be able to perform in order to take part in the movement culture (Kurz et al., 2007)? The essential guiding principles were to ensure reference to the living environment, as well as, to a lesser degree, curricular validity. In the selection of the test items, based on empirical data, special attention was paid to the average difficulty of the dichotomous test items, where the objective was to target a passing quote between 80% and 95%. Furthermore, a test manual and test materials for teacher training were developed. Initially, the test items comprised 29 basic motor qualifications in the six movement fields (1) moving on equipment (e.g. balancing, rotating); (2) moving in water (e.g. gliding, diving); (3) running and jumping (e.g. coordinated running, rhythmic skipping); (4) rolling and riding (on a kickboard; e.g. changing track, braking and stopping); (5) playing with small devices (e.g. hitting a target, controlling with a stick); and (6) playing with balls (e.g. throwing and catching, dribbling).

During the test phase, trained PE teachers conducted the tests during their regular PE lessons. The validation of the test instrument was realized in two studies. The first study involved the generation of a psychometrically best possible quality item pool, which reflects the dimensions, facets and levels of the underlying competence model of movement fields. The test data of a sample of 113 students in eight classes allowed to validate the test construction empirically, to select and revise the test items and to optimize the test instructions. Therefore, the data was examined for the classical test criteria objectivity, reliability and validity. The objectivity – given by a maximal standardization in implementation, analysis and interpretation – was analyzed using the evaluation of the rater compliance in assessment of video recordings of 20 students. The reliability was evaluated by a retest in one class. Finally, the validity was evaluated by the rating of the items by experts (content validity), a correlation analysis in the test dimensions in order to test the item characteristics (construct validity) and a correlation analysis between the test results and grades in PE (criterion validity). The findings provided the

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<sup>4</sup> The responsibility for this part of the review article lies with Scheuer and Bund.

<sup>5</sup> The development of the test items followed the cooperation with the University of Bielefeld (expert team of D. Kurz, S. Rethorst and U. Lindemann) as well as an exchange in expert workshops and the collaboration with trained physical education teachers and students in seminars.

basis for the subsequent item selection and item re-construction. After the application of the described test quality criteria, the item selection led to 18 MOBAQ-test items in six test dimensions.

In a next step, the test battery was used in a second study (N = 399; 50.4% girls; M = 8.33 years) in order to validate empirically the previously selected and/or improved items as well as the structure of the competence model lying behind the concept of basic motor qualifications (Scheuer, Bund, & Becker, 2014). For empirical purposes and in order to cover a broader range of the students' performances, a second level of advanced performance was implemented for 15 of the 18 test items<sup>6</sup>. This advanced level was reached by establishing more difficult passing criteria for the respective test item. Thus, each child first had two attempts at fulfilling the level 1 item. If successful, the child had two additional attempts at fulfilling the level 2 item. These test items were scaled on an ordinal scale level (0 = fail, 1 = level 1 passed, 2 = level 2 passed). A three-factor structure with the factors "object-movement", "self-movement" and "movement in water" was identified using a factor analysis (Scheuer, Bund & Herrmann, in preparation). The results of MOBAQ-LUX 3 provide an individual profile resuming the level of attendance of the basic motor qualifications for each student in the different test dimensions.

## **5 Genesis of the MOBAK-instruments for the assessment of basic motor competencies (IMPEQT-MOBAK)<sup>7</sup>**

In order to consider the demands of longitudinal studies in PE and to identify determinants of output indicators, the IMPEQT Study (**I**mplementation in **P**hysical **E**ducation and the **Q**uality of **T**eaching) was implemented at the department of sport, exercise and health at the University of Basel<sup>8</sup>. The study can be characterized as one of the first studies within a research program of school effectiveness research based on a theoretical framework of a model of influences and prerequisites for learning outcomes in school (Scheerens & Bosker, 1997). The change and development in students' motor performance was analysed over a period of one year and how the quality of PE influenced these changes. The MOBAQ approach by Kurz, Fritz and Tscherpel (2008) was used as testing instrument to measure motor outcomes of PE. In addition, quality criteria of PE and students' dispositions and intentions (i.e. self concept, motivation) were assessed (see Herrmann, Leyener, & Gerlach, 2014; Herrmann, Seiler, Pühse, & Gerlach, 2015). The data collections took place in January 2012 and February 2013. The sample size of the IMPEQT study involved 890 seventh graders (49% girls, M = 13.2 years). The schools were located throughout three Swiss cantons: Basle, Zurich and Aargau.

