Design and validation of a scale for the aquatic competence assessment instrument in lifeguards

Diseño y validación de una escala para la evaluación de la competencia acuática en socorristas

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Abstract

Drowning is a serious public health problem with profound economic and health impact. The objective was to design and analyze the validity of the content within a scale as to assess aquatic competence in aquatic rescue. The content validation has been carried out in accordance to the opinion, agreement and consensus of 9 experts using the Delphi technique. The validity (of comprehension) was bear out once the scale was applied to a separate sample. Following the collection of the contributions made by the trial of experts and adjusting the scale according to the indications, a second review was carried out obtaining in all of the scenarios values higher than 0.8 in the Kendall coefficient. The validity of content such as the confirmatory factorial analysis showed adequate measurements for the dimensions of the evaluation scale: aquatic competence in rescue and lifeguard. The results presented the aquatic competence assessment instrument in lifeguard as valid and reliable, which allows the opening of a new line of work towards the development of cognitive and behavioral processes in the teaching and training of lifeguard, offering a measuring instrument to analyze its effect on the decision-making.

Keywords: aquatic rescue, cognition, knowledge, decision-making, evaluation tool.

Resumen

Los ahogamientos son un grave problema de salud pública con un profundo impacto económico y sanitario. El objetivo fue diseñar y analizar la validez del contenido de una escala para evaluar la competencia acuática en el rescate acuático en socorristas. La validación del contenido se ha realizado según la opinión, acuerdo y consenso de 9 expertos mediante la técnica Delphi. La validez (de comprensión) se ha comprobado una vez aplicada la escala a una muestra independiente. Tras la recogida de las aportaciones realizadas por el juicio de expertos y el ajuste de la escala según las indicaciones, se realizó una segunda revisión obteniendo en todos los escenarios valores superiores a 0.8 en el coeficiente de Kendall. La validez de contenido como el análisis factorial confirmatorio mostraron medidas adecuadas para las dimensiones de la escala de evaluación: competencia acuática en salvamento y socorrismo. Los resultados presentaron la Escala de Evaluación de la Competencia Acuática en Socorristas como válida y fiable, lo que permite abrir una nueva línea de trabajo hacia el desarrollo de los procesos cognitivos y comportamentales en la enseñanza y formación del socorrista, ofreciendo un instrumento de medida para analizar su efecto en la toma de decisiones.

Palabras clave: rescate acuático, Técnica Delphi, conocimiento, toma de decisiones, instrumento de evaluación.

Introduction

Drowning deaths of young children have increased in the last 3 years, with swimming pools being the most frequent site of this tragedy (White et al., 2018). Drowning is a serious public health problem with profound economic and health impact (Forjuoh, 2013), with submersion time being a key prognostic factor between saving a life and not saving a life (Abelairas-Gómez et al., 2019), which is why a lifeguard ´s decision making can determine the effectiveness of the rescue and the saving of a life.

In an aquatic environment, the risk of drowning is omnipresent and untrained bystanders are often the only resort in preventing drowning (Moran et al., 2017), which highlights the importance of training in aquatic rescue, in order to act quickly and adequately. There is currently evidence of the positive effect of work focused toward the improving of the decision-making in the teaching of sports and skills of open character (Úbeda-Colomer et al., 2017). Following the definition that literature offers on the characteristics of open-skill sports (Claver et al., 2015), rescue and lifeguard is identified within the particularities described. In the absence of studies that analyze the effect of the work of decision-making on cognitive and behavioral processes in rescue and lifeguard. Also due to the lack of adaptation of the questionnaires and scales in place for the measurement of aquatic competence in rescue and lifeguard. As a result the need to create a scale oriented to context and content becomes necessary. The knowledge imparted by The Rescue and Lifeguard in Vocational Training have undertaken an evolution in the Autonomous Decrees that develop the legislation in this context (Ministerio de Educación, 2017; Ministerio de Educación y Ciencia, 1996; Ministerio de Educación y Cultura, 1997), where they set the basic aspects of the curriculum: basic contents, terminal capacities and evaluation criteria, without including in their process the training of the student in decision-making and their evaluation. After consultation of the physical evaluation tests established by the Spanish Federation of Lifesaving and Rescue for the evaluation of the lifeguards. Only units of analysis are found, that merely include technical aspects bypassing the analysis of the cognitive and behavioral processes of decision-making during a rescue. Different studies have shown the effectiveness of decision-making work in strategy sports supporting the importance of possessing skills in cognitive development that simultaneously regulate the psychological components, been in harmony with the development of tactical behaviors that positively influence performance (García et al., 2005), and learning in physical education classes (Aarskog et al., 2018). In the training process of Lifeguard the student must develop behavioral patterns at a cognitive and behavioral level, for the development of skills aimed at successfully resolving the rescue, as a result of this a need arises to measure the success of decision-making in the aquatic rescue. This makes it possible for future professionals to improve in hypothetical rescue situations.

