

University training of the basic kinesiologist

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Purpose: The aim was to verify the presence of a relationship between the distribution of ECTS in the three essential fields in L-22 courses. **Method:** The survey was document-based, using the University portal, a platform that allows for all the data of undergraduate and higher education courses in Italy. Data were collected on the ECTS present in the three essential fields in L-22 courses in the year 2023, for a total of 43 study courses. A multiple linear regression was performed to predict the value of a variable based on the value of two or more independent variables. **Results:** The result was statistically significant ($P < .05$) when the dependent variable was the ECTS related to the biomedical area. The psycho-educational and physical activity-sports areas significantly predicted the ECTS of the biomedical one. Therefore, the training courses seemed to be established based on a criterion. **Conclusions:** In designing the L-22 curricula, the distribution of ECTS was not due to chance, but was dependent on the biomedical area, inconsistent with the professional figure of the basic kinesiologist. Therefore, there is a need to redesign the L-22 curricula to make the training more focused on physical activity-sports area.

Keywords: core curricula; bachelor's degree; basis kinesiologist; sports reform

Introduction

The Italian university training of Exercise and sports sciences, over the years, experienced periods of significant changes. In 1998, Legislative Decree no. 178 established degree programs in exercise and sports sciences, in place of the Higher Institute of Physical Education (ISEF), radically changing the University education and training system.¹ This involved a shift from an orientation focused on training physical education teachers, to teach in secondary schools, to training individuals with multiple professional opportunities, including school, sports, organizational management and adapted physical activity.² Then, Ministerial Decree no. 270/2004 introduced the European Credit Transfer System (ECTS) and the two levels of education, bachelor's degree and specialist called master's degree.³ For each degree class, the Ministry of Universities and Research (MUR) has provided a specific table study class aimed at circumscribing the goals to be pursued. Each degree program was established by Universities, defining for qualifying training objectives, basic and characterizing disciplinary fields to which concern every curricula refer.^{4,5} The essential fields contained indispensable disciplines to define the cultural content and objectives that qualify professional figure. The bachelor's degree in Exercise and sports sciences (L-22) embraces the essential knowledge, basic and characterizing, useful to be applied by students. Specifically, the L-22 course provides theoretical knowledge and practical application of them, to promote the skills related to the professional area of basic kinesiologist.⁶ There are three essential fields in L-22 courses, represented by physical activity-sports, biomedical, and psycho-pedagogical areas.⁷⁻⁹ The physical activity-sports area unifies academic disciplines on sports and physical activities, including theory and methodology of human movement, methods and didactics of individual and group sports activities.

The biomedical area unifies academic disciplines on the biological, biomedical and clinical aspects of locomotion and sport, including physiology, anatomy and hygiene applied to physical-sports contexts. The psycho-pedagogical area unifies academic disciplines on pedagogy, didactics and psychology, including general and special didactics-pedagogy. Despite the good intentions, the figure of Exercise and sports sciences graduate struggled still to establish as a professional profile, until the enactment of the Legislative Decree no. 36 of 28 February 2021, which introduces the professional figure of the kinesiologist, both basic and specialized in the three fields, such as sports, preventive and adapted activity and managerial.¹⁰ For the title of basic kinesiologist, it is necessary to achieve the L-22 course. Specifically, the practice of this profession has as its object *"the conduction, management and evaluation on the one hand of individual/group physical activities of a compensatory, educational, recreational and sports nature aimed, at the maintenance and recovery of the best conditions of physical well-being in the various age groups, through the promotion of active lifestyles"* and on the other hand *"activities for the improvement of the quality of life through physical exercise, as well as personal training and non-competitive athletic preparation"*.¹⁰ As each University has its own autonomy, the distribution of ECTS in the three essential fields depends on each University, leading to a high degree of heterogeneity in undergraduate education, resulting in three-year graduates in Exercise and sports sciences with different knowledge and skills.¹¹ Indeed, in many cases, the training weight of the physical activity-sports area is lower than the others (biomedical and psycho-pedagogical), despite the fact that the academic discipline of *"physical training and methodology"* (code M-EDF/01), an *"sport sciences and methodology"* (code M-EDF/02) are the reference ones for the essential disciplines according to the class tables. This critical issue could have strong repercussions on the future careers