The MOBAQ test items were adapted for the purpose of the IMPEQT study. Items from the movement areas "running – jumping – throwing" and "ball sports" were taken from MOBAQ-NRW 5 (see chapter 2.1) in the same way, the areas "gymnastics" and "moving rhythmically" were summarized in the area "motion arts". The areas "swimming" and "cycling" had to be eliminated due to economic reasons. According to the higher age of the students, a few items (target throwing, balancing and catching and throwing) were adapted by increasing the minimum standard level to the seventh grade.

Considering the original focus of the MOBAQ-test items by collecting dummy-coded motor minimum standards, some test items were adapted. Therefore, some items were tested in a two-level difficulty in order to cover a higher range of students' performance and to increase the variance of the dependent variables. There was an adaptation in the ball-test items "bouncing" and "dribbling" with regard to the dominant and non-dominant hand or leg. Further adaptations took place in the change of the direction (layback, balancing), change of the rhythm (rope skipping) or minimization of the goal (target throwing). Those items were measured on an

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<sup>6</sup> The test items in the area "rolling and riding" have no level 2 as they had to be reconstructed completely after the first evaluation study.

<sup>7</sup> The responsibility for this part of the review article lies with Seiler, Gerlach and Herrmann.

<sup>8</sup> The IMPEQT study was funded by the Swiss Federal Office of Sport (FOSPO) and directed by Erin Gerlach.

ordinal scale level (0 = fail, 1 = level 1 passed, 2 = level 2 passed). For the test items "target throwing" and "throwing and catching" the amount of valid attempts was counted. All other items (10-min run, steeple chase, wall jump, roll over the high bar and jumping course) were measured on the original dichotomous scale (0 = failed, 1 = passed). A movement area was completed when a student passed more than half of the first level test items belonging to each area.

Descriptive analyses of the MOBAQ items across the three movement areas revealed that...

- ... 75% of all students achieved the basic motor qualifications.
- ... 20% of the students revealed deficiencies in one movement area.
- ... 25% required improvement in two or three movement areas.

### ***From basic motor qualifications to basic motor competencies***

One central scope of the IMPEQT study was to analyse the structure of the MOBAQ test items to identify latent factors, which meet satisfying psychometric criteria. Therefore an exploratory factor analysis with the T1 sample of the IMPEQT study was used and showed a structure with two latent factors. The model fit indices were very good. The first factor included seven items and represents body movements. The second factor included four items and represents test items with the ball. The T2 sample was used for a confirmatory factor analysis in order to confirm the structure and showed good model fit indices. Therefore, two dimensions within basic motor performance could be identified and were confirmed. In a longitudinal view, we calculated the stability of these two latent factors by using autoregressive models. The results showed high stability over one year. This depends on ceiling effects caused by the orientation of minimal standards within some test items (for details see Herrmann, Seiler, Pühse, & Gerlach, submitted).

The factors behind these MOBAQ items represent latent factors, which were called 'basic motor competencies' (MOBAK, derived from the German: *Motorische Basiskompetenzen*). Adapting the competence definition of Weinert (2001) basic motor competencies can be defined as motor performance dispositions which can be developed from situation-specific requirements and which can serve as an accomplishment strategy for requirements in the culture of sports and exercise. (1) They can be learned for the long-term, taking into account previous experiences and can be improved through practice. (2) They are explicitly context-dependent and refer to specific requirements in the culture of sports and exercise and (3) are functional performance dispositions. Basic motor qualifications (MOBAQ) are the standards in terms of can-do statement (e.g., can throw, can catch). They are observable performances of human movements and the basis of learning processes for sport-specific skills and techniques.

This step from using the MOBAQ items in order to assess basic motor qualifications further identifies latent factors as basic motor competencies, represents the crucial shift from MOBAQ to MOBAK in the development of basic motor performance indicators. This allows an "indirect" assessment of (latent) basic motor competencies (MOBAK) through (manifest) basic motor qualifications (MOBAQ). The following chapter illustrates in detail the relation as well as the difference between the MOBAQ test items and their superordinate MOBAK factors.

## **6 MOBAK-1 and MOBAK-3<sup>9</sup>**

The MOBAK test instruments evaluate basic motor competencies in the first (Herrmann & Gerlach, 2014; Herrmann, Gerlach, & Seelig, 2015; Herrmann & Seelig, 2014) and third grade respectively (Herrmann, 2015b; Herrmann & Seelig, submitted; Herrmann & Seelig, 2015). They were originally developed as an instrument for evaluating students' output in empirical research in consideration of psychometric quality criteria. Furthermore, teachers can use these

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<sup>9</sup> The responsibility for this part of the review article lies with Herrmann.



test instruments in order to evaluate students' output, enabling them to assess the individual performance level of each student.

