Abstract

The main objective of this article is to design a structural equation model to evaluate the predictor variables of professional performance in soccer coaches (PPSC), digital teaching competence (DTC) and professional competences of soccer coaches (PCSC). A sample of 612 coaches was taken from the different training levels of the Valencian Community (FFCV) in Spain, managed by UEFA. The results of the causal relationship model showed a good overall fit of the model. A statistically significant positive relationship was found to exist with the professional performance of soccer coaches in both the use of digital competencies (DTC) and the professional competence of soccer coaches. A statistically significant positive relationship was also observed between the use of digital competencies and the professional competence of soccer coaches. From the results obtained, it can be affirmed that the change generated by UEFA in the training of coaches in emerging technologies increases their professional performance.

Keywords: Soccer coach, digital teaching competence, professional competence of soccer coaches, professional performance of soccer coaches

Introduction

The society in which we live requires digitally competent citizens, where the use of technologies favours their professional work (Esteve, 2015). This requires training in the use of digital resources and tools from the initial stages of education and must continue throughout life (Casillas & Ramírez, 2019; Prensky, 2001; Rodríguez-Garcia et al., 2019; Saavedra et al., 2019; Suárez-Rodríguez et al., 2018). The acquisition of these digital competences is also considered essential in both grassroots and elite sport, especially if we take into account technological trends in this field, such as drones, heart-rate monitors or GPS, to cite a few examples.

In sports training, the coach is the person most responsible for managing the teaching and learning processes of his or her players. Therefore, it is relevant to assess the level of his or her digital competence as a teacher or educator. It is also worth investigating whether the coach’s level of competence in digital skills helps to improve his or her professional performance and specific professional competences (Ballester-Esteve et al., 2021; González-Ponce et al., 2017). Football is one of the most played sports worldwide. The convention of the Union of European Football Associations [(hereinafter UEFA), UEFA (2015)] specifically includes the incorporation of pedagogical competences to “know how to teach” football
in its curricula (Lledó et al., 2014; Vergara et al., 2018). It also incorporates digital competences for adapting to the new digital societies we live in (Espinosa et al., 2017), in addition to specific professional competences as coaches.

In the field of physical education and sport, the use of causal models has proliferated in recent years (Castro-Sánchez et al., 2019; González-Montesinos & Backhoff, 2014; Ortiz-Sánchez et al., 2022; Zurita-Ortega et al., 2016). In this context, it has been shown how exercise practice can be related to gender and age (Ortiz-Sánchez et al., 2022), self-concept and family (Zurita-Ortega et al., 2016) and the consumption of harmful substances (Castro-Sánchez et al., 2019).

However, there are few studies within sports training that analyze the relationship of dependence between digital competence variables and professional competencies, as elements of improvement in the sports performance practiced. This is not the case in other more traditional educational settings such as universities (González-Montesinos & Backhoff, 2014; Tourón et al., 2018). Coaches are considered educators in many cases, so these variables specific to the teaching profession and the social context in which we find ourselves should also be analyzed (Fuentes et al. 2019).

For all of these reasons, the aim of this study is to analyze whether the digital competences and the specific professional competences of football coaches are related to their professional performance. In the same way, we will try to find out to what extent the digital competences and professional competences of football coaches are related. To this end, a statistical study of structural equation modelling will be carried out in order to discuss the causal relationship between the three variables.

**Digital Teaching Competence (DTC) and Professional Football Coaching Performance (PFCP)**

DCT, broadly understood as the set of skills, attitudes and knowledge required by teachers in the digitalised world (Cabero & Palacios, 2020; Prendes et al., 2018), is translated as a procedural competence that has two dimensions – knowing and using digital resources. In this proposal, the use dimension has been analysed, since it confirms mastery in the use of digital tools and applications (Martínez et al., 2017). The whole construct will be analysed as a whole, and the football coach should be understood as a teacher. Among the models that study the acceptance and use of technology adapted to specialised contexts, the first and most widely accepted is the Technology Acceptance Model (TAM) (Davis, 1989). This model suggests that a person’s acceptance of any technology is determined by their beliefs about the positive consequences of use and is based on the perceived usefulness and ease of using the technology.

