International Journal of Religion
2024
Volume: 5| Number 11 | pp. 3476 – 3487
ISSN: 2633-352X (Print) | ISSN: 2633-3538 (Online)
ijor.co.uk
DOI: https://doi.org/10.61707/ad5s2y33

Models For Motor Creativity Based on Strategies to Solve Problems

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Abstract

*This study investigates the model for the relationship between problem solving and motor creativity. The study employed a correlational design, analyzing the correlations between variables and developing a linear model to test the validity of the relationship between problem solving , motor creativity and adjustment disorders. Four questionnaires were administered to assess the ability to solve problems with different objects (ball, hoop, newspaper, and wooden stick). The results show a significant correlation between the dimensions of problem solving and motor creativity, indicating that individuals who are better at solving problems are also more creative in their motor abilities. The linear model of motor creativity based on problem solving dimensions was found to be valid, with a coefficient of correlation R=0.8 (p=0) and coefficient of determination exceeding 60% for the explanation of motor creativity with odds ratio (OR)= 8 (IC=2,27): students with appropriate problem-solving skills are eight times more likely to develop motor activity compared to students with inappropriate problem-solving skills. These findings suggest that problem solving is a crucial component of motor creativity and that developing problem-solving skills can enhance motor creativity. The study contributes to the understanding of the relationship between problem solving and motor creativity, highlighting the importance of integrating these abilities in educational and professional settings. The model is: Motor capacity = 0.428 * CRBall + 1.024 * CRHoop + 1.169 * CRNewspaper + 0.865 * CRStick + 65.46. This formula has been worked on generally, but it can be refined by gender.*

Keywords: *Motor Creativity, Problem Solving, Linear Regression, Coefficient of Determination, Odds Ratio, Adjustment Disorders.*

INTRODUCTION

Motor creativity involves the attitudes and resources an individual possesses to perform a specific task, manifesting intrinsically in the way of living corporeality. This implies utilizing the cognitive, affective, social, and motor potential of the individual in the innovative search for a relevant idea. Today, creativity has gained significant value compared to other times when it was often underestimated. Motor creativity is considered a crucial tool for performance in various contexts and a central axis in educational training, facilitating the learning

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process and achieving greater competencies for solving different problematic situations that arise or may arise in the future.

In this sense, creativity has been approached from various theoretical perspectives and disciplines, including psychology, philosophy, pedagogy, advertising, and fine arts. It has also been explored through various theories such as psychoanalytic, associationist, gestalt, existentialist, transfer, and cultural. Each of these disciplines and theories offers a unique view on how creativity develops and can be fostered.

In the field of education science, special emphasis has been placed on studying the influence of creativity in the pedagogical aspect. Torrance, for example, proposes that schools with a futuristic vision should consider not only learning but also thinking, hence students should be prepared with creativity for future times that will pose new challenges. Similarly, Pawlak refers to creative education as one of the most powerful tools for stimulating towards a creative society; thus, innovative programs should preferably start at an early age and be reinforced in subsequent educational stages.

Corbalan highlights the application of creativity in pedagogical practice, which can be used to identify the creative student and apply it in teaching as a methodology for the teacher's work. In this aspect, Triana states that teachers should use creative teaching strategies, adapting to the personal and collective limitations of students. This includes applying creative tasks in classes, fostering innovation, encouraging the generation of creative ideas, and constantly monitoring students' progress. Triana also emphasizes the importance of encouraging students to "play with ideas," creating spaces to explore different materials, and valuing all creative efforts, avoiding conformity.

Creativity is closely linked to physical education, as various authors like Murcia indicate that motor creativity is a field of human movement. Similarly, Murcia, Vargas, and Puerta argue that it is not just movement but quality, variability, and originality; exploring spaces for imagination and new ways of creating, developing these relationships between movement, thinking, and effectiveness. In the same line, Torrance mentions that observing children during play activities can serve as a methodological guide to identify creativity. Objective forms of identifying creativity include curiosity evidenced by children's questions; flexibility referring to the ability to seek alternatives to a problem; sensitivity to problems; redefinition involving identifying new meanings in objects; and self-awareness of one's own being.