of Exercise and sports sciences graduates. Considering the recent legislative innovations, a reflection on academic training courses is necessary to analyze their state of the art and possibly suggest changes regarding the new professional profile. In the relevant scientific community, the *core curricula* of bachelor's degree programs in Italian Universities are often mentioned, to highlight their possible heterogeneity without understanding the phenomenon. Although the L-22 degree course does not affect the training of the teaching profession in physical education and sports kinesiology and preventive and adapted physical activities takes on an absolutely important cultural function.¹² The National Conference of Bachelor's and Master's Degrees in Sport Sciences (CNCLSM) needs to have the quantitative dimension of the phenomenon for possible partnerships among the different locations to make training more uniform for the choice of the eventual master's degree pathway. Currently, the problem is the non-knowledge of the criteria that determine the distribution of ECTS in the three essential fields, such as physical activity-sports, biomedical and psycho-pedagogical. Specifically, the problem, is that currently, it is not clear what criteria determine the distribution of ECTS in the three essential fields, such as physical activity-sports, biomedical and psycho-pedagogical. Therefore, the aim is to verify the existence of a relationship between the distribution of ECTS in the three essential fields in L-22 courses. The null hypothesis (H₀) is that no criteria that determines the distribution of ECTS in the three essential fields of L-22 courses, arriving at the conclusion that each University is indeed led to organize itself as it sees fit. This finding stems from previous studies that demonstrated the high degree of heterogeneity in the distribution of ECTS among the different Italian Universities of the same course of study.¹¹ However, any relationships have not been verified; therefore, it is necessary to deepen and update the state of the art of the study with more scientifically sound evidence.

Method

Design e participants

The survey was document-based, using the University portal of the Ministry of Universities and Research, that allows for all

data on degree and higher education courses in Italy. Data were collected on the total ECTS present in the physical activity-sports, biomedical and psycho-pedagogical areas in L-22 courses in the year 2023, for a total of 43 courses of study in 42 Italian University locations. Since this data varies over time, and since we cannot predict the number of future degree programs, data were treated as a sample, instead of population, based on the concept that by population we do not mean all the people who were present during a given period, but all the people who might have existed. In future we may have cohorts with which to compare current data.

Statistical analysis

After verifying the nature of the data, multiple linear regression, intended as an extension of simple linear regression, used when we want to predict the value of a variable based on the value of two/more independent variables, was performed. The variable to predict is called the dependent variable (or outcome variable) while the variables used to predict the value of the dependent variable are called independent variables (predictor variables). In this case, multiple regression was used to verify if it was possible to predict the ECTS of one of the three domains over two others, to see if there was a common criterion used in the distribution of ECTS. Its usefulness was to provide a statistical formula easy to evaluate and able to generate predictions. Thus, if H₀ was not accepted, any relationships between variables were deduced and thus, with the statistical determinants arising, the presence of implied criteria (H₁). Significance was set at $P \leq .05$. Data analyses were performed using the Statistical Package for Social Science software (IBM SPSS Statistics for Windows, version 25.0, IBM, SPSS Inc., Armonk, NY, USA).

Results

The University portal collected 43 L-22 courses offered by 42 Italian University locations with different distribution of ECTS in the three essential fields. From descriptive statistics, the predominant area was biomedical, followed by physical activity-sports and psycho-pedagogical, with high levels of standard deviation, making the average unrepresentative. A detailed description is shown in Table 1.

Table 1. Distribution of ECTS in the three essential scientific-disciplinary fields in L-22 courses

Descriptive statistics of the L-22 degree course					
Essential scientific-disciplinary fields	N	Minimum	Maximum	Average	Std. deviation
Physical activity-sports	43	34	74	47.4	10.4
Psycho-pedagogical	43	15	44	19.9	6.3
Biomedical	43	33	80	53.7	10.9

From multiple linear regression, the result was statistically significant ($P < .05$) when the dependent variable was the ECTS related to the biomedical area. R was discrete ($R = .681$) indicating a good level of prediction, while R^2 indicated the independent variables explained 47.1% of the variability of the dependent variable. The independent variables statistically significantly predicted the dependent variable, $F(2,40) = 17.810$, $P < .000$ (i.e., the regression model was a good fit of the data). The general form of the equation for predicting the ECTS of the biomedical area from the ECTS of the other two was: predicted biomedical area ECTS = $94.04 -$

$(.372 \times \text{physical activity-sports ECTS}) - (1.136 \times \text{psycho-pedagogical ECTS})$. A detailed description is shown in Table 2.

Table 2. Non-standardized coefficients.

		Coefficients				
	Model	Non-standardized coefficients.		Standardized coefficients.	t	Sig.
		B	Standard error	Beta		
1	(Constant)	94.04	7.788		12.075	.000
	Physical activity-sports	-.372	.122	-.356	-3.037	.004
	Psycho-pedagogical	-1.136	.202	-.66	-5.63	.000