The development of the test items took place on the basis of normative pedagogical considerations in several expert discussions. In order to ensure curricular validity, we developed the test items in close connection with the learning goals specified in the curriculum. The criteria for item construction were gender-specific test fairness as well as feasibility and age-appropriate item design. The selection of the test items was made on the basis of empirical data. Special attention was paid to the average difficulty of the test items (passing quote 50-70%) in order to secure the differentiation between performance levels.

The test items of the MOBAK-1 and MOBAK-3 test instruments each measure eight basic motor qualifications (MOBAQ-items) which can be assigned to the two basic motor competencies (MOBAK-factors) "object movement" and "self-movement". They are prerequisites in order to cope with higher requirements in different contexts. The more functional the application is in complex situations, the higher is the competence of the students. The assignment in the competency structure model was carried out on the empirical level and on the basis of motor development theories (e.g. Clark & Metcalfe, 2002).

The MOBAK-factor "object movement" involves MOBAQ-items (e.g. throwing, catching) which are developed from requirements that include handling balls, and serve as an accomplishment for requirements in various ball sports. The MOBAK-factor "self-movement" involves MOBAQ-items (e.g. balancing, rolling) which are developed from requirements that include handling the entire body in a room and serve as an accomplishment for requirements in gymnastics or athletics. These two MOBAK-factors are mutually dependent.

For the MOBAQ-items "throwing" and "catching", each child has six attempts (no trials) at each test item. Each hit is recorded and converted into points (0-2 hits = 0 points, 3-4 hits = 1 point, 5-6 hits = 2 points). For the other six MOBAQ-items each child has two attempts (no trials) to fulfil the task. Those test items are dichotomously scaled (0 = failed, 1 = passed) and the amount of times passed is recorded in points. On this basis the MOBAK-factors "object movement" and "self-movement" are calculated as the sum of the results of the four MOBAQ-items (= factor sum value). A total maximum of eight points can be achieved for each area. The data can be evaluated on the level of the MOBAQ-items as well as on the level of MOBAK-factors.

In three validation studies, we empirically reviewed the MOBAK-1 and MOBAK-3 test instruments. The first study in Zurich (N = 317; 55% girls; M = 7.0 years) and the second study in Frankfurt<sup>10</sup> (N = 1061; 45% girls; M = 6.8 years) used the MOBAK-1 test instrument in the first grade of primary school. Both studies focused primarily on construct validity (e.g. the factorial and discriminant validity of the instrument). The assignments of the basic motor qualifications and the basic motor competencies mentioned above were empirically confirmed by a factor analysis. In both studies we found two factors consisting of four MOBAQ-items each. The related exploratory factor analyses and confirmatory factor analyses revealed good model fit indices (factorial validity; in detail Herrmann et al., 2015). Moreover, it was shown that the MOBAK-1 test instrument displays parts of motor functions that differ from those of classical motor ability tests. The test items for the assessment of the basic motor qualifications are only slightly related to the test items for the assessment of the motor ability (e.g. 20m-sprint, standing long jump) (discriminant validity; Herrmann, Gerlach, & Seelig, in press). Based on these psychometric results, the MOBAK-1 test instrument can be accepted as suitable for the evaluation of the effects that PE has on basic motor competencies.

In the third validation study in Basle (N = 323; 59% girls; M = 9.2 years), the MOBAK-3 test instrument was used in the third grade of primary school. The expected factorial structures of the basic motor competencies were again confirmed empirically by factor analyses. The

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<sup>10</sup> In cooperation with Christopher Heim from the University of Frankfurt.

conducted confirmatory factor analyses with the two MOBAC-factors also consisting of four MOBAQ-items each revealed good model fit indices (Herrmann, 2015a).

## **7 Conclusion and discussion**

It is indispensable to ask which objective targets are to be met with the operationalization of basic motor qualifications and basic motor competences. The test instruments are differentiated according to their function. There are different requirements for the purpose of *diagnostic* or *evaluation*.