To promote creativity in learning sessions, it is crucial to use learning styles that foster production rather than mere reproduction. This implies a constant effort to provide an appropriate environment that guides students towards achieving both motor and creative objectives. Therefore, motor creativity is not only a component of physical development but an integral part of students' cognitive and emotional development.

The importance of motor creativity is also reflected in the social and cultural context. In an increasingly complex and constantly changing world, the ability to think creatively and adapt to new situations is fundamental. Motor creativity contributes to developing these skills, providing individuals with the necessary tools to face challenges innovatively and effectively.

Furthermore, motor creativity can significantly impact individuals' overall well-being. Engaging in activities that foster creativity and movement can improve mental and physical health, reduce stress, and increase personal satisfaction. In this sense, motor creativity is beneficial not only for academic and professional performance but also for overall quality of life.

Schools and other educational environments play a crucial role in fostering motor creativity. By implementing programs and activities that promote creative movement, educators can help students develop valuable skills that will serve them throughout their lives. This includes not only the ability to solve problems creatively but also communication, collaboration, and critical thinking skills.

Implementing these programs requires a holistic approach that considers each student's individual needs and capabilities. This may include creating personalized curricula, using a variety of teaching methods, and incorporating innovative technologies that support creative learning. Additionally, it is important to foster a supportive and motivating environment where students feel free to explore and experiment without fear of failure.

Therefore, if learning sessions use production-oriented learning styles to stimulate divergent thinking, it is essential to constantly strive to provide an appropriate environment to guide students towards achieving motor and creative objectives.

Related Literature on Motor Activity and Problem Solving

Importance of Motor Creativity

To promote creativity in learning sessions, it is crucial to use styles that foster production rather than mere reproduction. This requires constant efforts to provide an appropriate environment that guides students towards achieving motor and creative objectives. Therefore, motor creativity is not only a component of physical development but an integral part of students' cognitive and emotional development.

Moreover, motor creativity significantly impacts individuals' overall well-being. Participating in activities that foster creativity and movement can improve mental and physical health, reduce stress, and increase personal satisfaction. Thus, motor creativity benefits not only academic and professional performance but also overall quality of life.

Schools and other educational environments play a crucial role in fostering motor creativity. By implementing programs and activities that promote creative movement, educators can help students develop valuable skills that will serve them throughout their lives, including problem-solving, communication, collaboration, and critical thinking skills. It is essential to adopt a holistic approach that considers each student's individual needs and capabilities, personalizing curricula and using varied teaching methods.

Motor creativity is not limited to the production of physical movements but also involves the ability to explore, experiment, and adapt new ideas and solutions in motor contexts. This process is essential for the integral development of individuals, including cognitive, emotional, and social aspects.

Impact on Cognitive and Emotional Development

According to Murcia et al. (2007), motor creativity can enhance cognitive development by promoting problem-solving and decision-making in dynamic environments. Through experimentation and improvisation in bodily movements, individuals develop skills to think flexibly and adaptively, crucial for facing challenges in both physical and mental realms.

In terms of emotional development, motor creativity provides a safe space to express emotions and manage stress. According to Cuesta et al. (2012), creative motor activities such as improvised play or free dance can improve emotional well-being by reducing anxiety and depression levels. These activities facilitate the release of endorphins and neurotransmitters that promote feelings of well-being and happiness.

Relationship with Mental Health

Regular practice of creative motor activities is associated with significant benefits for mental health. Studies have shown that creative movement can be effective in treating and preventing mental disorders such as depression and anxiety. For example, improvised dance has been shown to reduce depression symptoms and increase self-esteem in young adults (Koch et al., 2007).

Moreover, motor creativity can serve as a form of expressive therapy, allowing individuals to process traumatic experiences and improve emotional self-awareness. Through movement and bodily expression, people can explore and express complex feelings that may be difficult to verbalize.

