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Developing a scale for educational problems facing swimming teachers and learners in Iraqi Universities

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Abstract
Swimming is a vital sport that develops physical, psychological, and social skills, yet teaching it in Iraqi universities faces numerous challenges. This study aimed to construct and validate a scale to identify the problems confronting swimming instructors and learners in Iraqi universities. The researchers employed the descriptive-survey method, targeting female students and instructors from the Colleges of Physical Education and Sports Sciences at the University of Baghdad and Al-Mustansiriya University. The construction sample included 328 participants, while the application sample consisted of 177 participants. A questionnaire was developed based on expert opinions and relevant literature, resulting in a two-dimensional scale addressing problems related to instructors and learners. Statistical analyses, including discriminative validity, internal consistency, and reliability (Cronbach's Alpha = 0.958), confirmed the scale's psychometric strength. Results revealed that the overall level of problems was medium (67.86%), reflecting systemic challenges rather than individual deficiencies. Instructor-related issues included limited resources, overcrowding, and insufficient professional development, while learner-related problems centered on fear of water, low fitness levels, and socio-cultural constraints. The findings highlight the need for improved infrastructure, curriculum flexibility, professional training, and psycho-social support to enhance the effectiveness of swimming education in Iraqi universities.

Keywords: Swimming education, instructors' challenges, learners' problems, Iraqi universities, scale development, physical education, psychometric validation

Introduction
Swimming is considered one of the most important sports. It is an individual sport that requires a clear vision for how to teach and learn it. This demands effort from instructors and new tasks in the face of development, such as revising educational curricula according to a specific, implementable strategy. The instructor has become a designer and programmer in addition to being a teacher, and the learner's role has become positive in interacting with the elements of the educational situation.

Swimming also requires precise explanation and an easy progression for learning its four strokes. It relies on a set of basic skills and requires a store of cognitive knowledge to help understand the stages of skill performance before execution. This is to guide novice learners toward performing the motor task with minimal effort and in the shortest possible time, through an engaging and enjoyable educational process, and to increase the speed of learning and mastery of some basic skills. This is an attempt to overcome shortcomings in the field of teaching basic skills and to achieve a better level of performance.

Swimming is one of the important aquatic sports that uses the water medium as a means of movement through arm and leg movements and the rest of the body parts, with the aim of improving an individual's skills, physical, mental, social, and psychological efficiency. Learning to swim involves acquiring various swimming skills and methods, starting with basic skills and progressing to the four swimming strokes (freestyle, backstroke, breaststroke, butterfly).

Swimming is a beloved sport that has many advantages over other sports, in addition to its health, social, and psychological benefits. Learning to swim is a humanitarian message and a duty for every individual to learn and teach swimming to others. Developed countries pay great attention to eradicating swimming illiteracy as an urgent necessity, as it achieves

important physical, muscular, and social aspects for the individual. Therefore, schools, educational institutions, clubs, and youth centers must dedicate all their capabilities to teaching swimming to young people.

Research problem

Graduates of physical education and sports sciences are the main pillar for implementing physical education programs and plans in general, and swimming in particular. However, it has been observed, based on the researcher's direct experience with female students of physical education and sports sciences in general and teaching the swimming curriculum in particular, that the majority of female students do not have the proper experience or concept of swimming. This may be due to multiple reasons, such as the lack of dedicated swimming facilities in all areas, the high cost of subscriptions where facilities exist, and some learners' refusal to try learning to swim due to fear or societal beliefs.

Research objectives

1) To develop a scale to identify the problems facing swimming instructors and learners in Iraqi universities.
2) To identify the problems facing swimming instructors and learners in Iraqi universities.

Research hypothesis

There are problems facing swimming instructors and learners in Iraqi universities.

Research scope

1. **Human scope:** Female university students in Iraqi universities for the academic year 2023/2024.
2. **Temporal scope:** From December 1, 2023, to May 1, 2024.
3. **Spatial scope:** Swimming pools of Iraqi universities.

Research Methodology

Research method

The researchers used the descriptive-survey method, which involves collecting, analyzing, and describing data.

Research population and sample

The research population included female instructors and students from colleges of physical education and sports sciences in Iraqi universities. The research sample was divided into two parts:

- **Construction sample:** This consisted of 328 instructors, female students, and male students from the College of Physical Education and Sports Sciences for Girls - University of Baghdad, and female students from the College of Physical Education and Sports Sciences at Al-Mustansiriya University. The sample was chosen intentionally after obtaining verbal consent from the individuals and colleges and informing them of the research objective.
- **Application sample:** The application sample consisted of 177 male and female instructors and students from the College of Physical Education and Sports Sciences / Al-Mustansiriya University, representing a certain percentage of the research population.