Decision-making

Further studies (Gréhaigne et al., 2012; Nielsen & McPherson, 2001), defined decision-making as the choice (appropriate or inappropriate) of a response to a particular context or situation. In sports the part takers are immersed in a continuous decision-making process to face numerous problems that may arise. The driving action is preceded by the prior decision-making, being this process regulated by problem solving (perception and analysis), mental solution (considering their knowledge of the material) and choice of final action (Mahlo, 1969). The quality of decision-making has the same relevance as the execution of motor skills (Thomas & Thomas, 1994) therefore it entails attention to the stimuli that is presented, the visual ability to identify and evaluate the context, the anticipation in the response to possible situations, the selection of response and motor action, in addition to the knowledge that he has of the athlete himself supporting in the adequacy when making decision (Gil Arias et al., 2012; MacMahon & McPherson, 2009) proving a determining factor.

Numerous studies show the importance of decision-making in the sporting and educational context (Aarskog et al., 2018; Gaspar et al., 2019) not finding research in the rescue and lifeguard one. One of the reasons for this limitation, among other things, is due to the context in which it develops (swimming pool), interaction of the lifeguard with the medium and the different stimuli surrounding the lifeguard (material, active victim and /or passive/drowning).

Aquatic competence assessment instrument in lifeguard

Decision-making has now been examined using different protocols and questionnaires for analysis. Based on the classification provided in the study of García-González et al. (2011) addressing the different approaches to decision-making analysis: (a)verbal protocols and questionnaires; (b) observational analyses; c) analysis of kinematic variables; (d) perceptual analysis; the evaluation method that best fits the object of study is observational analysis. The first instrument they present is the tool created by Nielsen and McPherson (Nielsen & McPherson, 2001). McPherson is one of the forerunners in the parcel of decision-making aspects and their subsequent outcome, for this purpose, it uses a coding system where it independently references both variables evaluating decision-making in terms of decisions appropriate or inadequate for the specific gaming situation, and providing different criteria for the evaluation of the decisions (García-González et al., 2011). As a second prototype they show the model of Oslin, Mitchell, and Griffin (Oslin et al., 1998) which examines decision-making through a qualitative (degree of response adequacy) and quantitative (valuation scale from 1 to 5). By not finding tools in lifeguard and and/or supported by quoted works, it seems advisable to create a tool to assess the aquatic competence in lifeguard to examine the behavioral and cognitive processes in the face of solving problems faced by the lifeguards before a rescue, not only as a student, but also as an approach to a future professional of emergencies who will act as the first link in the survival chain.

The present study

Our review of the status of content of instruments that analyze decision-making within lifeguard found that none were in line with this objective, following this it was considered necessary to design and validate its own scale that assessed aquatic competence in lifeguard. The purpose of the study was the design and validation of an instrument that validly and reliably assesses aquatic competence in lifeguard students supported by the theoretical framework of decision-making. The objectives of this work were: a) To determine the validity of content through expert judgement through the Delphi method (Dalkey & Helmer, 1963); b) Confirm the validity of understanding the scale in a pilot study in a separate sample; (c) Review the reliability of the questionnaire; and d) corroborate the one-dimensionality of construct.

Method

Participants

In line with the theoretical postulates (Reguant-Álvarez & Torrado-Fonseca, 2016) and following the Delphi method two human groups were formed to validate the designed instrument. The coordinating group consisted of four members who collaborated in the research and met the following criteria: a) Knowledge of the analysis through the Kendall Concordance Coefficient W; b) Have research and professional links in line with the study; c) The maintaining of good team communication. The study had a group of 9 experts in the field, with adequate research experience in the evaluation of instruments of this type (Escobar-Pérez & Cuervo-Martínez, 2008), other than to ensure that both the research trajectory and the professional experience of the judges were linked to the object of study and content. To measure internal consistency and perform confirmatory factorial analysis, a sample of 99 students was used, aged between 19 and 26 years (M x 20.83; *DT* 1.86) who took the subject of lifeguard in the teachings of the Superior Technician in teaching and socio sportive animation in a large (main) Spanish province.

