157 - DEVELOPMENT OF AQUATIC SKILLS IN CHILDREN - IMPLICATIONS OF DEEP WATER

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1. INTRODUCTION

The adaptation to the aquatic environment is a process that aims to change motor behavior in the aquatic environment and allows the man especially a child to be sufficiently at home in the water for the acquisition of motor skills each increasingly complex in the middle [22]. Thus a good adaptation to the aquatic environment is the base/learning tools for different sports.

Aquatic readiness includes fundamental skills and attitudes that precede the acquisition of more complex water skills as swimming lessons [11]. This concept is particularly important because swimming is developed in a peculiar environment. Water is a physical space that exerts stimulations: thermal auditory, visual circulatory, energy and the action of static pressure is the driving force that enables different sensations in our body having a form of a labyrinth [14]. Thus the starting point for development of aquatic readiness corresponds to total disability to the aquatic environment [3]. The traditional approach to teaching swimming is sequential, following a fixed set of skills, progression of teaching standards. However other approaches are known to be more synthetic, trying to develop the technique and enjoyment through creative teaching procedures such as water games [11, 13, and 17]. Above all, it is intended the acquisition of movement patterns, behavior, water development-level, cognitive and psychomotor development of children [10]. The age group between 5 and 6 years of age is privileged period / critical readiness water [1]. There are several factors which directly influence the organization of education and therefore determine its effectiveness. According to some authors [9] the main factors are: (i) the number of students – factor for the efficiency and quality of education; (ii) the teaching material which allows a variation of stimuli and the lesson, the water temperature which should range between 30º to 32; (iii) weekly attendance two times the ages of three to six years and (iv) in relation to deep swimming pools, where the number of students are reduced (to 6-12 students) although, in the beginning stage of study, one has to use the shallow area, seeking a more lucid and more secure study. The depth of water seems the only thing that shows variations of consensus in scientific and technical community. In fact a few authors refer to depths of water as an influential and effective factor. Moreover the considerations made by these authors are reflexive in experienced professionals built in education, are often based on little scientific data (eg. 2, 16 and 18). It is known that some swimming schools for logistical reasons or methodological and strategic conduct of classes in deep water). However in general, the adaptation to the aquatic environment is realized in shallow pools. This study focuses on the teaching-learning readiness of water in different contexts of practice- deep versus shallow water. Thus the study aims to: (i) describe differences in teaching methodology in shallow and deep water for children 4 and 5 years, (ii) identify the differences in aquatic skills acquired in the children studied after 6, 12 and 18 months teaching in both contexts (deep and shallow water). In special the key issue that arises relates to the following changes in the depth and teaching methodology will influence the effectiveness of adaptation to the aquatic environment for children from pre-school?

2. METHODS

2.1. SAMPLES

Thirty two teachers of swimming (29.3 + 14 years old) who were responsible for swimming lessons for children of this investigation, agreed to participate in the study. All teachers had academic qualifications for teaching swimming, i.e., Degree in physical education or similar. The swimming teachers were divided into two study groups based on type of pools for teaching swimming lessons, he taught classes in sixteen technical pools of deep water; 13 women and 3 men (5.4 + 0.7 years) and the remaining 16 pools in shallow water (8 men and 8 women) with 4.5 + 12 years of professional experience. There were no significant differences ($p<0.05$) between the two groups of experts in relation to age and professional experience. Also participating in this study ninety-eight children aged 4-5 years old (4.39 + 0.49 years). Children were also divided into two distinct groups, according to length of experience in swimming 6 months (16 samples in deep water and 16 in shallow water) 12 months (16 samples in deep water and 18, in shallow water). For data to be feasible and reliable the children started swimming lessons at the same time (about 6, 12 or 18 months of experience) and the approximate number of lessons per week (twice). In this age group there was no significant difference in cognitive and motor between gender (female and male). To carry out the measure the children's parents and teachers gave their consent to participate in this study and the procedures were approved by the management of different schools of swimming.