a. Dependent variable: Biomedical

Discussion

The results of the present study showed a significant predictive relationship starting from the distribution of ECTS of the physical activity-sports and psycho-pedagogical areas, to predict the ECTS of the biomedical one. From the multiple correlation coefficient and the coefficient of determination, good predictive power emerged and that the two independent variables (ECTS of the psycho-pedagogical and physical activity-sports areas) explained the 47% of the variability of the ECTS in biomedical area. In other words, the predictive power of the model with the independent variables was 47%. The higher this percentage, the higher the accuracy of the prediction. A statistically significant result emerged from the regression, which means that the regression model was suitable for these data. Finally, the regression coefficients give us a way to formulate the general equation to be able to predict the ECTS of the biomedical area from the ECTS of the psycho-pedagogical and physical activity-sports ones. In summary, the psycho-pedagogical and physical activity-sports areas significantly predicted the ECTS of the biomedical one. So, knowing the ECTS values of these two domains could help to predict those of the biomedical one. It was not possible to use the regression model for the other two domains because of unmet assumptions. It seemed that the combination of the ECTS of the physical activity-sports and psycho-pedagogical areas was distributed across the University sites in favour of the biomedical one. Accordingly, we reject H₀, in favour of the H₁, regarding the distribution of the ECTS of the biomedical area compared to the other two areas in L-22 courses. Instead, the null hypothesis (H₀) is accepted regarding the distribution of ECTS of the physical activity-sports and psycho-pedagogical areas respect to the biomedical one. In the study course design, the distribution of ECTS was not due to chance, but was dependent on the biomedical area, which was hardly consistent with the professional figure of the basic kinesiologist. This figure should have the appropriate skills to conduct, manage and assess activities for physical well-being and promotion of active lifestyles in various age groups, be able to perform personal training and non-competitive athletic preparation. Thus, there was a need to redesign the curricula to make training more focused on the physical-sports area. Few studies addressed a similar topic. D'Elia et al.¹³ highlighted the specificity between the two academic disciplines of the sport-physical activity area, M-EDF/01 and M-EDF/02, whereas in the present study they are considered unified. Therefore, the two studies are complementary, together with a third study on

the three master's degrees that uses the same research method. At International level, Elder et al.⁶ found the same problem: a high prevalence of teaching in the biomedical area including, physiology, anatomy, biochemistry, underestimating the topic related to health promotion. Dos Santos¹⁴, including 39 Universities and 99 sports sciences courses of all continents, except Africa, found a different approach to curricula analysis, which determined a prevalence of academic disciplines related to biology, psychology and sociocultural issues. In addition, the scientific production of Italian professors also went in the same direction.¹⁵ This has a strong impact on the training of students who very often perceive that they have not acquired, at the end of the University course, the necessary skills to practice the role of kinesiologist. A specific training is the basis that, followed by specialized training, guarantees the ability to teach in the school setting.^{16,17} Thus, there is a need to redesign curricula to establish the specific profile of the graduate and choose the most appropriate content and methods to achieve the expected results. The study has no sample limitations because it uses the population so far constituted. The study is original because only similar work has previously been performed, as just described in introduction. Future studies could investigate students' perceptions of the adequacy of their training to perform the profession of basic kinesiologist based on data of this study. Comparing the perceptions of students from Universities with different distribution of ECTS could help to understand whether the poor preparation stems from a lower number of ECTS in physical activity-sports area.

Practical Applications

The results of the present study encourage the interrelationships among different Universities that offer the same degree class, to redesign core curricula with greater emphasis on the physical activity-sports area. Future core curricula of bachelor's degree courses in exercise and sports science should be consistent with the professional figure of the basic kinesiologist, working on appropriate methods and content to perform this profession. Specifically, it would be necessary to redesign the distribution of ECTS in the three areas taking into consideration the professional practice of the basic kinesiologist. The method of this study could be useful sharing, through cross-University comparison, how selected criteria have to apply and, thus, determines which main teachings can help the student to learn the best practices of its future profession which requires projecting, conducting, managing, and evaluating individual

and group physical activities of different age class and typology. Once the fundamental knowledges have been established, the complementary ECTS can be distributed with the other teaching that complete the general training of the kinesiologist.

Conclusion

The psycho-pedagogical and physical activity-sports areas significantly predict the ECTS of the biomedical one; therefore, knowing the ECTS values of these two disciplines can help predict those of the biomedical discipline. The question then arises as to the specificity of the new professional profile, which should be related to the physical activity-sports area. Overall, the diametrically opposed findings can be dealt with in CNCLSM to derive possible correctives for the purpose of greater uniformity of training. The study is intended to urge the creation of interrelationships among Universities and redesign basic curricula together, with greater emphasis on the physical activity-sports area.

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Ethical Committee approval

Ethical approval was waived for this study, as it is a documentary research with no risks, using 'Universitaly' portal, an official Italian platform that allows for all published data on undergraduate and higher education courses in Italy. Specifically, data concerning the number of ECTS in the three areas of the essential scientific-disciplinary fields of Italian Universities, offering Bachelor's degree courses in Exercise and Sport Science, were collected.

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Author-s contribution in according to ICMJE

Sara Aliberti, PhD student, made substantial contributions to the conception and design of the work; the acquisition, analysis and interpretation of data for the work; drafting and revising the work critically and the final approval for the version to be published. She agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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