Procedure

The study was approved by the ethics committee of the Catholic University of San Antonio, Murcia (UCAM), 30020091, and was in accordance with the Declaration of Helsinki. For the collection of information, the Delphi method was used based on a panel of experts, in accordance to the following points within the schedule structure of the evaluation of the construction phases of the aquatic competence assessment instrument in lifeguard (ECAS) (Figure 1):

1. Preliminary phase. Election and construction of the expert group whose contribution favors the study. Contact and proposal for the participation in the study in order to collaborate.
2. Exploratory phase. Design of the scale where the object of study is reflected and indications for the completion, a brief introduction together with the approach to the problem, background and theoretical basis, a record sheet to indicate the personal data of the respondent followed by the instrument for validation.

   Instrument for validation: Likert type scale with 4 categories according to their degree of suitability or belonging of the item to the dimension that we intend to investigate by adding an open question in order to be able to indicate if necessary the qualitative assessments on the items raised or the introduction of a new one. The maximum stipulated period was 30 days. It was contacted by e-mail between groups (coordinated and expert). Pick up of the completed scales.
3. Final phase. Evaluation of the information obtained on the Delphi scale by the coordinating group from a quantitative and qualitative point of view (analyzed through the introduction of an open question within the consultation instrument).

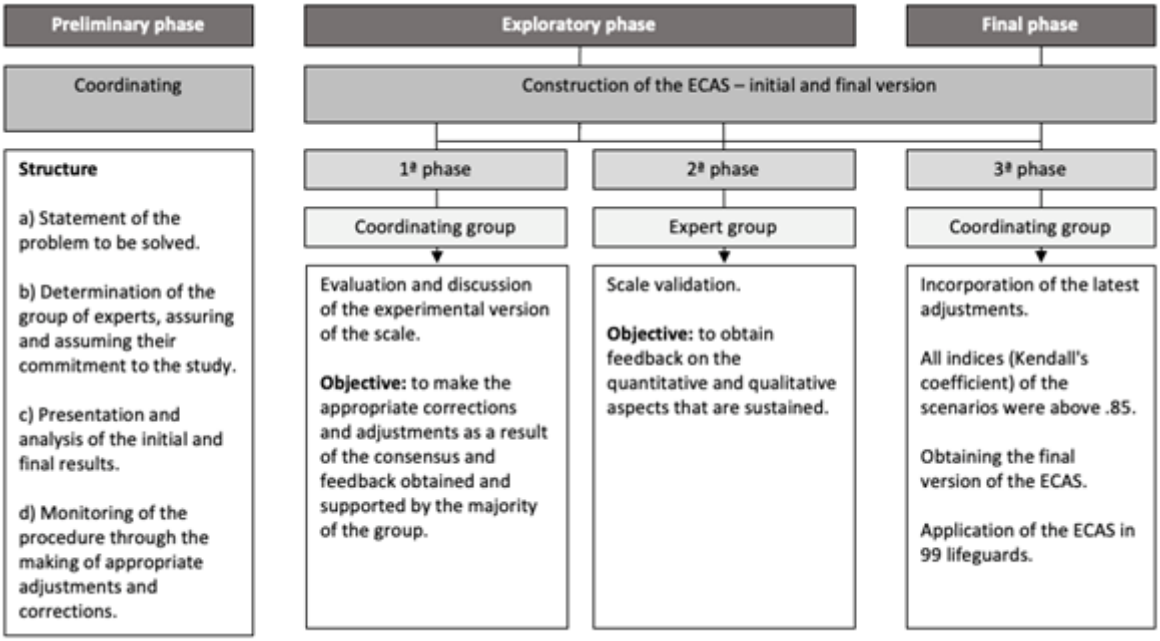

Figure 1. Timeline of the evaluation phases of the construction of the ECAS

Data analysis

Qualitative data has been analyzed using content analysis. With regard to quantitative data, preparatory data analysis, calculation of descriptive statistics and estimation of internal consistency have been carried out with the SPSS 22.0 software. The confirmatory factorial analysis (CFA) of the questionnaire has been developed with the SPSS Amos 22.0 software.