2.2 ASSESSMENT OF TEACHING METHODOLOGY

A questionnaire was applied with the aim to analyze the organization and teaching methodology based on designs Ghiglione [8] and Santos [21] for the construction of the questionnaires. The first version of the questionnaire (i.e. the pilot questionnaire) was tested in a control group, 10 swimming teachers who were not part of the study sample selection. Minor adjustments were made to increase the clarity of the questions included. The questionnaire was still subject to detailed review by experts in teaching swimming. The final questionnaire included the following: (i) for the purpose of the level of adapting to the aquatic environment is important in the development of aquatic readiness (agree or disagree) - to survive in the water to learn formal swimming, and finish the fear of water promotes a pleasurable activity and develop future competitive swimmers; (ii) the importance in the use of didactic materials were used for each item of material. The technicians had four options to choose from – always used, sometimes, rarely and never, no material – none, swim boards, swimming armbands, swimming noodle, water small sticks, rings or small hoops (not floating); (iii) the teaching programs of the adaptation to the aquatic environment water skills (the response also showed four modes – developed always , sometimes rarely and never) and entrance to the pool guidance on water adjustment submersion, leg propulsion action, action propulsion of legs and arms, sliding rotations around the axis, dives breathing control and deep dives.

2.3 READINESS AQUATIC ASSESSMENT

All children who participated in the study were assessed for the readiness to water; the evaluation was performed using an observation form of aquatic motor skills based on Langendorf, Roberts & Ropke [12] and Navarro [19]. A pilot questionnaire has been tested by experts in swimming the control sample which was composed of six children who were not a part of the study sample. Later a swimming coach with the necessary academic qualifications and who had no knowledge of the present study applied the observation form to the pilot sample. The concordance rate for both assessments was high (ICC= 0.95).

Thus aquatic motor skills were evaluated as follows – (i) entry into the water (ii) vertical balance (iii) breath control horizontal buoyancy; (iv) body position at ventral gliding; (v) body position at dorsal gliding; (vi) body position at longitudinal rotation in gliding; (vii) body position at front and back somersaults; (viii) leg kick with breath control at ventral body position (with and without flutter boards); (ix) leg kick with breath control at dorsal body position (with and without flutter boards); (x) deep-water immersion; (xi) vertical buoyancy at deep water; (xii) feet-first entry and; (xiii) head-first entry. based on guidelines Langendorf & Bruya [11].

To increase the objectivity of the evaluation the information given to children to perform each skill was given instead by the same investigator/technical expert. The children studied, had three attempts to reach the last level of complexity.

2.4 STATISTICAL ANALYSIS

We used descriptive statistics to describe and characterize all numeric variables using measures of central tendency and dispersion. The differences between the groups in terms of teaching methodology and motor skills of acquired water were compared by a test of chi-square. The exact Fisher test was also used when appropriate statistical significance was defined as $p < 0.05$.

3. RESULTS

As regard so to the analysis of methodological and organizational differences in the teaching of adaptation to the aquatic environment between swimming schools that use different contexts to the depth of the pool (shallow and deep water) were not significant. The responses of the questionnaire of both the groups of swimming technicians (deep and shallow water - $p> 0.05$). However, the swimming technicians for deep water seem to value an analytical design-based learning although this trend was not significant ($p> 0.05$). In relation to teaching materials the response chosen by the coaches was sometimes utilized which reveals a great diversity in the educational use of equipment in both groups. However, the importance given to the propulsive autonomy and frequent use of swimming armbands by technical deep water is quite different. Besides these differences observed, the devaluation standards were given by the swimming coaches in both contexts, the teaching of rotations about the longitudinal and transverse axes. Based on the results we can see that children with more practice time (12 and 18 months) acquired a greater number of water skills regardless of context (deep and shallow water). However the descriptive data also indicate that children can consolidate and acquire a better water promptness after 6 and 12 months of practice in shallow water compared with students in deep water. This trend can be detected in almost all water skills assessed.