The construct of Professional Performance of the Football Coach (PPSC) is understood as the level of competence presented by the coach in his professional work, measured in its three dimensions of continuing education, technology mastery and self-assessment (Ballestero-Esteve et al., 2021; González et al., 2014; Rivilla-García et al., 2012; Rodriguez et al., 2018). In order to know whether a technology will be used and help to improve professional performance, it is essential to identify the external variables that condition the perceived usefulness and ease of use. This model has influenced numerous researchers, who have added variables such as user type, gender, age, and level of education (Teo and Noyes, 2011; Kumar and Kumar, 2013; López-Bonilla and López-Bonilla, 2011).

Rivilla-García et al. (2012) tried to evaluate the importance of DCT in the process of teaching and learning handball. The authors suggested that the use of technology improves players’ learning and claimed that the work of the coach improves, partially increasing their professional performance. Their proposal adjusts, on the one hand, the increase in players’ motivation and, on the other hand, the capacity of perception and analysis of the game by athletes. Another of the initial models exploring the relationship between DCT and PPSC is that by Sánchez et al. (2007). It is an empirical model on the adaptation and use of the web, based on its perceived usefulness and ease of use. The model shows a remarkable mediating value between motives and intention to use it. Another model, designed by Mahdizadeh et al. (2008), on university teachers who teach online training, highlighted the fact that teachers only use simple functions of digital platforms and teachers’ lack of prior training in digital skills to improve perceptions of the added value of using this type of tools. Also based on TAM models, Cabero and Pérez (2018) analysed university students’ intention to use Augmented Reality technology based on four dimensions: perceived usefulness, perceived ease of use, perceived enjoyment, and attitude towards use. This confirms the robustness of the theoretical model proposed by the researchers following the original model proposed by Davis (1989).

From the examples analysed, a strong relationship can be observed between the use of technologies and an increase in professional competence. This aspect allows us to argue a first hypothesis:

**Hypothesis 1: There is a positive relationship between digital competence in teaching and improved professional performance.**

**Professional Football Coaching Competence (PCSC) and Professional Football Coaching Performance (PFCP)**

The PCSCs are a set of specific competencies of sports coaches covering four dimensions: athlete education, athlete motivation, athlete character guidance, and preparation for competition. Physical preparation was also included in the original scale, but is currently not contem-
plated due to the existence of physical trainers (Feltz et al., 1999; González-Ponce et al., 2017; Myers et al., 2008).

Studies between specific competences in sports trainers and their relationship with their own professional performance are limited in the sports context. Even more so if one tries to find previous causal relationship models between both variables. However, if we focus on football sports coaches as trainers rather than competition coaches, a larger number of publications exist that relate professional competences and professional performance (Escudero, 2019; Escudero et al., 2017; García-Ruiz and Castro, 2012; Gonczi, 1994), with Physical Education teachers (Rojas et al., 2015) and in studies of the education sector itself in general (Pimienta, 2014; Pinya, 2008). As for the relationship models used in the different professional sectors, some of them, such as the pedagogical sector, have shown very diverse models that propose numerous variables conditioned by academic performance (Chasco et al., 2017; Flores Del Ángel, 2021; Moneta, 2019). Continuing in the educational context, another model on distance education and the determining factors in academic performance was designed by Moneta (2019), which proposes a series of aspects that condition this educational modality.

The model proposed by Flores De Ángel (2021) stands out, in which an increase in professional performance is produced through motivation using specific methodologies. The model in question places constructs that are linked to performance such as: knowledge, skills and attitudes, incentives and rewards, or bonuses for increased performance.

Bolancé et al. (2013), analysed the relationship between an educator’s critical self-assessment and the improvement of his or her professional competence. Self-assessment is a concrete dimension of professional performance and key to the work of training, whether in the classroom or on the playing field.