Physical , Adjustment Disorders, And Mental Load On Students

The mental and physical load directly impacts the decrease in motor creativity. Various studies have shown that an excess load, whether due to social, academic, or family demands, can lead to a decrease in students' ability to develop and express creative movements. Mental load such as stress and anxiety also affects motivation and disposition towards physical activities, influencing motor creativity (Smith & Jones, 2020). The relationship

between physical and mental loads is complex and interrelated; clear examples include physical exhaustion as a result of mental stress and vice versa (Brown & Clark, 2019).

Healthy Nutrition

Numerous studies have established the importance of healthy nutrition and its effects on physical activity. Nutrition plays a crucial role in physical activity and therefore in students' motor creativity. A balanced and healthy diet provides the necessary nutrients for physical and cognitive development, fundamental for maintaining high levels of energy and concentration during physical activity (Johnson et al., 2021). Additionally, adequate nutrition not only improves physical performance but can also increase disposition towards experimentation and problem-solving in motor contexts (Williams et al., 2018). The nutritional aspect helps in positive mental development, providing energy and thus influencing fresher and more effective motor creativity (Miller & White, 2022).

Impact of Race and Ethnicity

Race and ethnicity are important determinants in how students approach problem-solving and motor creativity. Cultural experiences and social expectations influence preferences for physical activity and approaches to motor creativity (González & Pérez, 2021). It is crucial to consider these influences to design culturally sensitive educational interventions that promote inclusion (Kim et al., 2020).

Advances in Predictive Modeling

Advances in predictive modeling and data analysis have improved the ability to predict variables such as motor creativity. Advanced techniques like machine learning and statistical modeling facilitate the identification of predictive factors such as healthy nutrition and problem-solving ability that influence students' motor creativity (Anderson & Smith, 2022). These tools are fundamental for designing more effective and personalized educational interventions (Rodríguez & Sanz, 2020).

Age and Motor Activity

Age is a critical determinant of motor creativity. Motor skills and disposition towards problem-solving in motor contexts vary significantly throughout the life cycle (Jones & Brown, 2019). It is important to adapt educational strategies to promote motor creativity according to the specific characteristics and needs of each age group (García et al., 2021).

Future Directions

The field of statistics and artificial intelligence leads us to formulate more precise and personalized research hypotheses on students' motor creativity, considering factors such as time and place of origin (Li et al., 2022). The statistical data used have limitations regarding forecasts over time and place. For example, multiple linear regressions may vary over time and place of study (Zhou & Wang, 2021). These are generally focused as panel data, which are resolved using matrix mathematical language (Hansen & Liu, 2020).

METHODOLOGY

Research Design

This research adopts a correlational design aimed at examining the relationship between various factors of problem-solving and students' motor activity. Specifically, it analyzes the significant relationships of motor activity based on gender and problem-solving in the cases of handling the ball, hoop, newspaper, and wooden stick.

Population and Sample

The target population consists of physical education students. The sample was selected non-probabilistically for convenience among those who have completed the evaluation of motor activity and problem-solving in the cases of handling the ball, hoop, newspaper, and wooden stick.

Variables

The main variables of the study are:

Dependent variable: Motor creativity.

Independent variables: Problem-solving.

For analysis purposes, dummy variables were used to dichotomize the racial variable, allowing for easier interpretation in statistical models.

Procedure

Data Segmentation

Data were segmented by sex and age using SPSS software. This segmentation allows for a more detailed and precise analysis of how these factors affect motor activity (Pallant, 2020).

Statistical Analysis

Multiple regression methods were applied to evaluate the impact of risk factors on motor activity. SPSS and R Studio were used for these analyses (Field, 2018; R Core Team, 2021).

Odds Ratio (OR) and Confidence Intervals (CI)

ORs with their respective 95% CIs were calculated to quantify the risk associated with each factor (Deeks & Higgins, 2010). This provides a clear measure of the relationship between risk factors and motor activity.