Besides these differences which are observed, aquatic skills acquired by children in both contexts are significantly different ($p<0.05$) the following parameters: (i) After six months of practice swimming body position at dorsal gliding ($p= 0.018$) none of children with previous swimming lessons in deep water are able to perform a reasonable glide with proper body position;(ii) After 12 months of practice of swimming – body position at longitudinal rotation in gliding ($p=0.034$) only 31.3% of children in deep water are capable of rotation in the longitudinal axis. ((iii) After 18 months of swimming practice – vertical buoyancy at deep water ($p=0.035$): only one children (5.6%) from deep water lessons can submerge and hold breath for 5 seconds or more, sustaining a vertical body position. Consecutively, 38.0% of non-deep water students are already capable of this skill.

4. DISCUSSION

The first objective of the present study was to describe differences in teaching methodology in the readiness of water between deep and shallow water in programs for children from pre-school. The results indicate that no statistically significant differences ($p>0.05$) in both groups of technicians. Analyzing descriptive data it is noticed there are some changes that should be high lightened. The first change seems to occur in the objectives of programs in readiness in water; in deep water swimming, the coaches seem to overestimate the learning in the category of “learning to swim” (87.8%). No materials of floating device or assistance of an adult, the child is incapable of autonomous diving in deep water. Thus the emphasis of propulsion when overvalued might be an objective in these early ages. The swimming schools have a duty to inform parents about the role of swimming lessons for pre-school children related to the prevention of drowning and the importance of close and adult supervision of children near water (15). The educational material is an instrument that should be chosen with the principal purpose for which it is intended. However it should be noted that any material can be more than an educational purpose (19 16 20). In fact the use of swimming armbands to swim or float vests undertakes the development of hydrodynamic buoyancy in the position and the use of these materials is criticized by many authors (eg. 4, 5). The results of the study also reveal a remarkable variability (although not statistically significant), in the importance given to some aquatic skills between both groups of technicians especially the skills of combined movements (greater importance attributed by technical deep water) and the slide breath control (more important for technicians in shallow water). As already mentioned above once that students do not have plantar support, experts emphasize the teaching of the combination of movements particularly a combined action of propulsive legs or arms with breath control.

In addition we note that the rotations around the axis of rotation (longitudinal and transverse) are less valued by both technicians shallow and deep water. The result seems inadequate for the opinion of several authors and /or swimming books (eg.19) for the full development of aquatic skills. The results also show that children with more practice time (12 and 18 months) acquired a greater number of aquatic abilities. However, pupils in shallow water after 6 and /or 12 months of swimming lessons seem to have greater competence in water compared to students in deep water. But after 18 months of practice these differences in both contexts are not significant. Thus the combination of teaching between deep and shallow water seems to represent an important space for the type of aquatic programs.

5. CONCLUSIONS

The results indicate that no statistically significant differences exist between the methodology of teaching and aquatic readiness in deep and shallow water for children in pre-school. However there are some significant variations in overvaluations by technicians in the autonomous movement (propulsion) and the frequent use of swimming armbands.

Data indicates that children with more practice (12 and 18 months) have acquired a greater number of aquatic skills

regardless of the context of water depth. With regard to 12 months of practice, aquatic competence appears to be greater in shallow water in such a way that the slide back into position has a high failure in deep water. However at 18 months of practice, these differences seem to be dissolved and there are very few differences between the two groups of students in relation to aquatic readiness. However the ability of vertical fluctuation remains a small degree of success among children in deep water. Thus it seems that the existence of asymmetries in the skills of water may be related to differences in the depth of the pool as well as the methodological organization adopted by the swimming schools especially the pedagogical importance attributed to certain contexts appear to have the guidance of educational programs adopted.

These results suggest that the variations are not significant in teaching, it is conjectured that the depth of water affects the aquatic skill acquisition in children of pre-school.