Escudero et al. (2017), argue that teacher learning and professional performance are fundamentally linked. It cannot be considered that high scores in the domains of a sports coach, such as his or her work to motivate, educate or compete, are not related to the improvement of his or her professional work. Therefore, after the reading of proposals that relate the professional competences of the coach and his/her professional performance, hypothesis 2 is formulated:

**Hypothesis 2**: There is a positive relationship between professional competence of the football coach and improved professional performance.

**Digital Teaching Competence (DTC) and Professional Football Coaching Competence (PTC)**

When studying the possible relationships between DCT and PCSC, it is necessary to differentiate between grassroots football, in a context of training and sport initiation, and elite football, focused on competitions, tactical play and the professionalization of sport. In both cases, we are interested in analysing the relationship with those technologies that are specific to the sport, regardless of the level of technician (analysis tools, force measurements, etc.).

Along these lines, we find research in relation to cardiovascular variability according to age or gender, as well as comparisons between different collective sports, such as hockey or basketball (Botek et al., 2016; Prajapat et al., 2018; Recuenco and Juárez, 2017; Rojas-Inda, 2018; Vasileios et al., 2018). GPS technology is now a reality among athletes and sports teams, and they are increasingly used due to the very high accuracy of the data obtained (Alonso et al., 2017; Hoppe et al., 2018; Izzo and Varde’i, 2017; Hernández-Martín et al., 2020). Other technologies used are accelerometers and photoelectric cells, which make it possible to assess travel speeds on the pitch and analyse how they affect fatigue (Alonso et al., 2017; Gutiérrez-Dávila et al., 2016).

Technological trends in terms of devices and connectivity are generating advances in current devices, providing them with greater functionality and applicability to the field of football, as is the case of nanotechnology in the production of carbon sports materials, applications of biometric data such as the aforementioned GPS, and the use of drones and augmented reality lenses (Seshadri et al., 2017). The influence of technologies on the work of the football coach is envisaged, due to the close relationship between digital technologies and the sport of football, thus opening up a new hypothesis that assumes a positive relationship between digital competence in teaching (DDC) and the influence on their professional work (PCSC).

**Hypothesis 3**: There is a positive relationship between teaching digital competence and increased professional performance in football coaching.

**Proposed model**

In the event held by UEFA (2015), on the one hand, the training of the federative football coach has been altered and, on the other hand, new competences have been incorporated into training plans, especially digital teaching competences that have a direct impact on increasing the professional performance of the technical coach (Ballester-Esteve et al., 2021).

Currently, societies are in the constant process of updating in digital matters, not only in everyday aspects of life, but also in specific and important contexts such as education, where digital competence in teaching is key in addressing the teaching-learning process (Area, 2014; Fuentes et al., 2019). Given this situation, the guidelines provided by UEFA (2015) show the need for the coach to adapt as an educator, and, on the other hand, the need to evaluate the professional performance of the coach. To this end, a model of relationships has been designed to...
accommodate the hypotheses formulated on the basis of previous models and the professional skills of coaches and the improvement of their professional performance. Thus, the relationships established between the different constructs or variables included in the model are summarised in Figure 1, which presents the final model proposed for this research.

The model details the influences of Professional Football Coaching Performance (PFCP) on the predictor variables of Use of Digital Teaching Competence (DTC) and Professional Football Coaching Competences (PFTC). The possible influence between the Use of Digital Teaching Competence (DTC) and Professional Competences of the Football Coach (PCSC) will also be analysed.

Figure 1. Model of relationships, constructs, and factors on which it is sized.

Method

Participants
This study involved 612 students from the football coach training courses managed by la Federación de Fútbol de la Comunidad Valenciana (FFCV), under the auspices of the Real Federación Española de Fútbol (RFEF). All the coaches who took part in this research have completed the standardized federative courses following the UEFA convention held in 2015. The relevant methodological adaptations were made there, similarly adapted to the university educational model, European Higher Education Area (EHEA). The type of sampling used was non-probabilistic convenience sampling.