Data collection tools and equipment

1. Questionnaire on the problems facing swimming instructors and learners.
2. Data entry forms.

Field research procedures

Scale for problems facing swimming instructors and learners

Due to the lack of a scale designed to measure the problems facing swimming instructors and learners in Iraqi universities, the researchers aimed to develop a standardized scientific tool. The researchers relied on the scale for problems facing swimming academies in Sharqia Governorate, developed by Nahla Sayed Ahmed (2023) [12]. By reviewing scientific sources in the fields of scale construction, measurement, and swimming, the researchers noticed several problems related to instructors and learners in swimming. The main important problems were selected to suit the nature of the research and the sample. As a result of this analysis, the axes were presented in the form of a closed and open questionnaire to a number of experts and specialists in the field of physical education and sports sciences, in measurement and evaluation, and in swimming. The following two axes were chosen, having an agreement rate of 85% on both:

1. **First axis:** Problems related to instructors.
2. **Second axis:** Problems related to learners.

The researchers adopted the revised Likert scale method for preparing and formulating the items. "The Likert method is one of the most widely used methods and is distinguished by containing means that enable the measurement of the degree of agreement for each unit included in the scale." The items were reformulated to prepare the initial version of the scale according to its fields and to suit the nature of the research population, consisting of 19 items distributed across the scale's axes.

Determining the dimensions of the scale

Through logical analysis of specialized scientific sources and references and conducting personal interviews, a questionnaire was prepared to determine the dimensions of the scale for the problems facing swimming instructors and learners in Iraqi universities. It was presented to experts from December 30, 2023, to February 1, 2024, to gauge their opinions on the validity of the scale's dimensions. Table (1) shows this.

Table 1: Dimensions of the scale for problems facing swimming instructors and learners in Iraqi universities and the agreement rate of experts on their validity

S. No.	Dimensions	Number of experts	Agreed	Percentage	Disagreed	Percentage
1	Problems related to instructors	15	12	80%	3	20%
2	Problems related to learners	15	15	100%	0	0%

Thus, the dimensions obtained the required agreement rate, which are (Problems related to instructors and Problems related to learners). "Bloom (1983) indicated that an agreement rate of 75% or more from experts' opinions is

adopted" (Benjamin Bloom *et al*., 126). Therefore, these two dimensions were adopted based on this percentage to be the main dimensions of the scale.

Formulating the scale's items

Through content analysis of specialized scientific sources and references in the fields of learning and swimming, and conducting personal interviews with specialists, a questionnaire for the items of the scale for problems facing swimming instructors and learners in Iraqi universities was prepared in its initial form and distributed to experts.

Face validity of the scale

The scale was subjected to face validity by presenting it to experts. Their responses were analyzed to determine their opinions on the items of the scale's dimensions for problems facing swimming instructors and learners in Iraqi universities and their suitability for measuring the phenomenon among instructors and learners of the swimming course from the perspective of their staff members. An agreement rate of 75% or more from experts was adopted as a criterion to retain the items. Table (2) shows this.

Table 2: Items of the scale for problems facing swimming instructors and learners in Iraqi universities and the agreement rate of experts on their validity

Dimensions	Items	Total experts	Agreed	Percentage	Disagreed	Percentage
Problems related to instructors	1-12	15	14	93.33%	1	6.66%
Problems related to learners	13-19	15	15	100%	0	0%

Thus, the scale for problems facing swimming instructors and learners in Iraqi universities consisted of 19 items in its initial form.

Initial version of the scale

After the aforementioned steps and procedures, the items were listed sequentially in a questionnaire to conduct the pilot study and establish its scientific basis.

Pilot application of the scale's items

The pilot application sample was defined as swimming instructors and learners in Iraqi universities, numbering 20 workers, representing 52.5% of the application sample. The researcher conducted the pilot application of the scale with the help of an assistant team on January 2, 2025, to check for any ambiguity in the items and to determine the necessary time to answer.

Construct validity

This type of validity is sometimes called hypothetical construct validity. "This type of validity is the extent to which test performance can be explained in light of some hypothetical constructs" (Ali Samoum Al-Fartousi *et al*., 196).