Results

Regarding the ongoing construction of the instrument

After checking and examining the limitations of the published instruments, the scale of assessment of aquatic competence in first or foremost was prepared, setting as starting requirements: (a) study variables: kinematic variables, space, time, lifeguard competence out of water

(First Aid) were discarded to assess only the lifeguard's aquatic competence in decision-making in situations where a victim is detected or danger by assessing the process from its location until it reaches the edge of the pool. It was refused to include the measurement of the time variable as the study focuses on the degree of adequacy of the lifeguard's decision-making (appropriate or inadequate). Unlike the physical tests of evaluation marked by other entities like Spanish Federation of Lifesaving and Rescue, where the physical condition of the lifeguard is evaluated this intervention studies the cognitive and behavioral process of the student to solve the situation; b) way of collection, coding and analysis of the data: according to the protocols analyzed in other investigations (García-González et al., 2011) for the data collection an evaluation instrument was designed according to the context of study; c) time of data collection: because the students belonged to the same group, the assessment had to be at the same time, so that the information obtained from the student did not interfere with the decision-making of his peers, in addition the difference between the collecting student data could not be excessively long as it would affect the state of nervousness of the student who hopes to be evaluated, and to avoid physical and mental exhaustion in decision-making four scenarios were designed; (d) comfort and clarity: for the design of the evaluation scale it was taken into account that the premises were detailed so that the reading could be clear and concise by the researcher in the face of future interventions, without generating doubts during its reading and subsequent analysis so that it indicated each of the decision-making that the lifeguard had to make for an effective rescue in each of the different scenarios.

Regarding the general procedure for the creation of the instrument

The content was determined taking into account the following premises: a) Following the contents marked by Royal Decree 653/2017 (Ministerio de Educación, 2017) that develops the legislation in this context (teachings of the Superior Technician in teaching and socio sportive animation), b) The consultation of the physical evaluation tests established by the Spanish Federation of Rescue and Lifeguard; c) To develop the evaluation scale from the theoretical decision-making framework so that its design is in line with the inputs of the studies and in line with the suggestions of the different authors, in addition to drawing on the opinion of experts. Following the model of Nielsen and McPherson (2001) that employs a coding system in terms of appropriate or inappropriate decisions. The preparation of the items focused on determining the degree of adequacy of the lifeguard's response according to the previous decision making in each of the scenarios raised in the aquatic environment.

Regarding the development of the instrument

In order to bring the victim and his own life to safety and design the different scenarios through the approach of the different common situations faced by a lifeguard, pre-setting the decision-making he must make during the development of the rescue. A first experimental version was developed where a total of 5 scenarios were developed, eliminating the expert group those scenarios that were ambiguous and confusing. The choice "torpedo material" envisaged in the third scenario (since its availability and function is not common to all swimming pools) and the corresponding premises that assessed the decision-making of having chosen the student's use: when entering the pool it is launched at the same time as the material; nothing keeping the controlled material and as the victim approaches keeps him between him and the victim; places the material correctly; tows the victim without losing sight other. In turn, the fifth scenario "active adult victim located at a distance of 125 m" was scrapped. The victim is bracing without advancing and splashes in the water. The lifeguard has auxiliary material (fins) to perform the rescue" (since it sighted a distance greater than the common size of the vessel so that the stage is not adjusted to the reality of the lifeguard) along with the premises raised for the analysis of decision-making: the material been placed well before immersion; it keeps the airways out during the swimming controlling the environment; does not submerge the victim during the rescue by keeping the airways waterproof. The answers to each question were designed according to the following parameters: it does not make any premises, it makes a premise, it makes two premises, it makes three premises, it makes four premises.

Regarding the classification of the scenarios

Following the incorporation of the adjustments provided by the expert group, the coordinating group proceeded to read each scenario by classifying them into one dimension: aquatic competence. The final version of the scale (Annex 1) obtained a bank of 4 scenarios to evaluate the aquatic competence adjusted to the reality and context of the lifeguard: a) common material available in pool to perform a rescue: hoop and/or floppy, b) state of the accident: conscious and/or unconscious, c) emotional state of the victim: heeds the indications of the lifeguard and/or is upset and confused, d) distance between the lifeguard and the victim: half of the vessel forward and/or half of the glass back, e) moment when the lifeguard detects the situation: inside the pool area and/or when leaving the changing room area, f) request for help: the victim demands help with auditory and visual stimulation of help and / or the victim is unconscious without hearing aid stimulus. The items were drafted specifically for the occasion according to Royal Decree 653/2017 (Ministerio de Educación, 2017), the consultation of the physical evaluation tests established by the Spanish Federation of Rescue and Lifeguard and the bibliographic review of studies on decision-making in sport. The order in which each of the danger situations would appear was then established, while incorporating the place of development. In order to complete the written information and ensure its understanding, the scale was accompanied by an illustration (Figure 2) where the scenarios are incorporated graphically showing the place and its order of appearance.