The mean age of all respondents is 31.03 years (SD=10.18), with a minimum age of 18 and a maximum age of 64. The percentage of male respondents is 91.8%, while the percentage of female respondents is 8.2%. The mean number of years of experience as coaches is 3.65 (SD=5.26) and of those who have played football, the mean number of years played is 14.29 (SD=7.69). According to their level as coaches, many people have the title of UEFA C coach (83.1%), 6.5% have UEFA B Level I, 6.9% have UEFA A Level II and 3.5% have UEFA PRO Level III. Regarding the level of education, 12% have primary education, 18.4% secondary education, 21.2% high school studies, 16.9% higher education and 31.5% university studies.

Instrument
Three validated questionnaires present in the scientific literature were selected or adapted to assess DCT, PCSC and PPSC. Among the questionnaires found that assess digital teaching competencies, it was decided to use the “Teaching Digital Competencies Questionnaire” developed by the team of Tourón et al. (2018). Based on this questionnaire, a validation was performed for use with coaches (Ballester-Esteve et al., 2023). This was finally administered to the group of sports coaches. It is therefore a very complete research tool, with 54 items measuring the five dimensions of DCT in two scales, one assessing the teacher’s knowledge of their corresponding digital competence and the other the use they make of their digital competence in their teaching practice. Responses are provided by means of a 7-point Likert scale indicating the degree of knowledge and the degree of use of the aspect to which each item refers.

Once the instrument was selected, the original scale was adapted, and it was decided to reduce the scale without losing reliability and validity.

The first decision taken was to focus only on the Use dimension and to discard the Knowledge dimension. As different studies argue, the use of digital tools implies action and knowledge (Almerich et al., 2011; Coll et al., 2008; Herrera-Brenes et al., 2015).
Continuing with the downscaling process, first the Delphi method was used, and second the questionnaire was fine-tuned by administering it to a pilot sample. The literature indicates that an adequate number of experts should range from a minimum of 6 to a maximum of 30 (Reguant-Alvarez & Torrado-Fonseca, 2016).

Finally, those items with lower scores were reduced, some questions were reformulated for greater clarity in the possible answers, and some items considered similar were regrouped. In other words, the scale was reduced and adapted by 22 final items, from 54 in the original instrument to 31, leaving the grouping of the scale of Use of Digital Competence in Teaching as follows:

- Dimension 1, information and information literacy, from 8 items to 5.
- Dimension 2, communication and literacy, from 9 items to 6.
- Dimension 3, digital content creation, from 16 items to 9.
- Dimension 4, security, from 8 items to 6.
- Dimension 5, problem solving, out of 13 items 5 pass.

To assess the PCSC, the “Coaching Competence Scale” adapted by González-Ponce et al. (2017) from the original version by Myers et al. (2010) was used. The reason for this choice is that it is a scale validated in Spanish in the original questionnaire by Myers et al. (2010), “Athletes’ Perceptions of Coaching Competency Scale II-High School Teams”. Thus, it is a valid questionnaire that has been used in different research studies with the aim of assessing the competence of sports coaches either through their athletes or through themselves, as will be done in this research. The questionnaire presents the same indices in both groups and the same structure – Likert-type questions rated from 1 to 5, where 1 shows incompetence and 5 shows complete competence. The scale evaluates 5 dimensions based on the coach’s belief in his or her ability to: Dimension 1, motivate players, 4 items; Dimension 2, educate players, 4 items; Dimension 3, develop character, 3 items; Dimension 4, compete, 4 items.

The scale for assessing the PPSC was the “Scale for the evaluation of the professional performance of the football coach based on their continuing education, DCT level and self-assessment” by Ballester-Esteve et al. (2021), which was validated on the basis of the following procedure:

It was administered to a sample of 412 football coaches in training in the Valencian Community. Based on the three dimensions that cover the three selected domains (lifelong learning, ICT training, and self-evaluation), eleven indicators were adapted, all of them evaluated using a Likert-type response scale ordered from 1 to 5 frequency, where 1 is never and 5 is equal to always.

Procedure

After designing the final questionnaire, the next step in the research is to administer it in order to obtain data. The ideal population for the present study is all coaches in training at the FFCV, under the auspices of the Royal Spanish Football Federation (RFEF).