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DEVELOPMENT OF AQUATIC SKILLS IN CHILDREN - IMPLICATIONS OF DEEP WATER

ABSTRACT

The effectiveness of different methods of teaching swimming has not been studied. The effects in aquatic competency in learning contexts are totally unknown. The study has two objectives: (i) describing differences in teaching methodology in shallow and deep water in swimming lessons for children from pre-school (ii) identifying changes in aquatic acquisition of motor skills (basic) acquired after 6, 12 and 18 months of practice. The study consists of 32 swimming technicians and 98 children, divided into two distinct groups with different depths. The sample was also studied accordance to previous experience of swimming practice: 6, 12 e 18 months practice. To assess the organization and the methodology of teaching a questionnaire was administered to technicians. Later the children were assessed at the level of readiness in water using an original form of observation.

Comparisons developed between chi-square and Fishers exact test when appropriate groups of statistical significant were set at $p < 0.05$. The results show some methodological differences between the two contexts in the pre-school children, although not significant. The importance given to the propulsive autonomy and frequent use of swimming armbands by technicians in deep water is quite distinct. The results also indicate that children with more practice (12 and 18 months) in both contexts showed a greater number of aquatic skills acquired. However, the competency appears to be greater in students of shallow waters namely the slide back (6 months) in rotation about the longitudinal axis (12 months) and vertical fluctuations in deep waters (18 months). These results suggest that the variations are not significant in teaching, it is conjectured that the depth of water affects the aquatic skill acquisition in children of pre-school.

KEYWORDS: Swimming; water competence (or readiness); teaching methodology.

CONSÉQUENCES DE L'EAU PROFONDE - DÉVELOPPEMENT DES COMPÉTENCES AQUATIQUES DANS LES ENFANTS

RÉSUMÉ

L'efficacité des différentes méthodes d'enseignement de natation est une zone avec peu d'études. Les effets sur l'acquisition de compétences dans des contextes d'apprentissage variés aquatiques sont totalement inconnus. L'étude a deux objectifs: (i) de décrire les différences de méthodologie de l'enseignement en eau peu profonde et profonde des cours de natation pour les enfants du préscolaire, (ii) identifier les changements dans l'acquisition des habiletés motrices aquatiques (de base) acquis après le 6, 12 et 18 mois de pratique.

L'étude se compose de 32 entraîneurs de natation et 98 enfants, répartis en deux groupes distincts avec des profondeurs différentes. L'échantillon a également été étudiée en fonction de l'expérience antérieure de pratiquer la natation: 6,12 et 18 mois de pratique.

Afin d'évaluer l'organisation et la méthodologie de l'enseignement, un questionnaire a été administré à des techniciens. Plus tard, les enfants ont été évalués au niveau de l'eau de préparation, en utilisant une forme originale de l'observation.

Développé comparaisons entre groupes par le biais chi carré ou le test exact de Fisher, le cas échéant. La signification statistique a été fixé à p <0,05. Les résultats montrent des différences méthodologiques entre les deux contextes dans les enfants d'âge préscolaire, bien que non significatif. L'importance accordée à l'utilisation de propulsion et de l'autonomie fréquente des pinces par des eaux profondes technique est assez différente. Les résultats indiquent aussi que les enfants avec plus de pratique (12 et 18 mois) dans les deux contextes ont montré un plus grand nombre de compétences acquises aquatiques. Cependant, l'eau semble être une plus grande compétence dans des eaux peu profondes des étudiants. Ces résultats suggèrent que les variations ne sont pas significatives dans l'enseignement, il est supposé que la profondeur de l'eau affecte l'acquisition de compétences aquatiques chez les enfants de maternelle.

MOTS-CLÉS: natation ; compétence aquatique (ou promptitude); méthodologie d'enseignements.

EL DESARROLLO DE HABILIDADES ACUATICAS EN LOS NIÑOS – IMPLICACIÓN DE AGUAS PROFUNDAS.