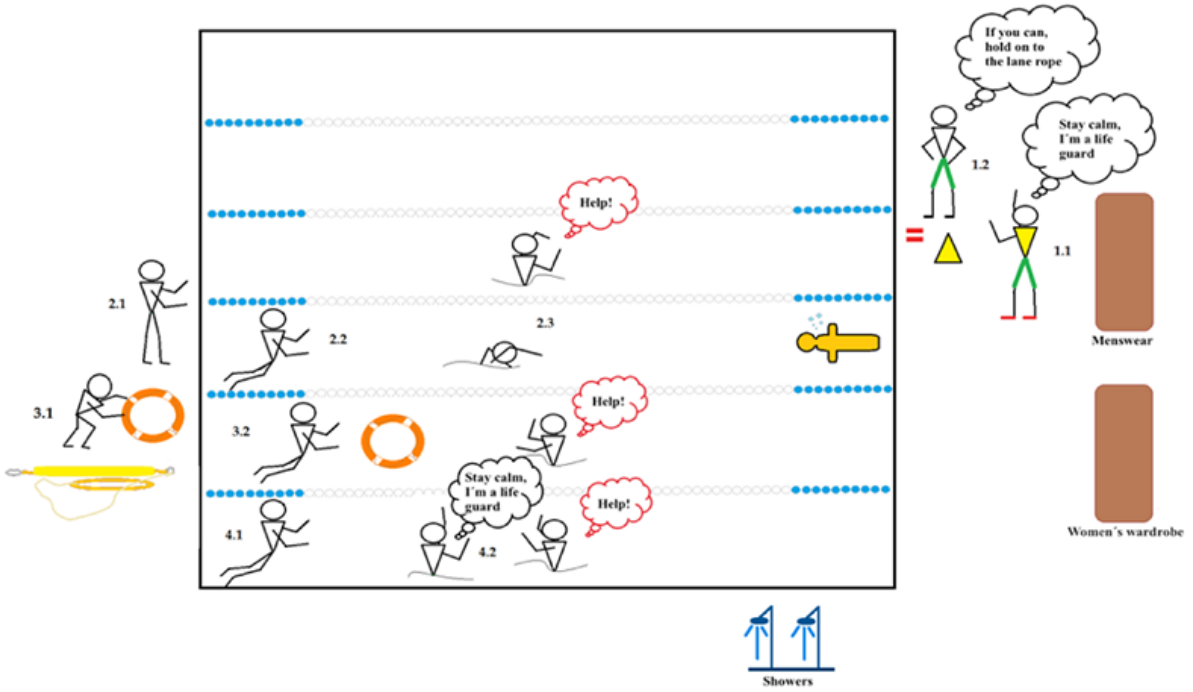

Figure 2. Graphical representation of the Aquatic Competence Assessment instrument in lifeguard (ECAS)

Regarding the validity of the instrument content

Through the use of qualitative techniques by experts, data for content analysis was collected with the intention of achieving evidence to support the conceptual, cultural and linguistic validity of the scale of assessment (Thomas & Nelson, 2007; Wiersma, 2009). To this end, the experts assessed the different aspects (considering the degree of understanding, adequacy in the wording, etc.) on the initial information, the evaluation scale, the scenarios and an overall assessment of each of them (Wiersma, 2009). This information was supplemented by the quantitative inputs of the average scores that the experts sought to each scenario. All indexes (Kendall coefficient) of the scenarios were above .85. The four scenarios that build the evaluation scale were unchanged as they reached values close to 1, therefore the group of experts did not propose another version.

Regarding the validity of understanding of the instrument

In order to verify the validity of understanding and analyzing the degree of understanding from a qualitative point of view, a pilot study was carried out, in which the instrument was provided to an independent sample composed of 22 lifeguards aged 20 and 27 years (M s 22.83; *DT* 1.67) in a large Spanish province. The questions, doubts and suggestions that students made during their completion were recorded and taken into account for their final version.

Confirmatory factorial analysis

The confirmatory factor analysis was used with the four selected scenarios. They were grouped into a component called aquatic competence. The analysis confirmed the categories, coinciding with the anticipated grouping. A positive and significant correlation was given between all scenarios (*r* .751-.888, $p < .001$). The value of the test 2 and the adjustment indices for the model were as follows: .2 (2, 98) s 7.07 (p .29), CFI .97, NFI .97, TLI .97, RMSEA .02 [.00, .06]. Factorial weights ranged from .76 to .88. By relying together on all these indices, the proposed model it is in fact 3 appropriately approximated.

Internal consistency analysis

For the reliability analysis of the aquatic competence assessment scale in lifeguard has been calculated the Alpha of Cronbach, the total reliability of the scale was .89.