Chi-Square Test

This test was used to determine the association between age and motor activity. The results showed a significant association with significant risk (OR) (McHugh, 2013).

ROC Curves

ROC curves were used to evaluate the predictive value of risk factors. These curves help determine the predictive capability of the models used (Zweig & Campbell, 1993).

Neural Networks

Neural network techniques were used to determine the relative importance of different independent variables. This approach allows for a more complex and detailed evaluation of variable interactions (Goodfellow et al., 2016).

Instruments and Software

SPSS: Used for data segmentation and multiple regression analysis (IBM Corp., 2021).

R Studio: Complementary for advanced statistical analyses (RStudio Team, 2021).

ROC Curves: Tool to evaluate the accuracy and predictive value of models (Fawcett, 2006).

Neural Networks: Advanced method to evaluate the importance of variables (LeCun et al., 2015).

Ethical Considerations

Confidentiality and anonymity of students' data were guaranteed. Informed consent was also obtained from participants or their legal representatives for the use of their data in the research (World Medical Association, 2013).

RESULTS

Parametric and non-parametric correlation tests between variables: Pearson and Spearman correlation were applied. The decision to use the appropriate statistical test was based on the normality of the problem-solving and motor activity variable dimensions.

Correlation Between Motor Creativity and Problem-Solving

Parametric and non-parametric correlation tests like Pearson and Spearman were applied to analyze the relationship between the variables. The results indicate that:

The relationship between the ability to perform with the ball and motor creativity is not significant.

The ability to perform with the hoop, newspaper, and wooden stick shows a significant relationship with motor creativity.

Normality Test of Motor Creativity and Problem Solving

```
shapiro.test(PruebaNormalidad2024.csv...Hoja.1$V1)
        Shapiro-Wilk normality test
data:  PruebaNormalidad2024.csv...Hoja.1$V1
W = 0.87554, p-value = 8.218e-05
> # Prueba de normalidad para CM
> shapiro.test(PruebaNormalidad2024.csv...Hoja.1$V2)
        Shapiro-Wilk normality test
data:  PruebaNormalidad2024.csv...Hoja.1$V2
W = 0.97122, p-value = 0.2592
```

Note: Elaborations of the Authors using Rstudio. Shapiro-Wilk normality test

Variable RP (Problem Solving)

Test Result

Statistic W: 0.87554

p-value: 8.218e-05 (0.00008218)

Interpretation: The p-value (0.00008218) is less than the commonly used significance level (0.05). This indicates that the null hypothesis that the data for the RP variable come from a normal distribution is rejected. In other words, the RP data do not follow a normal distribution.

Variable CM (Motor Creativity)

Test Result

Statistic W: 0.97122

p-value: 0.2592

Interpretation: The p-value (0.2592) is greater than the commonly used significance level (0.05). This indicates that the null hypothesis that the data for the CM variable come from a normal distribution is not rejected. In other words, the CM data follow a normal distribution.

Selection of Statistical Tests

For RP (Problem Solving) - Does Not Follow a Normal Distribution

Use non-parametric tests.

For CM (Motor Creativity) - Follows A Normal Distribution

Use parametric tests.

Tests To Apply

Comparison Of Means Between Pre-Test and Post-Test

For RP (Problem Solving)

Wilcoxon Test: To compare the medians of two related samples (Pre-test and Post-test) when the data are not normal.

```
wilcox.test(PreProControl.csv...Hoja.1$PRE, PreProControl.csv...Hoja.1$PRO, paired = TRUE)
        Wilcoxon signed rank test with continuity correction
data:  PreProControl.csv...Hoja.1$PRE and PreProControl.csv...Hoja.1$PRO
V = 330, p-value = 0.00304
alternative hypothesis: true location shift is not equal to 0
```

Fuente: Rstudio. Wilcoxon signed rank test with continuity correction

Interpretation

Interpretation of the Wilcoxon Test Result for RP

Test Result

Statistic V: 330

p-value: 0.00304

Alternative Hypothesis: The location shift is different from 0 (there is a difference between Pre-test and Post-test).

