

University education for physical education teachers, sports and preventive and adapted physical activities kinesiologists and sports manager

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Purpose: The study aims to measure and verify the relationship between the distribution of European Credit Transfer System (ECTS) in the three essential fields (biomedical, physical activity-sports and psycho-pedagogical) related to the master's degrees in sport science and techniques (LM-68) and science of preventive and adapted physical activities (LM-67) and in the three essential fields (physical activity-sports, economic-legal and psycho-sociological) of the master's degrees in sport management (LM-47).

Method: The method is document-based. Using University portal, data on ECTS numerosity in the three essential fields for each degree course were collected. Multiple linear regression was used to predict the value of a dependent variable based on the value of other two independent variables.

Results: The predominant field for LM-67 is biomedical, in LM68 physical activity-sports and in LM-47 economic-legal, all with high degrees of variation. Regarding the distribution of ECTS in the three essential fields in LM-68 and LM-47, the result is not statistically significant ($P > .05$). No one area can predict the other two, therefore, there is no relationship underlying the degree course designs. In LM-67, the ECTS of the biomedical field predict significantly those in the physical activity-sports and psycho-pedagogical ones ($P < .05$).

Conclusion: The results show that only in LM-67 there is a relationship between ECTS distribution in the three essential field, in which the ECTS in biomedical field predict how ECTS in the other two fields are distributed, showing a certain degree of agreement among universities on how to distribute them.

Keywords: core curricula, master's degree, kinesiologist, sports reform

Introduction

Towards the end of the last century, university education in exercise and sport sciences underwent reforms aimed to align the Italian university system with European higher education policies. Until their implementation, post-secondary physical-sports education had been entrusted to the Higher Institute of Physical Education (ISEF), established by law no. 88 of 7 February 1958, which, for more than half a century, had the task of "promoting the progress of applied sciences in physical education and providing the scientific and technical culture necessary for the preparation of those who intended to dedicate themselves to the teaching of physical education and technical jobs in sports field".¹ In 1998, Legislative Decree no. 178 established degree courses in exercise and sport sciences², expanding educational opportunities through the diversification of university curricula. Based on the Italian university reform promoted by Minister Berlinguer and implemented by Ministerial decree no. 509 of 1999, degree courses in exercise and sports science also took the so-called "3+2 configuration," which provides for a bachelor's degree, lasting three years, and a master's degree, lasting two years.³ For exercise and sport sciences, there were three master's degree programs: (a) Preventive (Preventive and Adapted Physical Activities), (b) Economic-Managerial (Management of Exercise and Sports Activities), (c) Technical-Scientific (Sports Science and Techniques). The application of

the subsequent and current regulatory framework determined a different university organizational-didactic structure, which provided the transformation of the master's degree programs into three distinct master's degree courses, named as follows: "organization and management of services for sports and physical activities", study class LM-47, "science and techniques of preventive and adapted physical activities", study class LM-67, and "science and techniques of sports", study class LM-68.⁴ For each master's degree program, the Ministry of University and Research (MUR) has provided a specific table of classes to circumscribe the objectives to be pursued with the establishment of individual degree programs by the universities, declined in terms of the learning objectives of the output profile formed by the specific learning objectives of the degree disciplines. These objectives are included in the disciplinary areas made up of the scientific-disciplinary fields, to which reference should be made when defining individual curricula. In the application of the "general criteria" defined in the class tables, the rationale behind the reform of ISEF to the new university education pathways should be kept in mind, as well as the consistency of the specific learning objectives of the teachings pertaining to the academic disciplines (ADs) with the qualifying educational objectives of the output profile from the educational pathway. Along with consistency also requires congruence, understood as the appropriate amount of content of the disciplines pertaining to the ADs to achieve the objectives, both specific and qualifying.⁵

Congruence ensures that the consistency between objectives of the disciplines with the final objectives of the pathway are achieved for the right amount of knowledge and applications of it in the individual disciplines.

The current state of degree programmes in exercise and sport sciences appears to have some critical issues.⁶⁻⁸ In particular, there is a high level of heterogeneity between the curricula of the degree courses in the different Italian universities, which has also led to cases in which 50% of the curriculum, in defiance of the general principles previously mentioned, provides curricula in which the educational weight of the field of physical activity-sports is lower than that of the other fields (biomedical, or psycho-pedagogical), despite the ADs of “*physical training and methodology*” (code M-EDF/01) and “*sport sciences and methodology*” (code M-EDF/02) being the reference ones.⁹ This condition represents a limitation because it is highly likely that, at the end of their studies, exercise and sport sciences graduates may end up with a heterogeneous set of knowledge and skills that are not closely related to the specifics of the qualifying educational objectives of exercise and sport sciences.^{10,11} Given the recent legislative innovations, concerning the new professional figure of the kinesiologist,¹² and the compulsory teaching of physical education in primary schools,¹³ it is necessary to conduct a study on training courses to analyse the state of the art and, if necessary, highlight any critical points. It is also necessary to know the relationship between the essential fields in the three master’s degree courses. The individual courses consist of degree disciplines belonging to the scientific-disciplinary fields and are quantified in European Credit Transfer System (ECTS).¹⁴