Discussion

Since the 1980s, teaching approaches focused on developing decision-making capacity have been developed by modifying the conditions and situations of the game so as not to isolate the tactical aspects of the teaching models since situations similar to the real context are used (Harvey et al., 2010). Due to the importance of the development of these processes and since no study was found to measure the decision-making in first hand, the objective was to design and analyze the validity of content of an instrument that evaluated aquatic competence in lifeguard.

The results of this work indicate that the aquatic competence assessment instrument in lifeguard (ECAS), composed of four scenarios has good psychometric properties obtaining an adequate internal consistency, which allows its application in different contexts. Moreover the confirming factor analysis showed satisfactory metric quality of scale presenting an optimal fit of the proposed model. These results conclude the scale structure in a single factor: aquatic competence of lifeguard.

The four scenarios proposed for the assessment of the dimension of aquatic competence in lifeguard allowing to analyze the different aspects of the cognitive and procedural processes of decision-making by taking them with a single dimension, and connecting it with hypothetical real situations. By itself, this instrument is in line with both the context and content of lifeguard as well as the various aspects that accompany the process of decision-making. This study presents a scale for lifeguards in line with the notions proposed by Thurstone since 1929 and prolonged by Likert in the 1930s; McPherson's coding

system, a precursor in the parcel of the decisions and their subsequent result, since its appearance, this system has been used in numerous studies for the evaluation of decision-making (Gracia et al., 2009); the evaluation instrument designed by Oslin et al. (1998) being also applied in notable interventions after teaching-learning periods responding to the evaluation of the tactical aspects (Sánchez et al., 2016). In addition, this work opens a new line for decision-making assessment and incorporates a measurement tool tailored to the context of lifeguard.

Conclusions

A quick and correct decision by a lifeguard can save a life. This study provides lifesaving with an aquatic competency assessment instrument based on the open skills teaching model towards the development of lifesaving decision-making. The results open a new line of research in the field of lifeguard providing a tool that determines the effectiveness of the aquatic rescue, taking into account the degree of adequacy of the process and development of decision-making that the lifeguard takes from the time he detects the problem until he manages to bring the victim to safety as his own life. The aquatic competence assessment instrument in lifeguard (ECAS) can be employed by teachers of higher level training courses and middle and higher level sports technicians in lifeguarding, trainers and sports technicians of lifeguard, as well as professional in order to evaluate and identify the lifeguard's ability to detect a problem and effectively resolve the situation of rescue according to the degree of adequacy of his response so that the trainer not only evaluates the technical execution of the lifeguard but also incorporate a teaching model based on prevention and safety, as this tool adapts and adapts to the reality that the lifeguard faces in his day to day.

Among the limitations found, it is necessary to carry out new studies that follow the line of this research so that the results of the works can be compared with higher samples. It would also be interesting to evaluate the aquatic competence of lifeguard on beaches and design an evaluation scale tailored to its context and content.

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Conflicts of Interest

The authors declare no conflict of interest.

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References

Aarskog, E., Barker, D., & Borgen, J. S. (2018). What were you thinking? A methodological approach for exploring decision-making and learning in physical education. *Sport, Education and Society, 24*(8), 828–840. https://doi.org/10.1080/13573322.2018.1491836

Abelairas-Gómez, C., Tipton, M. J., González-Salvado, V., & Bierens, J. J. L. M. (2019). El ahogamiento: epidemiología, prevención, fisiopatología, reanimación de la víctima ahogada y tratamiento hospitalario. *Emergencias, 31*, 270–280.

Claver, F., Jiménez, R., del Villar Álvarez, F., García-Mas, A., & Moreno, M. P. (2015). Motivación, conocimiento y toma de decisiones: Un estudio predictivo del éxito en voleibol. *Revista de Psicologia Del Deporte, 24*(2), 273–279. Retrieved from https://www.rpd-online.com/article/view/1451

Dalkey, N., & Helmer, O. (1963). An Experimental Application of the DELPHI Method to the Use of Experts. *Management Science, 9*(3), 458–467. https://doi.org/10.1287/MNSC.9.3.458

Escobar-Pérez, J., & Cuervo-Martínez, A. (2008). Validez de contenido y juicio de expertos: una aproximación a su utilización. *Avances En Medición, 6*(1), 27–36. Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=2981181

Forjuoh, S. N. (2013). Water safety and drowning prevention. *International Journal of Injury Control and Safety Promotion, 20*(3), 207–208. https://doi.org/10.1080/17457300.2013.822634

García-González, L., Araújo, D., Carvalho, J., & Del Villar, F. (2011). Panorámica de las teorías y métodos de investigación en torno a la toma de decisiones en el tenis. *Revista de Psicología Del Deporte, 20*(2), 645–666.