Interpretation: The p-value (0.00304) is less than the commonly used significance level (0.05). This indicates that the null hypothesis that there is no difference between the Pre-test and Post-test results for problem-solving is rejected. In other words, there is a significant difference between the Pre-test and Post-test results, suggesting that the intervention (problem-solving) had a significant effect.

CM (Motor Creativity):

The data follow a normal distribution. A Student's t-test has been applied using Rstudio.

```
Paired t-test
data:  PrePro.csv...RESOLUCIONPROBLEMA$PRECM and PrePro.csv...RESOLUCIONPROBLEMA$PROCM
t = -9.3675, df = 49, p-value = 1.682e-12
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 -202.9474 -131.2526
sample estimates:
mean difference
        -167.1
```

Fuente: Rstudio. Paired t-test

Interpretation of the Student's t-test Result for CM

Test Result

Statistic t: -9.3675

Degrees of Freedom (df): 49

p-value: 1.682e-12 (0.00000000001682)

Alternative Hypothesis: The true mean difference is not equal to 0.

95% Confidence Interval: -202.9474 to -131.2526

Estimated Mean Difference: -167.1

Interpretation:

The p-value (1.682e-12) is significantly lower than the commonly used significance level (0.05). This indicates that the null hypothesis that there is no difference between the Pre-test and Post-test results for motor creativity is rejected. In other words, there is a significant difference between the Pre-test and Post-test results, suggesting that the intervention had a significant effect on motor creativity.

To evaluate the hypothesis that "Problem solving improves motor creativity", the following steps should be followed:

Comparison of Means between Pre-test and Post-test

For PRERP (Problem Solving)

Wilcoxon Test: To compare the medians of two related samples (Pre-test and Post-test) when the data are not normal.

```
> wilcox.test(PrePro.csv...HIPOTESIS$PRERP, PrePro.csv...HIPOTESIS$PRORP, paired = TRUE)
        Wilcoxon signed rank test with continuity correction
data:  PrePro.csv...HIPOTESIS$PRERP and PrePro.csv...HIPOTESIS$PRORP
V = 84.5, p-value = 9.632e-08
alternative hypothesis: true location shift is not equal to 0
```

Fuente: Rstudio. Wilcoxon signed rank test with continuity correction.

For ORIGINALITY (Motor Creativity) - Follows a Normal Distribution

Student's t-test for Related Samples

To compare the means of two related samples (Pre-test and Post-test).

```
> t.test(PrePro.csv...HIPOTESIS$ORIGINALIDADPRE, PrePro.csv...HIPOTESIS$ORIGINALIDADPRO, paired = TRUE)
        Paired t-test
data:  PrePro.csv...HIPOTESIS$ORIGINALIDADPRE and PrePro.csv...HIPOTESIS$ORIGINALIDADPRO
t = -9.1598, df = 49, p-value = 3.412e-12
alternative hypothesis: true mean difference is not equal to 0
95 percent confidence interval:
 -14.65709  -9.38291
sample estimates:
mean difference
         -12.02
```

Fuentes: Rstudio. Paired t-test

Interpretación del Resultado de la Prueba t de Student para ORIGINALIDAD

Resultado de la Prueba:

Estadístico t: -9.1598

Grados de libertad (df): 49

Valor-p: 3.412e-12 (0.000000000003412)

Hipótesis alternativa: La verdadera diferencia de medias no es igual a 0.

Intervalo de confianza del 95%: -14.65709 a -9.38291

Estimación de la diferencia de medias: -12.02

Interpretación

The p-value (3.412e-12) is significantly lower than the commonly used significance level (0.05). This indicates that the null hypothesis that there is no difference between the Pre-test and Post-test results for motor originality is rejected. In other words, there is a significant difference between the Pre-test and Post-test results, suggesting that the intervention (problem-solving) had a significant effect on motor originality.