The study aims to verify and verify the relationship between the distribution of ECTS in the three essential fields (biomedical, physical activity-sports and psycho-pedagogical) in relation to the two master’s degree courses in sport sciences and techniques study class (LM-68) and science of preventive and adapted physical activities study class (LM-67) and in the three essential fields (physical activity-sports, economic-legal and psychosociological) of the master’s degree course in sport management study class (LM-47). Beyond the ministerial prescriptions concerning the specific learning objectives of the disciplines and the qualifying educational objectives of the outgoing profile, this study intends to verify whether there is a certain agreement among universities that has been referred to in the

design of degree courses. The null hypothesis (H_0) is that there is no relationship that determines the distribution of ECTS in the three essential fields as each university is allowed to design courses according to its own needs. This finding stems from the results of previous studies, which demonstrated a high degree of heterogeneity in the distribution of ECTS among the different national universities of the same course of study.^{15,16}

Method

Design and participants

The method is document-based using the University portal of the Ministry of Universities and Research. The ECTS of the biomedical, physical activity-sports and psycho-pedagogical fields of the LM-68 and LM-67 degree courses, and the ECTS of the physical activity-sports, psychosociological and economic-legal fields of the LM-47 degree courses in the year 2023 were collected. The sample consists of the population of the academic year 2022-23: 19 study courses of the LM-68, 36 courses of study of LM-67 and 7 study courses of the LM-47.

Statistical analysis

After measuring the numerosity of the ECTS for each of the three essential fields, a multiple linear regression was applied to predict the value of one dependent variable from the value of the other 2 independent variables. Multiple regression is useful for predicting the ECTS of one of the three fields with respect to the other two, as well as for identifying a criterion for course design based on the associations between the three variables. The alternative hypothesis (H_1) is that there may be some underlying agreement, such as the relationship between the three domains, that can help us understand how ECTS are distributed across the three essential fields. 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 the 19 courses of study of the LM-68, the 36 courses of study of the LM-67 and the 7 courses of study of the LM-47 with different distribution of ECTS in the

Table 1. Distribution of ECTS for the 3 master’s degree courses.

Descriptive statistics of the LM-68 degree course					
Essential scientific-disciplinary fields	N	Minimum	Maximum	Average	Std. deviation
Physical activity-sports	19	28	49	35.84	6.57
Psycho-pedagogical	19	4	18	7.21	3.62
Biomedical	19	12	43	22.47	9.87
Descriptive statistics of the LM-67 degree course					
Essential scientific-disciplinary fields	N	Minimum	Maximum	Average	Std. deviation
Physical activity-sports	36	20	48	29.50	7.05
Psycho-pedagogical	36	7	16	8.97	2.77
Biomedical	36	18	50	34.83	8.49
Descriptive statistics of the LM-47 degree course					
Essential scientific-disciplinary fields	N	Minimum	Maximum	Average	Std. deviation
Physical activity-sports	7	15	30	19.85	5.04

Psychosociological	7	6	27	12.57	7.16
Economic-legal	7	27	65	43.42	14.21

three essential fields. A detailed description is shown in Table 1. From the descriptive statistics, the predominant field for the LM-68 degree course is physical activity-sports, followed by the biomedical and psycho-pedagogical fields, with high levels of standard deviation, making the average unrepresentative. From the regression, the result is not statistically significant ($P > .05$). No domain can predict the other two.

Regarding the distribution of ECTS in the three fields in the LM-

67 degree courses, from multiple linear regression, the result was statistically significant ($P \leq .05$) when the dependent variable was the ECTS related to the biomedical field. The independent variables statistically significantly predicted the dependent variable, $F(2,33) = 7.153$, $P < .001$ (i.e., the regression model was a good fit of the data). A detailed description is shown in Table 2.

Table 2. Non-standardized coefficients.

Model	Coefficients				Sig.
	Non-standardized coefficients.		Standardized coefficients.	t	
	B	Standard error	Beta		
(Constant)	58.434	6.468		9.034	.00
Psycho-pedagogical	-1.223	.446	-.399	-2.740	.01
Physical activity-sports	-.428	.175	-.356	2.441	.02

a. Dependent variable: Biomedical

Regarding the distribution of ECTS in the three fields in the LM-47 degree courses, the result is not statistically significant ($P > .05$). No one domain can predict the other two. There is no relationship below them. One limitation is certainly the sample size, as it is a degree course offered in only a few universities.