The present research has been carried out since the 2019–20 academic year, so the total population of the study is made up of 612 coaches from the different federative courses who completed their training in that academic year. All the coaches who are part of the present research have completed the standardised federative courses following the UEFA convention held in 2015. The relevant methodological adaptations were made and adapted to the university educational model, the European Higher Education Area (EHEA). The type of sampling used was non-probabilistic convenience sampling. The administration of the questionnaire was carried out in two phases: in person and then by means of an online questionnaire. During the first part of the 2019–20 academic year, the federative courses were held face-to-face, so the research was presented in one of the practical sessions and the questionnaire was administered to the students so that they could answer it voluntarily (during the period of September 2019 to January 2020). Following this protocol, we intervened in different courses until the beginning of 2020, when, due to the global Coronavirus pandemic, the online questionnaire had to be used exclusively.

Of the total number of questionnaires collected, only 612 coaches completed the entire questionnaire. 182 incomplete or invalid responses were discarded and not considered in the study.

Statistical analyses

For the statistical analysis, the SPSS (Statistical Package for the Social Sciences, Version 26) and EQS (Structural Equation Modeling Software, Version 6.4) were used. To check the validity of the constructs under study, several confirmatory factor analyses (CFA) were carried out, using the estimation provided by the robust method of maximum likelihood estimation, recommended to correct for the possible absence of multivariate normality. The adequacy of the CFA was tested through the significance of the Chi-square, and its robust correction provided by Satorra-Bentler (S-B χ²) (Bentler, 2004; Satorra & Bentler, 1994). Other coefficients were also calculated to check the adequacy of the proposed models, such as the ratio of χ² and its degrees of freedom (χ²/df) and S-B χ² and its degrees of freedom, with values of less than five being acceptable (Byrne, 2009; Carmines & McIver, 1981). Finally, the coefficients of the robust goodness-of-fit indices of the proposed models were tested: Non-Normed Fit...
Index (NNFI), the Comparative Fit Index (CFI) and the Incremental Fit Fix (IFI). For these indicators, values above .90 are considered to be a good fit (MacCallum and Austin, 2000). Finally, the Root Mean-Square Error of Approximation (RMSEA) is shown, with scores below .08 being necessary to consider a good fit (Browne & Cudeck, 1993).

In assessing the reliability of the scales, three measures were taken into account: Cronbach’s Alpha, Composite Reliability (CF) and the Extracted Variance Measure (EVA) for each factor (Hair et al., 2006). On the other hand, convergent validity was also tested through the significance of the factor loadings on their respective dimension and the associated t-test values. In addition, discriminant validity, which is concerned with the clear distinction between any pair of constructs, was assessed using the method suggested by Fornell and Larcker (1981). This method admits discriminant validity if the square root of the AVE value of a given factor is greater than the correlation coefficients between the factor and any other factor of the proposed scale. Another criterion to ensure discriminant validity is that the correlations between the various pairs of factors must be less than .85 (Kline, 2005).

Finally, a causal relationship model was conducted to test the relationship between the various constructs. The causal relationship model was evaluated using the estimates provided by the R coefficient 2, the standardized coefficients (β) and the significance level (t-statistic). The fit of the model was tested using the goodness-of-fit indicators mentioned for confirmatory factor analysis.

**Results**

**Validity and reliability of scales**

First, the validity and reliability of the variables under study (PPSC, DCT and PCSC) were tested. To analyze the validity of the scales, a CFA was performed on each of the scales measuring the constructs analyzed. Table 1 shows the goodness-of-fit indices for the three scales. As can be seen, all the scales have a good fit. However, it was necessary to eliminate one item in each scale because they had low factor loadings (<.40) or high residuals with other variables.