RESUMEN

La eficacia de diferentes métodos de aprendizaje de la natación es una zona con pocos estudios. Los efectos sobre la adquisición de experiencia en diversos contextos de aprendizaje acuáticos son totalmente desconocidos. El estudio tiene dos objetivos: (i) describir las diferencias en la metodología de la enseñanza en aguas superficiales y profundas en las clases de natación para niños desde pre-escolar, (ii) identificar los cambios en la adquisición de las habilidades motrices acuáticas (básica) adquirida después de 6, 12 y 18 meses de práctica.

El estudio consta de 32 entrenadores de natación y los niños 98, divididos en dos grupos distintos, con diferentes profundidades. La muestra se estudió también en función de la experiencia previa de la práctica de la natación: 6,12 y 18 meses de práctica.

Para evaluar la organización y metodología de la enseñanza, se administró un cuestionario a los técnicos. Más tarde, los niños fueron evaluados en el nivel de agua de preparación, con una original forma de observación.

Comparaciones entre los grupos desarrollados a través de chi-cuadrado o la prueba exacta de Fisher cuando fue apropiado. La significación estadística se estableció en p <0,05. Los resultados muestran algunas diferencias metodológicas entre los dos contextos en los niños pre-escolares, aunque no significativa.

La importancia dada al uso frecuente de propulsión y la autonomía de las abrazaderas de aguas profundas técnica es muy diferente. Los resultados también indican que los niños con más práctica (12 y 18 meses) en ambos contextos mostraron un mayor número de habilidades acuáticas adquiridas. Sin embargo, el agua parece ser mayor competencia en los estudiantes de las aguas poco profundas. Estos resultados sugieren que las variaciones no son significativas en la enseñanza, se conjetura que la profundidad del agua afecta a la adquisición de habilidades acuáticas en los niños de edad preescolar.

PALABRAS CLAVE: natación; competencia (o disposición); metodología de enseñanza.

O DESENVOLVIMENTO DAS HABILIDADES AQUÁTICAS EM CRIANÇAS - IMPLICAÇÕES DA PROFUNDIDADE DA ÁGUA

RESUMO

A eficácia de diferentes métodos de ensino na natação é uma área escassa em estudos. Os efeitos na aquisição da competência aquática em contextos de aprendizagens diversificadas são totalmente desconhecidos. O estudo apresenta dois objectivos: (i) descrever as diferenças na metodologia de ensino em águas rasas e profundas, em aulas de natação para crianças do pré-escolar; (ii) identificar variações na aquisição de habilidades motoras aquáticas (básicas) adquiridas após 6, 12 e 18 meses de prática.

O estudo é constituído por 32 técnicos de natação e 98 crianças, divididos em dois grupos distintos, com diferentes profundidades. A amostra foi ainda estudada de acordo com a experiência prévia de prática de natação: 6,12 e 18 meses de prática.

Para aferir a organização e metodologia de ensino, foi aplicado um questionário aos técnicos. Posteriormente as crianças foram avaliadas ao nível da prontidão aquática, utilizando uma ficha de observação inédita.

Desenvolveram-se comparações entre os grupos através do

teste qui-quadrado ou teste exacto de Fisher quando apropriado. A significância estatística foi definida com p <0,05. Os resultados mostram algumas diferenças metodológicas entre ambos os contextos em crianças do pré-escolar, embora não sejam significativas.

A importância dada à autonomia propulsiva e o uso frequente de braçadeiras por parte dos técnicos de águas profundas é bastante distinto. Os resultados também indicam que as crianças com mais prática (12 e 18 meses) em ambos os contextos apresentaram um maior número de competências aquáticas adquiridas. No entanto, a competência aquática parece ser maior nos alunos de águas rasas, nomeadamente: ?o deslize dorsal (6 meses); na rotação sobre o eixo longitudinal (12 meses) e a flutuação vertical em águas profundas (18 meses). Estes resultados sugerem que as variações não são significativas no ensino, conjectura-se que a profundidade da água afecte aquisição de habilidades aquáticas em crianças do pré-escolar.

PALAVRAS-CHAVE: Natação; Competência aquática (ou prontidão); metodologia de ensino.