The assessment of basic motor qualifications (MOBAQ) is useful and practical for *diagnostic* purposes which corresponds to the original idea by Kurz et al. (2008, see chapter 2.1). On the basis of normative discussions it will be decided which basic qualifications should be recorded and how these can be operationalized in practicable test items. From a pedagogical point of view it is useful to anchor the test items to minimal standards (Tenorth, 2008) as teachers are able to derive special educational needs for students from minimal standards. The test items determine or “form” the construct to be collected which is why it is also called the “formative model” (Bühner, 2011, p. 37) in the test theory. The construction of a set of tests is very complex. The selection of test items must be justified clearly as the change in the items influences the construct to be measured directly. However, the major problem is that this is not a psychometric test and thus cannot be used in classical test theory. Moreover, the pedagogical useful orientation on minimal standards holds the statistical problem of a ceiling effect. For instance, if 90% of the students pass the test items, this is pleasing from a pedagogical perspective. It is also possible to analyse differences in the frequencies for passing and failing in a task between groups (such as boys and girls, or students with and without migration background). However, a more detailed statistical calculation is difficult due to insufficient variance in this dimension.

Psychometric validated tests will be needed for this research question – in the context of *evaluation* – as they were developed with the MOBAC-instruments (cf. Herrmann et al., 2015). For example the question of what impact the quality of teaching on the changes in the basic motor competencies has within a school year can be answered.

There is no focus on manifest basic motor qualifications in this case, but more importantly there is a focus on basic motor competencies. From a statistical point of view it is more sensible to construct the test items according to their average item difficulty in order to ensure high differentiation ability. In this instance, the test items “mirror” the construct and are interchangeable. This means that the items do not influence the construct substantially (Bühner, 2011, p. 37).

It must also be differentiated between the individual who carries out the set of tests. The items are either carried out by a teacher within the school context or by a researcher in a scientific context. Thus, teachers can use basic motor qualifications within the regular lessons, for instance, in order to examine which students have special educational needs. The standardized criteria are not of central importance as a comparison with classes is not usually drawn. The MOBAQ-LUX (see chapter 2.2) follows this direction. If the MOBAQ-items are used for monitoring, the performance scores of students can be compared amongst classes and schools. The standardization of the test items must be ensured in order to measure the same item. This requirement is followed by the MOBAQ-NRW test instrument (see chapter 2.1) in their representative measurements in North Rhine-Westphalia (Germany). The results demonstrate political relevance as, for example, it is possible to state the percentage of children in a certain region, or that of a population, which is not able to swim.

Basic motor competencies are to be collected when, for instance, the teacher wants to document the learning process of his students and needs an instrument that is sensitive to change. The standardized assessment in a scientific context can then be assigned to the impact and educational research in order to reveal the determinants for the learning efficiency. One possible

question can be whether classroom management has a positive effect on basic motor competences. The central aim of the MOBAK-instruments (see chapter 3) is to develop an instrument for the impact research in PE. If it is possible to include this instrument in practice in schools afterwards, teachers will be able to describe the learning process of their students in PE in dependence of quality of PE or in specific interventions (Herrmann, 2015b; Herrmann & Gerlach, 2014).