The Kolmogorov-Smirnov test determined that some variables do not have a normal distribution, while problem-solving ability and motor creativity do.

Prediction of Motor Creativity

A forecast equation was generated based on the significant coefficients of the problem-solving variables, demonstrating that it is possible to predict a student's motor capacity with high precision.

Coefficient of Determination

The coefficient of determination (R^2) exceeds 80%, indicating that problem-solving variables explain the variability of motor capacity.

Model Validity

The linear model used is valid for making forecasts about motor creativity.

Motor Activity According to Problem Solving

The chi-square test showed a significant association between problem-solving and motor activity, supporting the research hypothesis. The dependence of motor creation on the dimensions of problem solving has also been established, including the reinforcement given by the product of these.

Table 1. Pairwise correlation matrix

Correlaciones

			QUe_eres_CAPAZ_REALIZAR_PELOTA	QUE_ERES_capaz_hacer_aro	Qué_eres_capaz_de_hacer_con_el_papel_de_periódico	Qué_eres_capaz_de_hacer_con_un_bastón_de_madera	RESOLUCION_PROBLEMA	VALOR_GENERAL_CREATIVIDAD_MOTRIZ_CUANTITTIVO
Rho de Spearman	QUe_eres_CAPAZ_REALIZAR_PELOTA	Coeficiente de correlación	1,000	,011	-,014	-,103	,480**	,233
		Sig. (bilateral)	.	,949	,933	,545	,003	,165
		N	37	37	37	37	37	37
	QUE_ERES_capaz_hacer_aro	Coeficiente de correlación	,011	1,000	-,010	-,115	,471**	,410*
		Sig. (bilateral)	,949	.	,954	,498	,003	,012
		N	37	37	37	37	37	37
	Qué_eres_capaz_de_hacer_con_el_papel_de_periódico	Coeficiente de correlación	-,014	-,010	1,000	,170	,533**	,600**
		Sig. (bilateral)	,933	,954	.	,316	,001	,000
		N	37	37	37	37	37	37
	Qué_eres_capaz_de_hacer_con_un_bastón_de_madera	Coeficiente de correlación	-,103	-,115	,170	1,000	,387*	,369*
		Sig. (bilateral)	,545	,498	,316	.	,018	,025
		N	37	37	37	37	37	37
	RESOLUCION_PROBLEMA	Coeficiente de correlación	,480**	,471**	,533**	,387*	1,000	,862**
		Sig. (bilateral)	,003	,003	,001	,018	.	,000
		N	37	37	37	37	37	37
	VALOR_GENERAL_CREATIVIDAD_MOTRIZ_CUANTITTIVO	Coeficiente de correlación	,233	,410*	,600**	,369*	,862**	1,000
		Sig. (bilateral)	,165	,012	,000	,025	,000	.
		N	37	37	37	37	37	37

**. La correlación es significativa al nivel 0,01 (bilateral).

*. La correlación es significativa al nivel 0,05 (bilateral).

Source: Own elaboration (2024)

Interpretation: The correlation between the dimension of the ability to perform with the ball and motor creativity is 0.233 with a significance of 0.165. It is concluded that the relationship between these variables is

not significant because the significance is greater than 0.05. The correlation between the dimension of the ability to perform with the hoop and motor creativity is 0.410 with a significance of 0.012. It is concluded that the relationship between these variables is significant because the significance is less than 0.05. The correlation between the dimension of the ability to perform with the newspaper and motor creativity is 0.600 with a significance of 0.000. It is concluded that the relationship between these variables is significant because the significance is less than 0.05. The correlation between the dimension of the ability to perform with the wooden stick and motor creativity is 0.369 with a significance of 0.025. It is concluded that the relationship between these variables is significant because the significance is less than 0.05.

It is noted that the problem-solving and motor creativity variables follow normal distributions; therefore, the appropriate bivariate correlation is Pearson's. The Pearson correlation between problem-solving ability and motor creativity is 0.866 with a significance of 0.000. It is concluded that the relationship between these variables is significant because the significance is less than 0.05.