<table>
<thead>
<tr>
<th>Construct</th>
<th>X2 (df)</th>
<th>S-B X2</th>
<th>X2/df</th>
<th>RMSEA (CI)</th>
<th>NNFI</th>
<th>IFC</th>
<th>IFI</th>
</tr>
</thead>
<tbody>
<tr>
<td>DCT</td>
<td>1880.18 (424)</td>
<td>1430.28</td>
<td>4.43</td>
<td>.062 (.059-.066)</td>
<td>.90</td>
<td>.91</td>
<td>.91</td>
</tr>
<tr>
<td>PPSC</td>
<td>231.98 (71)</td>
<td>178.46</td>
<td>3.27</td>
<td>.050 (.041-.059)</td>
<td>.93</td>
<td>.94</td>
<td>.94</td>
</tr>
<tr>
<td>PCSC</td>
<td>115.23 (32)</td>
<td>96.66</td>
<td>3.60</td>
<td>.06 (.045-.071)</td>
<td>.96</td>
<td>.97</td>
<td>.97</td>
</tr>
</tbody>
</table>

Note. DF=Degree of freedom; RMSEA=Root Mean-Square Error of Approximation; CI=Confidence Interval; NNFI = Non-Normed Fit Index; CFI = Comparative Fit Index; IFI = Incremental Fit Fix.

The convergent and discriminant validity of each scale was also tested. In the first case, the items of the three scales were significantly correlated with the latent variables they were supposed to measure, with t-values above 1.96 being observed in all cases for the different items. In terms of discriminant validity, it was found that the correlation between the pairs of factors of the scales did not exceed the value of .85 recommended by the literature in any of the three scales. Likewise, the square root of the AVE was found to be higher than the correlation between pairs of factors in the scales measuring the PPSC and DCT constructs. However, in the case of the PCSC scale, this criterion was not met in all dimensions for all dimensions.

Finally, Table 2 shows the reliability values for each of the factors of the three scales. As can be seen, most of the dimensions show adequate values for both Cronbach’s alpha and composite reliability (> .70) and AVE (> .50). Only in the dimension of competence to motivate were values lower than the values considered optimal by the literature. Also, the factor of interest in continuous training was found to have a value below .50 in the AVE, although it presented adequate values in the rest of the reliability measures.

**Causal Relations Model**

In the model proposed, the predictor variables are the construct or latent variable referring to the use of digital competencies (DCT), made up of five factors that reflect different areas of digital competence, and the construct of evaluation of the professional competence of football coaches (PCSC), made up of four factors. The dependent or predicted variable is the construct of professional performance of football coaches (PPSC), itself composed of three factors. The use of digital competencies (DCT) is also considered as a predictor variable of the PCSC construct in the model.
The robust maximum likelihood estimation method was used to estimate the model in order to correct for the possible absence of normality in the data distribution. The results of the causal relationship model showed an overall good model fit: \((S-B\chi^2= 3148.46, gl=1405, p<.01);\) \((\chi^2 =3719.08, gl=1405);\) \((\chi^2 /gl=2.65);\) \((RMSEA=.045;\) \(CI=.043-.048);\) \((CFI=.90;\) \(IFI=.90)\). Figure 2 shows the standardized coefficients of each of the relationships that have been found to be statistically significant predictors of the predicted variables.

The model explained 12% \((R^2 =.12)\) of the variance of football coaches’ professional competence evaluation \((PCSC)\) and 41% \((R^2 =.07)\) of the variance of football coaches’ professional performance \((PPSC)\). A statistically significant positive relationship with football coaches’ professional performance was found to exist for both the use of digital competence \((DDC)\) \((\beta=.26, p<.05)\) and football coaches’ professional competence \((\beta=.50, p<.05)\). A statistically significant positive relationship was also observed between the use of digital competences \((DCT)\) and

![Table 2. Reliability of the dimensions of the constructs under study](image)