Below is a description of the statistical analysis methods used to verify the scale's construct validity.

Method of discriminative power with extreme groups

This method is considered one of the appropriate methods for discriminating items because it distinguishes between individuals who score high on the measured trait and those who score low (Ali Hussein Hashem Al-Zamili, 54-55).

The discriminative power is extracted by applying the scale to the construction sample of 140 swimming instructors and learners in Iraqi universities, following the steps below:

- Find the total score for each questionnaire of the construction sample.
- Arrange the questionnaires according to their total scores in descending order.
- Determine the 27% of the highest and lowest scores for the scale.
- Find the discriminative power between the two groups for each item of the scale by calculating the value of (t) for independent samples. Table (3) shows this.

Table 3: Mean, standard deviation, and calculated (t)-values between the upper and lower groups for the items of the scale for problems facing swimming instructors and learners in Iraqi Universities

Dimension	Item No.	Upper group	Lower group	Calculated (t)-value	Significance
		$\bar{x}$	± σ	$\bar{x}$	± σ
Problems related to instructors	1	3.432	1.714	3.348	1.451
	2	3.414	1.132	3.321	1.442
	3	3.424	1.915	2.257	1.743
	4	3.957	1.435	3.128	0.746
	5	3.985	0.788	3.892	0.192
	6	3.586	1.745	3.085	1.438
	7	3.600	0.697	3.121	0.428
	8	4.685	1.833	2.320	1.730
	9	4.314	1.794	3.212	1.424
	10	4.258	1.569	3.214	1.672
	11	4.863	1.354	3.652	1.432
	12	4.125	1.456	3.875	1.294
Problems related to learners	1	3.942	0.905	2.828	0.617
	2	4.285	0.957	3.114	0.631
	3	3.708	0.725	3.687	0.811
	4	5.000	0.701	4.228	0.813
	5	4.909	0.942	3.657	0.725
	6	4.314	0.993	2.114	0.529
	7	4.828	0.617	3.228	0.770

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Internal consistency of the scale

This method "provides us with a scale whose items are homogeneous, such that each item measures the same behavioral dimension that the scale as a whole measures, in addition to its ability to highlight the correlation between the scale's items." The correlation coefficient between the score of each item and the total score of the scale was found for the same 39 discriminative items, which is called "internal consistency validity of the scale." It is measured by calculating the correlation coefficient between the item and the total score of the dimensions or the total score of the scale[^1]. The simple correlation coefficient (Pearson) was used to achieve this. Table (4) shows this.

Table 4: Correlation coefficients between the item and the dimension/scale, and the significance value for the items of the reliability scale for problems facing swimming instructors and learners in Iraqi Universities

Dimension	Item No.	Item-to-dimension correlation	Significance	Item-to-scale correlation	Significance
Problems related to instructors	1	0.682	0.000	0.513	0.000
	2	0.489	0.000	0.475	0.000
	3	0.449	0.000	0.404	0.000
	4	0.367	0.000	0.319	0.000
	5	0.369	0.000	0.523	0.000
	6	0.698	0.000	0.577	0.000
	7	0.781	0.000	0.765	0.000
	8	0.565	0.000	0.418	0.000
	9	0.632	0.000	0.633	0.000
	10	0.731	0.000	0.641	0.000
	11	0.522	0.000	0.682	0.000
	12	0.345	0.000	0.348	0.000
Problems related to learners	1	0.711	0.000	0.655	0.000
	2	0.521	0.000	0.554	0.000
	3	0.688	0.000	0.781	0.000
	4	0.434	0.000	0.543	0.000
	5	0.542	0.000	0.581	0.000
	6	0.522	0.000	0.376	0.000
	7	0.371	0.000	0.462	0.000

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Table (4) shows that the values of the correlation coefficient between the scale items and the total scale score ranged from (0.319 - 0.781). The results showed that the correlation coefficient values are statistically significant because the calculated correlation coefficients are greater than the critical value of the correlation coefficient at a significance level of (0.05). After the statistical analysis, the scale in its final form consists of (19) items.

Reliability of the scale for problems facing swimming instructors and learners in Iraqi Universities

Test reliability refers to "the agreement of the scores obtained by the same individuals in different applications, meaning that the test scores are not affected by changes in external factors and conditions" (Ali Hussein Hashem Al-Zamili, 68).