García, L., Moreno, M. P., Moreno, A., Iglesias, D., & Del Villar, F. (2006). El conocimiento táctico en tenis. Un estudio con jugadores expertos y noveles. *Cuadernos de Psicología Del Deporte, 6*(2), 11–20.

Gaspar, V. M., Del Villar, F., Práxedes, A., & Moreno, A. (2019). El cuestionamiento como herramienta fundamental para el desarrollo de la toma de decisiones de los alumnos en educación física. *Movimento: Revista Da Escola de Educação Física, 25,* 1–14. Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=7317911

Gil Arias, A., Álvarez, F. D. V., Claver Rabaz, F., Moreno Domínguez, A., García González, L., & Moreno Arroyo, M. P. (2012). ¿Existe relación entre el nivel de competición y el conocimiento del juego en voleibol? (Is there a relationship between level of competition and knowledge in volleyball?). *Retos, 21*(21), 53–57. https://doi.org/10.47197/RETOS.V0I21.34605

Gracia, L., Moreno, M. P., Moreno, A., Iglesias, D., & del Villar, F. (2009). Estudio de la relación entre conocimiento y toma de decisiones en jugadores de tenis, y su influencia en la pericia deportiva. (Relation between knowledge and decision making in tennis players and its influence in sport expertise). *RICYDE. Revista Internacional de Ciencias Del Deporte, 5*(17), 60–75. https://doi.org/10.5232/RICYDE2009.01705

Gréhaigne, J. F., Godbout, P., & Bouthier, D. (2012). The Teaching and Learning of Decision Making in Team Sports. *Quest, 53*(1), 59–76. https://doi.org/10.1080/00336297.2001.10491730

Harvey, S., Cushion, C. J., & Massa-Gonzalez, A. N. (2010). Learning a new method: Teaching Games for Understanding in the coaches' eyes. *Physical Education and Sport Pedagogy , 15*(4), 361–382. https://doi.org/10.1080/17408980903535818

MacMahon, C., & McPherson, S. L. (2009). Knowledge base as a mechanism for perceptual-cognitive tasks: Skill is in the details! - PsycNET. *International Journal of Sport Psychology, 40*(4), 565–579. Retrieved from https://psycnet.apa.org/record/2010-05712-008

Mahlo, F. (1969). *La acción táctica del juego*. Paŕis: Vigot.

Ministerio de Educación, C. y D. (2017). Real Decreto 653/2017, de 23 de junio, por el que se establece el título de Técnico Superior en enseñanza y animación

sociodeportiva y se fijan los aspectos básicos del currículo. «BOE» núm. 168, de 15 de julio de 2017. Retrieved March 24, 2022, from https://www.boe.es/diario_boe/txt.php?id=BOE-A-2017-8301

Ministerio de Educación y Ciencia. (1996). Real Decreto 2048/1995, de 22 de diciembre, por el que se establece el título de Formación Profesional de Técnico superior en Animación de Actividades Físicas y Deportivas y las correspondientes enseñanzas mínimas. «BOE» núm. 35, de 9 de febrero de 1996. Retrieved March 24, 2022, from https://www.boe.es/buscar/doc.php?id=BOE-A-1996-2750

Ministerio de Educación y Cultura. (1997). Real Decreto 1262/1997, de 24 de julio, por el que se establece el currículo del ciclo formativo de grado superior correspondiente al título de Técnico superior en Animación de Actividades Físicas y Deportivas. «BOE» núm. 218, de 11 de septiembre de 1997,. Retrieved March 24, 2022, from https://www.boe.es/buscar/doc.php?id=BOE-A-1997-19616

Moran, K., Webber, J., & Stanley, T. (2017). The 4Rs of Aquatic Rescue: educating the public about safety and risks of bystander rescue. *International Journal of Injury Control and Safety Promotion, 24*(3), 396–405. https://doi.org/10.1080/17457300.2016.1224904

Nielsen, T. M., & McPherson, S. L. (2001). Response selection and execution skills of professionals and novices during singles tennis competition. *Perceptual and Motor Skills, 93*(2), 541–555. https://doi.org/10.2466/PMS.2001.93.2.541