<table>
<thead>
<tr>
<th>DCT</th>
<th>Cronbach’s alpha</th>
<th>FC</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1. Information and Information Literacy</td>
<td>.84</td>
<td>.85</td>
<td>.58</td>
</tr>
<tr>
<td>Factor 2. Communication and Collaboration</td>
<td>.84</td>
<td>.85</td>
<td>.50</td>
</tr>
<tr>
<td>Factor 3. Digital Content Creation</td>
<td>.90</td>
<td>.90</td>
<td>.51</td>
</tr>
<tr>
<td>Factor 4. Security</td>
<td>.91</td>
<td>.91</td>
<td>.63</td>
</tr>
<tr>
<td>Factor 5. Problem Solving</td>
<td>.88</td>
<td>.88</td>
<td>.59</td>
</tr>
<tr>
<td>PCSC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 1. Motivational competence</td>
<td>.65</td>
<td>.66</td>
<td>.40</td>
</tr>
<tr>
<td>Factor 2. Competence to manage the competition</td>
<td>.80</td>
<td>.81</td>
<td>.52</td>
</tr>
<tr>
<td>Factor 3. Teaching competence</td>
<td>.80</td>
<td>.80</td>
<td>.50</td>
</tr>
<tr>
<td>Factor 4. Competence to develop character</td>
<td>.76</td>
<td>.76</td>
<td>.51</td>
</tr>
<tr>
<td>PPSC</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Factor 1. Interest in lifelong learning</td>
<td>.76</td>
<td>.77</td>
<td>.46</td>
</tr>
<tr>
<td>Factor 2. ICT training</td>
<td>.88</td>
<td>.88</td>
<td>.71</td>
</tr>
<tr>
<td>Factor 3. Self-assessment</td>
<td>.83</td>
<td>.84</td>
<td>.64</td>
</tr>
</tbody>
</table>

![Figure 2. Model of causal relationships between the constructs digital competence use (DTC), professional competence of football coaches (PCFC) and professional performance evaluation of football coaches (PPFC)](image)
the professional competence of football coaches (PCSC) ($\beta=.35$, $p<.05$).

Therefore, it is found that both DCT and PCSC are statistically significant predictors of football coaching performance, while DCT is also a significant predictor of PCSC.

**Discussion**

This study tests the relationship of two independent or predictor hypotheses, linked to the constructs of digital competence in teaching and professional competence of the football coach. A dependent variable and the professional performance of the football coach are also found.

The model also considers as a predictor variable the professional competences of the football coach, referring to the use of digital teaching competences assessed through the questionnaire adapted from Tourón et al. (2018). It can be affirmed that there is a positive relationship between digital competence in teaching and the improvement of professional performance. Based on the reflections generated in the conclusions of other research, this proposal follows a very similar line to that provided by Rodriguez et al. (2018). Currently, there are many limitations in the assessment of digital competence in teaching among sports coaches. Therefore, more research is needed in this context to provide greater rigour in the assessment of football coaches. Access to the evaluation of professional coaches is a complicated challenge due to the very culture of sport in high competition contexts, influenced by factors such as professional secrecy. However, they could be complemented with qualitative studies based on interviews in order to gather information on the role played by technology in training with elite players, as well as in performance and sporting achievements.

As indicated by Vergara et al. (2018), it can be stated that this proposal is a further step in the evaluation of sports coaches and especially in one of the dimensions that allows them to increase their professional performance – the teaching digital competence. As Vergara et al. (2018) point out, there is no uniform scale, in most of the relevant studies, and scales have had to be adapted for the given professional context. This proposal has also had to adapt an assessment scale to the sports coaching community (Tourón et al., 2018) as noted by Vergara et al. (2018).

Regarding the analyses of the role of ICT as a dimension that increases professional performance, this research is in line with Gutiérrez-Castillo et al. (2016), who have shown that ICT is becoming an increasingly important competence in society. When evaluated with a valid and objective scale, it is concluded that ICT increases professional performance. This article supports their conclusions that the increase in the level of digital competence among teachers has a positive influence on professional performance.

As Prendes et al. (2018) point out, in order to improve professional performance at the teaching level, in any institution that wants to train, prepare and provide future teachers, it is necessary to increase the level of digital competence – especially teaching digital competence – among teaching staff. Although this research has evaluated the level of football coaches and Prendes et al. (2018) investigated university teachers, their conclusions are fully in line with our findings. As described in the introduction, training contexts need to increase digital competence and especially digital teaching competence in order to improve the professional performance of education professionals.