## References

- Bühner, M. (2011). *Einführung in die Test- und Fragebogenkonstruktion* (3rd ed.). München: Pearson Studium.
- Clark, J. E., & Metcalfe, J. S. (2002). The mountain of motor development: A metaphor. In J. E. Clark & J. H. Humphrey (Eds.), *Motor development. Research & reviews* (pp. 163–190). Reston, VA: National Association for Sport and Physical Education.
- Herrmann, C. & Seelig, H. (2014). *MOBAK-1: Basic motor competencies in first grade: Testmanual*. Retrieved from [www.dsbg4public.ch](http://www.dsbg4public.ch).
- Herrmann, C. & Seelig, H. (2015). *MOBAK-3: Motorische Basiskompetenzen in der 3. Klasse: Testmanual*. Retrieved from <http://www.dsbg4public.ch>.
- Herrmann, C. (2015a). Erfassung motorischer Basiskompetenzen in der dritten Grundschulklasse. *Sportunterricht*, 64(3), 72–76.
- Herrmann, C. (2015b). Entwicklung eines Testinstrumentariums zur Erfassung von Schülerkompetenzen im Sportunterricht. In G. Stibbe (Ed.), *Brennpunkte der Sportwissenschaft*. Sankt Augustin: Academia.
- Herrmann, C., & Gerlach, E. (2014). Motorische Basiskompetenzen in der Grundschule: Pädagogische Zielentscheidung und Aufgabenentwicklung. *Sportunterricht*, 63(11), 322–328.
- Herrmann, C., & Seelig, H. (submitted). Structure and profiles of the Basic Motor Competencies in the third grade – validation of a test instrument. *Measurement in Physical Education and Exercise Science*.
- Herrmann, C., Gerlach, E., & Seelig, H. (2015). Development and validation of a test instrument for the assessment of basic motor competencies in primary school. *Measurement in Physical Education and Exercise Science*, 19(2), 80–90.
- Herrmann, C., Gerlach, E., & Seelig, H. (in press). Motorische Basiskompetenzen in der Grundschule. Begründung, Erfassung und empirische Überprüfung eines Messinstrumentes. *Sportwissenschaft*.
- Herrmann, C., Leyener, S., & Gerlach, E. (2014). *IMPEQT-Studie. Dokumentation der Erhebungsinstrumente*. Retrieved from <http://www.dsbg4public.ch>.
- Herrmann, C., Seiler, S., Pühse, U., & Gerlach, E. (2015). „Wie misst man guten Sportunterricht?“ – Erfassung der Dimensionen von Unterrichtsqualität im Schulfach Sport. *Zeitschrift für Sportpädagogische Forschung*, 3(1), 6–26.
- Herrmann, C., Seiler, S., Pühse, U., & Gerlach, E. (submitted). Empirische Überprüfung der Struktur von motorischen Basiskompetenzen im Schulsport. *Unterrichtswissenschaft*.
- Kleindienst-Cachay, C., Kastrup, V., & Cachay, K. (2009). Koedukation im Sportunterricht-ernüchternde Realität einer löblichen Idee. *Sportunterricht*, 57, 99–104.
- Kröger, C., & Roth, K. (2005). *Ballschule: Ein ABC für Spielanfänger*. Schorndorf: Hofmann.
- Kurz, D., & Fritz, T. (2007). *MOBAQ Motorische Basisqualifikationen von Kindern: Ergebnisse einer repräsentativen Untersuchung in Nordrhein-Westfalen*. Bielefeld: Universität Bielefeld.
- Kurz, D., & Fritz, T. (2008). Das Bewegungskönnen der Kinder - eine Bestandsaufnahme. In Innenministerium des Landes Nordrhein-Westfalen (Ed.), *Kinder l(i)eben Sport* (pp. 20–27). Velbert: Scheidsteger.
- Kurz, D., Fritz, T., & Tscherpel, R. (2007). *MOBAQ Motorische Basisqualifikationen von Kindern: Testmanual*. Bielefeld: Universität Bielefeld.

- Kurz, D., Fritz, T., & Tscherpel, R. (2008). Der MOBAQ-Ansatz als Konzept für Mindeststandards für den Sportunterricht? In V. Oesterhelt, J. Hofmann, M. Schimanski, M. Scholz, & H. Altenberger (Eds.), *Sportpädagogik im Spannungsfeld gesellschaftlicher Erwartungen, wissenschaftlicher Ansprüche und empirischer Befunde* (pp. 97–106). Hamburg: Czwalina.
- Kurz, D., Sack, H.-G., & Brinkhoff, K.-P. (Eds.). (1996). *Der Sportverein und seine Leistungen*. Düsseldorf: Ministerium für Stadtentwicklung, Kultur und Sport des Landes Nordrhein-Westfalen.
- Lindemann, U., Maatmann, H., Rethorst, S., Scheuer, C., Schroer, T., & Kurz, D. (in preparation). *MOBAQ-LUX – Motorische Basisqualifikationen von Luxemburger Schülerinnen und Schülern am Übergang zur Sekundarschule: Testmaterialien*.
- Scheerens, J., & Bosker, R. J. (1997). *The foundations of educational effectiveness*. Oxford: Pergamon.
- Scheuer, C., Bund, A., & Becker, W. (2014). *MOBAQ-LUX8 – A competence-oriented test battery for 8 year-old Luxembourgish students: Item analysis*. Retrieved from [http://fiep2014sofia.com/Congress\\_proceedings\\_corrected.pdf](http://fiep2014sofia.com/Congress_proceedings_corrected.pdf)
- Scheuer, C., Bund, A., & Herrmann, C. (in preparation). *Development and validation of a test instrument to assess basic motor qualifications in elementary school in Luxembourg*.
- Schmidt, W., Hartmann-Tews, I., & Brettschneider, W.-D. (Eds.). (2003). *Erster deutscher Kinder- und Jugendsportbericht*. Schorndorf: Hofmann.
- Tenorth, H.-E. (2008). Grundbildung klären – Mindeststandards formulieren. *Pädagogik*, 60(7/8), 70–73.
- Weinert, F. E. (2001). Concept of competence: A conceptual clarification. In D. S. Rychen & L. H. Salganik (Eds.), *Defining and selecting key competencies* (pp. 54–65). Kirkland, WA: Hogrefe & Huber.