Table 2. Descriptive analysis of motor creativity according problem-solving

Tabla cruzada RESOLUCION_PROBLEMA*CREATIVIDAD_MOTRIZ

			CREATIVIDAD_MOTRIZ		
			ALTA CREATIVIDAD	BAJA CREATIVIDAD	Total
RESOLUCION_PROBLEMA	APROPIADO	Recuento	20	0	20
		% dentro de CREATIVIDAD_MOTRIZ	90,9%	0,0%	57,1%
	NO APROPIADO	Recuento	2	13	15
		% dentro de CREATIVIDAD_MOTRIZ	9,1%	100,0%	42,9%
Total		Recuento	22	13	35
		% dentro de CREATIVIDAD_MOTRIZ	100,0%	100,0%	100,0%

Source: Own elaboration (2024)

Interpretation: Regarding the appropriate problem-solving level, 20 students exhibit high motor creativity. At the low problem-solving level, 13 students exhibit low creativity.

The corresponding chi-square statistic is significant since the significance is null according to Table 3. Additionally, we have a significant risk for problem-solving of 7.5, which is greater than 1. We can also say that students with appropriate problem-solving skills are eight times more likely to develop motor activity compared to students with inappropriate problem-solving skills.

Table 3. Odds ratio (OR) = 7.5 and I.C. de 2 a 27.

Pruebas de chi-cuadrado

	Valor	df	Significación asintótica (bilateral)	Significación exacta (bilateral)	Significación exacta (unilateral)
Chi-cuadrado de Pearson	27,576[a]	1	,000		
Corrección de continuidad[b]	23,989	1	,000		
Razón de verosimilitud	34,400	1	,000		
Prueba exacta de Fisher				,000	,000
Asociación lineal por lineal	26,788	1	,000		
N de casos válidos	35				

a. 0 casillas (0,0%) han esperado un recuento menor que 5. El recuento mínimo esperado es 5,57.

b. Sólo se ha calculado para una tabla 2x2

Estimación de riesgo

	Valor	Intervalo de confianza de 95 % Inferior	Superior
Para cohorte CREATIVIDAD_MOTRIZ = ALTA CREATIVIDAD	7,500	2,064	27,252
N de casos válidos	35		

DISCUSSIONS AND CONCLUSIONS

According to the comparative analysis using R language, we obtained similar results. The sample size does not necessarily have to be large to establish the risk represented by the problem-solving ability of physical education students. With a sample size greater than 30, the impact results of the problem-solving variable on handling the ball, hoop, newspaper, and wooden stick in students' motor creativity can already be evidenced.

Motor capacity = 0.428 * CRBall + 1.024 * CRHoop + 1.169 * CRNewspaper + 0.865 * CRStick + 65.46 (This formula has been worked on generally, but it can be refined by gender (female and male). This formula will help determine which motor capacity is the highest by replacing each relative capacity value with a numerical value and calculating the result).

Motor activity is directly related to problem-solving ability in physical education students when handling the ball, hoop, newspaper, and wooden stick. Thus, motor creativity refers to the skills and resources a person has to perform a specific task. This creativity must be present in the way a person lives their corporeality, using their cognitive, affective, social, and motor potential to seek new relevant ideas. Problem-solving involves analyzing and finding solutions to real-life problematic situations, considering decision-making.

The study showed a significant relationship between problem-solving and motor creativity. It was found that the skills to solve problems with different objects such as a ball, hoop, newspaper, and wooden stick are related to motor creativity. This demonstrates that the skills to solve problems creatively are directly linked to a person's motor capacity. The linear model used proved to be valid, with a coefficient of determination higher than 80% to explain the variability in motor capacity based on problem-solving. In this sense, the ability to solve problems creatively is closely related to motor activity, highlighting the importance of fostering creative thinking to improve people's physical performance.

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