According to the conclusions of the study by Suárez-Rodríguez et al. (2018), the pedagogical level of the teaching staff as a whole (Primary Education, ESO and Baccalaureate) is somewhat limited. In this proposal, the level of teaching digital competence of the group of coaches is not very high either. Therefore, as indicated by Suárez-Rodríguez et al. (2012), if training in the development of ICT skills is increased, the level of professional performance improves and increases.

To close the predictive data for the first hypothesis, the positive relationship found in the causal relationship model of this article is explained. The model found a statistically significant positive relationship between teachers’ digital competence and professional performance. It also explains the predictive relationship of the influence of digital competence on professional performance.

Continuing with the second hypothesis, it can be stated that there is a positive relationship between the professional competence of the football coach and the improvement of professional performance. As seen in the results of the present research, the model explained 12% of the variance of football coaches’ professional competence assessment and 41% of the variance of football coaches’ professional performance. A statistically significant positive relationship with the professional performance of football coaches was found to exist in the professional competence of football coaches. It is confirmed that both the scale of evaluation of digital teaching competences and the professional competence of the football coach are statistically significant predictor variables of the professional performance of the football coach.

This aspect is in line with the results found in the proposal by Bolancé et al. (2013) which showed that the increase in the competences of university teachers is reflected in the dimension of self-assessment. This proposal also follows the line of argument of the study by Escudero (2019), which shows that an increase in teachers’ learning and therefore an increase in their professional competences positively develops professional performance.
Finally, the third hypothesis that there is a positive relationship between teaching digital competence and the increase of professional competence of the football coach is also confirmed.

Undoubtedly, the latter hypothesis was more difficult to answer due to the lack of literature linking the two theoretical constructs. However, research by Osmanović et al. (2020) suggests an interest in the use of digital teaching competences and the improvement of coaches’ competences. In fact, although their study did not use the same scales as those used in this research, there are some dimensions that coincide. The work presented in their research is closely linked to the hypothesis put forward, since the main reason for the research was to improve the methodological content of digitalization in physical education. One of the objectives was to see how the management of the physical education class progresses as a result of digital incorporation among the teaching staff. Therefore, the authors affirm the fact that digital competences have a direct impact on the professional competences of coaches.

Conclusions

This paper can argue as a conclusion that the proposed causal relationship model is valid for demonstrating the dependency relationships between the constructs analyzed.

It can be stated that there is a positive relationship between digital competence and the professional performance of coaches. Digital competence in teaching is also a predictor of professional performance. The model found a statistically significant positive relationship with the professional competence of football coaches based on digital teaching competences.

This aspect demonstrates that the change in curriculum education has shown that training in emerging technologies, and especially the use of these technologies by coaches, has a positive impact on their professional performance. UEFA (2015) has reformulated training, and it seems to be a quality future investment in coaching education in today’s society.

On the other hand, a positive relationship was also observed between the professional competence of football coaches and professional performance. Finally, a statistically significant positive relationship was also observed between digital teaching competences and professional competence of football coaches (PCSC).

This aspect shows that mastering the specific aspects of the coaching role improves professional performance. Thus, educating, motivating, teaching, and teaching football players to compete improves professional performance.

It can be concluded that both teaching digital competence and football coach professional competence are statistically significant predictors of football coach professional performance. It can also be stated that teaching digital competence is a significant predictor of the professional competence of the football coach.

As a final conclusion, further research linked to professional performance with the two predictors variables should be conducted, especially for coaches of other team sports. It should be noted that the sample is not representative of the total number of coaches in the Valencian Community. This is due to the fact that no football coach trained by the Regional Government in Education has been selected. This fact, however, motivates the researchers to continue testing the functioning of the scale in other samples of coaches.

Competing interests

There is no commercial interest in the publication of this material.

Funding

There has been no funding.

Bibliography


Moneta, A. (2019). Determinants of academic performance in *Distance Education: Application of a structural equation model* [Universidad Nacional de Córdoba]. Retrieved from https://rdn.unc.edu.uy/bitstream/handle/11086/14007/Moneta%Pizarro%2C%20Adrian%20Maximiliano%20Determinantes%20del%20desempe%C3%B3o%20academico.pdf?sequence=1&isAllowed=y