Discussion

For the LM-68 degree course, the result is not statistically significant because no one field can predict the ECTS present in the other two fields; there is no relationship below them. A high degree of heterogeneity was found between the different Italian universities, especially regarding the distribution of ECTS in the biomedical domain (min = 12, max = 43, with SD = 9.87). Probably each university designs courses without consulting. The predominant field is physical activity-sports, followed by the biomedical and psycho-pedagogical ones.

Regarding LM-67, the size of the data and the verification of the assumptions required to be able to apply the multiple linear regression were verified. It turned out that the only variable that showed significance was the variable relating to the ECTS of the biomedical field. Thus, the ECTS of the biomedical field represents the dependent variable (x), while the ECTS of the psycho-pedagogical and physical activity-sports fields, represent the two independent variables (y). R was discrete ($R = 0.55$) indicating a good level of prediction, while R^2 indicated our independent variables explained 30.2% of the variability of our dependent variable (biomedical ECTS), while the remaining percentage indicates that the variability depends on many other unmeasured factors. The higher this percentage, the greater the accuracy of the prediction. The independent variables predict the dependent variable statistically significantly, $F(2, 33) = 7.153$, $P < .00$ (the regression model is a good fit to the data). Finally, the regression coefficients were calculated, giving a way to formulate the general equation to predict the number of ECTS of the biomedical field from the number of ECTS of the psycho-

pedagogical and physical activity-sports field. Both ECTS from the psycho-pedagogical ($P = .01$) and physical activity-sports fields ($P = .02$) help to predict ECTS from the biomedical field. There is no relationship between ECTS from the physical activity-sports and psycho-pedagogical fields ($P > .05$). Thus, the distribution of ECTS in the LM-67 was probably made using the biomedical field as a benchmark. The predominant field is biomedical, followed by physical activity-sports and psycho-pedagogical. The coefficients in a multiple regression model represent the change in the dependent variable for each one-unit increase in the independent variable, holding all other variables constant. A positive coefficient indicates a positive relationship between the independent variable and the dependent variable, while a negative coefficient indicates a negative relationship. The size of the coefficient reflects the strength of the relationship. The ECTS vary from a minimum of 18 to a maximum of 50 with a standard deviation of 8.49, therefore quite high. As there is no uniformity in the curricula, it is at the discretion of the individual university, in this case the biomedical area has a prevalence of ECTS. This choice could be consistent with the profile of the kinesiologist of preventive and adapted physical activities, due to its health and wellbeing peculiarities, compared to the other two professional profiles of the kinesiologist. The general form of the equation for predicting the ECTS of the biomedical field from the ECTS of the other two fields was: predicted biomedical field ECTS = $58.43 - (1.223 \times \text{physical activity-sports ECTS}) - (0.428 \times \text{psycho-pedagogical ECTS})$.

Finally, in the case of the LM-47 degree course, the main problem is certainly the sample size, as it is a degree course that is activated in only a few university locations and does not allow for ordinary statistical application. However, a high degree of inhomogeneity can already be seen from the descriptive statistics, especially as regards the distribution of ECTS in the economic-legal field, the predominant one, followed by physical activity-sports and psycho-sociological. Here too, as in LM-68, it appears that each university does not apply any criteria.

Consequently, H_0 is rejected in favor of the H_1 regarding the distribution of ECTS of the biomedical field in relation to the other two fields in the LM-67 degree course. We do not reject the H_0 regarding the distribution of ECTS in the three essential fields in the other two-degree courses (LM-47 and LM-68). This implies that there is no underlying agreement in the distribution of ECTS and therefore each university adjusts itself. Few studies addressed a similar topic. D'Elia et al.¹⁷ highlighted the specificity between the two ADs of the sport-physical activity area, M-EDF/01 and M-EDF/02, while in the present study they are unified. As a results, the two studies are complementary, with a third study on the three master's degrees with the same research method. These indications may be useful when trying to calibrate curricula in different universities in the same degree class.^{18,19} The study has no sample limits because it uses the population so far. With the same collected data, other statistical elaborations can be simulated, and relationships can be argued differently to verify their construct validity.

Conclusion

The results show that only in LM-67 there is a relationship between ECTS distribution in the three essential field, in which the ECTS in biomedical field predict how ECTS in the other two fields are distributed, showing a certain degree of agreement among universities on how to distribute them. Thus, it raises the doubt that the LM-47 and LM-68 degree programs should be revised. The predominant field in LM-67 is biomedical, in LM-68 physical activity-sports and in LM47 economic-legal, all with high degree of variation. Overall, the diametrically opposed findings can be discussed at the conference of exercise and sport sciences degree courses to derive possible corrective measures for greater uniformity of training. The study aims to encourage the creation of interrelationships between universities and to redesign master's degree training in exercise and sport sciences, with greater emphasis on the physical activity-sports field.

Ethical Committee approval

Ethical approval was waived for this study, as it is 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 Master's degree courses in Exercise and Sport Science, were collected.

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Author-s contribution in according to ICMJE

Gaetano Raiola, Full Professor, 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 to the final approval for the version to be published. He 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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