Oslin, J. L., Mitchell, S. A., & Griffin, L. L. (1998). The Game Performance Assessment Instrument (GPAI): Development and Preliminary Validation. *Journal of Teaching in Physical Education, 17*(2), 231–243. https://doi.org/10.1123/JTPE.17.2.231

Reguant-Álvarez, M., & Torrado-Fonseca, M. (2016). El mètode Delphi. *REIRE Revista d'Innovació i Recerca En Educació, 9*(1), 87–102. https://doi.org/10.1344/REIRE2016.9.1916

Ruiz, L. M., & Arruza, J. A. (2005). El proceso de toma de decisiones en el deporte. Clave de la eficiencia y el rendimiento óptimo. *RED: Revista de Entrenamiento Deportivo = Journal of Sports Training, 19*(4), 36–45. Retrieved from https://dialnet.unirioja.es/servlet/articulo?codigo=1380919

Sánchez, J. A., Tamayo, I. M., & Ríos, L. J. C. (2016). La evaluación en educación física a través del "Game Performance Assessment Instrument" (GPAI). *Estudios Pedagógicos (Valdivia), 42*(2), 7–19. https://doi.org/10.4067/S0718-07052016000200001

Thomas, J., & Nelson, J. (2007). *Métodos de investigación en actividad física*. Barcelona: Paidotribo.

Thomas, K. T., & Thomas, J. (1994). Developing expertise in sport: The relation of knowledge and performance. *International Journal of Sport Psychology, 25*(3), 295–312. Retrieved from https://psycnet.apa.org/record/1995-31295-001

Úbeda-Colomer, J., Monforte, J., & Devís, J. D. (2017). Percepción del alumnado sobre una Unidad Didáctica de enseñanza comprensiva de los juegos deportivos de invasión en Educación Física . *Retos, 31*, 306–311. https://doi.org/10.47197/RETOS.V0I31.53507

White, K. M., Zhao, X., Hyde, M. K., & Hamilton, K. (2018). Surviving the swim: Psychosocial influences on pool owners' safety compliance and child supervision behaviours. *Safety Science, 106*, 176–183. https://doi.org/10.1016/J.SSCI.2018.03.020

Wiersma, L. D. (2009). Conceptualization and Development of the Sources of Enjoyment in Youth Sport Questionnaire. *Measurement in Physical Education and Exercise Science , 5*(3), 153–177. https://doi.org/10.1207/S15327841MPEE0503_3

ANNEX I

Evaluation of the Aquatic Competence Assessment Instrument in Lifeguard (ECAS)

Item				
1. Active adult victim located on the fourth swimming lane with the corks on. The victim is bracing without advancing and splashes in the water.				
Premises - The lifeguard is not submerged into the water. - It gets the victim's attention and directs it to grip the corks. - Stripped of garments that interfere with the possible rescue (shoes and T-shirt). - Find the nearest entry point to the event site.				
1	**2**	**3**	**4**	**5**
Doesn't make any premises	A premise	Two premises	Three premises	Four premises
2. Submerged passive adult victim (drowning) located on the third swimming lane.				
Premises - The lifeguard will enter giant step so that it advances with a step forward falling with its chest over the water and open arms. - Do not dip your head into the water in so that you do not lose the reference point where you have located the drowned/danger zone. - Keeps the airways out during the sway by controlling the environment. - Do not immerse the victim during the rescue by keeping the airways waterproof.				
1	**2**	**3**	**4**	**5**
Doesn't make any premises	A premise	Two premises	Three premises	Four premises
3. Active victim on the second swimming lanes. The lifeguard has material to perform the rescue in the pool: hoop and rescue tube. You will need to decide which material to use and use it correctly based on the decision you make.				
Premises a) Hoop - Throw in hoops before entering the water. - Swim with the hoop in front of it so as not to lose sight of it keeping the same between him and the victim. - Correctly position the hoop to the victim. - Tows the victim without losing sight of it.		Premises b) Rescue tube - When entering the swimming pool, it is launched at the same time as the material. - Nothing keeping the material under control and as you approach the victim keeps it between him and the victim. - Place the material correctly. - Tows the victim without losing sight of it.		
1	**2**	**3**	**4**	**5**
Doesn't make any premises	A premise	Two premises	Three premises	Four premises
4. Active victim on the first swimming lane. The victim ignores the lifeguard's instructions.				
Premises - This one will enter the water looking for the fastest approach (head or giant step). - Before reaching the victim, you will try to reassure her. - It will control the victim by his back. - It will help you reach the curb (trailer controlling the victim).				
1	**2**	**3**	**4**	**5**
Doesn't make any premises	A premise	Two premises	Three premises	Four premises