To find the reliability coefficient, the researchers used two methods: (Cronbach's Alpha method and the Split-Half method), as the researchers were convinced that using more than one method to extract reliability enhances the validity of the procedures. Table (5) shows this.

Table 5: Cronbach's alpha and split-half for the reliability coefficient in the scale for problems facing swimming instructors and learners in Iraqi Universities

No.	Statistics	Values
1	Cronbach's alpha	0.958
2	Correlation between the two halves of the scale	0.938
3	Total reliability	0.968

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Description of the final version of the scale for problems facing swimming instructors and learners in Iraqi Universities

After the procedures performed by the researchers, the scale for problems facing swimming instructors and learners in Iraqi universities is in its final form (Appendix 1), which was presented to specialists. The scale consists of 19 items distributed across the scale's dimensions, which are:

- Problems related to instructors (six items).
- Problems related to learners (seven items).

The highest score a respondent can get is (160), and the lowest score is (32), with a hypothetical mean of (96). The items were rearranged randomly to be ready for application to the application sample. Table (6) shows this.

Main experiment and final application of the scale

Due to the difficulty of gathering the research sample in one place and at one time, especially since the researchers limited the spatial scope to Al-Shaab Hall to ensure the availability of necessary requirements, the researchers conducted two field experiments on January 8 and 10, 2025. The research procedures were summarized by distributing the forms to swimming instructors and learners at the universities, explaining the scale and the method of answering, and collecting the forms.

Statistical tools

The researchers relied on the SPSS statistical package to extract the numerical results of the research.

Presentation and discussion of results

The researchers will verify the research hypothesis as follows:

- There are problems facing swimming instructors and learners in Iraqi universities.

Table 7: Means, standard deviations, percentage, and levels for the scale for problems facing swimming instructors and learners in Iraqi Universities

Variables	Mean	Standard deviation	Percentage	Level
Problems facing swimming instructors and learners in Iraqi universities	108.576	0.775	67.86%	Medium

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Discussion of the findings

Table (7) shows that the extracted statistical values indicate that the mean for the total scale of problems facing swimming instructors and learners in Iraqi universities was 108.576, with a standard deviation of 0.775 and an equivalent percentage of 67.86% of the hypothetical maximum score of the scale.

Based on the hypothetical mean of the scale (96 points) and the total score range, the mean position at 108.576 indicates a moderate increase from the hypothetical line. This places the level of problems within the medium category (i.e., not low enough to be ignored, nor high enough to be alarming), which is consistent with the textual classification accompanying the table.

The relatively small standard deviation value (0.775) carries an important methodological implication: it reflects a noticeable homogeneity in the sample's responses around the central value. This means that most participants perceive the problems to a similar degree. This can be interpreted in two complementary ways:

1) The sample shares largely similar field conditions (type of pools, equipment, number of students, safety procedures, teaching styles), and/or
2) The distribution of responses tended to have low variability due to the nature of the scale's items (Likert style) and the similar experiences of the respondents.

On a relative level, the 67.86% percentage translates to respondents perceiving that approximately two-thirds of the maximum potential burden of problems is actually present, while the remaining one-third represents areas that can be improved through administrative-educational enhancements and psychological and environmental preparation.

Discussion of the Results

This result reveals an educational scene where elements of strength and weakness are balanced. There is a basic infrastructure and practical experience that enables the educational process to continue and provides students with fundamental aquatic skills. However, this same structure shows systemic and functional deficiencies that hinder the achievement of higher, more sustainable mastery. On one hand, the available university pools, the experience of the teaching staff, and the existence of course plans contribute to establishing an acceptable minimum level of learning. On the other hand, problems with equipment (scarcity of aids, wear and tear of tools, limited class times and group sizes), the organizational environment (scheduling conflicts, limited budgets for operation and maintenance, difficulties in adhering to optimal safety procedures), psychological preparedness (fear of water, low self-efficacy, and social sensitivity among some groups especially female students towards regular participation), and physical individual differences (general fitness, ability to adapt to the aquatic environment) all contribute to raising the respondents' perception of a "problem burden" to about two-thirds.

The low homogeneity of dispersion around the mean represented by a small standard deviation is explained by the shared field experience in universities (systems, infrastructure, class norms, assessment methods) that generates similar "institutional traits" in terms of strengths and weaknesses. That is, most students and instructors experience a similar quality of constraints (task, environment, and learner constraints). Within the Constraints-Led Approach model, these constraints are seen on three axes: Learner constraints (physical abilities, previous experiences, achievement motivation, self-efficacy), Environmental constraints (pool characteristics, class density, noise, overcrowding, safety procedures), and Task constraints (class objectives, difficulty of skill progression, performance standards). When these constraints combine without systematic treatment, they push learning toward a path that settles at a medium "functional competence" instead of progressing to advanced mastery.

There is a core psychological-educational dimension that explains the result's medium placement; self-efficacy among learners especially those inexperienced in the aquatic environment is formed by the accumulation of early success/failure experiences and the quality of feedback and social support from peers and the instructor. When this self-efficacy is shaken by unmanaged fear or difficult first experiences, responses tend towards caution and avoidance, and learning becomes slower and more fragile. This highlights the value of designing a well-thought-out skill progression (from water familiarization, breathing, floating, and gliding to arm and leg patterns, then rhythmic integration) combined with a psychologically safe classroom environment, sufficient aids, and a reasonable class density that allows for actual and structured practice time.

Specialized literature in psychometric and educational measurement confirms that a scale showing high internal consistency and proving discriminative power between extreme groups becomes suitable for detecting real differences in problem perception. Therefore, the medium result here is considered a valid diagnostic indicator rather than statistical "noise." From a comparative perspective, environments with complete aquatic infrastructure and continuous professional development for staff often record lower levels of problem perception, while these levels are higher in contexts that suffer from a lack of funding, maintenance, and overcrowded classes. Accordingly, the current outcomes do not suggest that university swimming is "stumbling" but rather that it operates without sufficient educational safety margin. This makes the possibility of a decline or rise in the level of mastery sensitive to any qualitative administrative-educational intervention (or its absence).

In conclusion, the 67.86% percentage reflects a state of "potential for rapid improvement" if investment is made in three interconnected areas: Resources (tools, maintenance, reducing density), Curriculum/Instruction (progression, actual practice time, constructive feedback, diversification of presentation methods), and Psycho-Social Support

(building self-efficacy, fear management, gender sensitivity, safety culture). Any tangible improvement in one of these areas even partially is likely to reduce the perception of problems for a wide segment of the population due to the homogeneity of their conditions, which could quickly translate into a shift from a "medium" to a "low acceptable" level within a single academic semester if planning and implementation are done well.

Conclusions

Through the analysis and discussion of the statistical results, the following conclusions can be formulated:

1. The study showed that the problems facing swimming instructors and learners in Iraqi universities were at a medium level (67.86%), which reflects the existence of an educational environment capable of providing a minimum level of learning but is insufficient to reach high levels of mastery.
2. The homogeneity of responses (low standard deviation) indicates that students and instructors live in approximately similar conditions, which makes the problems structural rather than individual; that is, they are more related to the characteristics of the educational system and the university environment than to individual differences.
3. The problems related to instructors were mainly a lack of resources, overcrowded groups, curriculum pressure, and a modest level of professional training and development opportunities, which limits the instructor's ability to provide innovative and effective teaching methods.
4. The problems related to learners were centered on the fear of water, poor physical fitness, and social and cultural constraints, which makes the learning process slower and affects the self-efficacy of learners, especially female students.
5. The current educational environment, despite its ability to continue, operates without a sufficient educational safety margin, which makes the educational process sensitive to any additional lack of resources or increase in student numbers and highlights the need for urgent reforms.

Recommendations

1. The need to increase investment in university swimming pools and their regular maintenance, and to provide aids (kickboards, floats, safety equipment) to ensure a safe and effective educational environment.
2. Revising academic schedules and reducing the number of students in a single group to allow instructors to monitor individual performance and provide appropriate feedback.
3. Organizing specialized training courses and workshops for swimming instructors in innovative teaching methods, aquatic classroom management, and strategies for reducing the fear of water, which will contribute to improving the quality of the educational process.
4. Integrating guidance programs that focus on building students' self-efficacy and providing practical introductory sessions to overcome the fear of water, while considering the privacy of female students and the challenges of the social environment.
5. Reviewing university swimming curricula to be more flexible and suitable for beginner students, adopting a skill progression (from water familiarization to full motor rhythm) and ensuring their alignment with the latest educational strategies.
6. Calling on universities and the Ministry of Higher Education to allocate annual budgets to support swimming education programs, due to the high health, social, and educational value of this sport.
7. Encouraging future studies to measure the impact of implementing these recommendations on improving swimming learning levels and linking them to students' physical and psychological indicators.

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