

Self-Reported ICT Competences Among Users of the eSavezi Sports Information System in AP Vojvodina: A Cross-Sectional Study

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Abstract

This study examines self-reported information and communication technology (ICT) competences among users of the eSavezi sports information system in AP Vojvodina. A cross-sectional survey was conducted from May 4 to July 17, 2026, with 413 representatives of clubs (19.76% response rate). Data were collected via an online five-point Likert scale questionnaire and analyzed using IBM SPSS Statistics. Item means ranged from 3.25 to 4.43, with an overall item mean of 3.86. The results show that self-reported ICT competences are associated with selected demographic, sport-related, and system-use characteristics. Positive correlations with gender indicate higher scores among female respondents, while positive correlations with type of sport indicate higher scores among representatives of team sports. The results may provide a basis for future user training and further development of digital services within the eSavezi system.

Keywords: digital literacy · sports administration · user training · digital governance

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Introduction

The hardware and software capabilities of the eSavezi system support its smooth functioning. The human factor remains an essential component: representatives of provincial branch sports associations administer the system and maintain its data (Figure 1).

Information and communication technology (ICT) competence refers to the ability to use digital technologies to access, manage, integrate, evaluate and create information. It encompasses technical skills, critical thinking and the application of digital tools for problem-solving and communication.

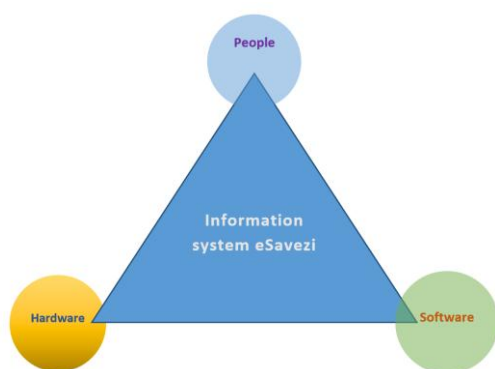


Figure 1. Hardware, software and human factors as pillars of the eSavezi system

The present study is based on a new data collection and examines self-reported ICT competences among representatives of sports clubs, with particular attention to their associations with demographic, sport-related, and system-use characteristics.

The motivation for this research arose from many years of cooperation between the author and representatives of provincial branch sports associations, their member clubs, the Faculty of Sport and Physical Education, the Provincial Institute for Sport and Sports Medicine, and other sports stakeholders in AP Vojvodina and the Republic of Serbia.

Strajnić (2004) emphasized the importance of reliable information as a prerequisite for effective management. Creating and maintaining databases are basic functions of an information system.

The issue of different sectors and data sources within the sports information system has been a topic that sports informatics has been addressing for many years (Baca, 2006).

Entities in sports information systems can include sports associations, sports clubs, athletes, sports

societies, sports experts, sports facilities and sports results (Link & Lames, 2009).

Informatics can be understood as the science of using information to support management and decision-making (Krnet, 2020). Information consists of data that can be used to manage a process. A system is a defined set of interrelated elements forming a whole according to common criteria (Krnet & Bala, 2013).

The organization and management of sports information systems support data collection and information exchange. These systems comprise information, entities and the relationships between them (Krnet, 2020).

Sports science has identified the need for sports organizations to integrate information from different sectors and provide user-specific information, leading to the concept of a sports information system (*Sportart-Informationssystem*; Lames, 1997). Many clubs and associations are implementing such systems and face the challenge of selecting solutions suited to their requirements. Blobel et al. (2021) highlighted the lack of a consistent definition and general requirements for sports information systems.

In previous research, the author dealt with the level of satisfaction of users of the sports information system in the AP Vojvodina, and in the most recent research, representatives of provincial branch sports associations expressed a high level of satisfaction with the improved eSavezi system (Veličković, 2025).

The aim of this cross-sectional study was to examine self-reported ICT competences among representatives of sports clubs using the eSavezi system in the AP Vojvodina and to investigate their associations with selected demographic, sport-related, and system-use characteristics.

Sports Information System in the Autonomous Province of Vojvodina

The Provincial Secretariat for Sport and Youth of AP Vojvodina has invested in developing and improving the eSavezi information system for more than sixteen years. In 2026, the system contained the following categories and numbers of records:

- Provincial branch sports associations: 59.
- Member clubs: 2,090.
- Competition/activity calendars: 7,977.
- Sports experts: 2,448.
- Categorized athletes: 1,891.

- International results: 1,335 in individual sports and 209 in team sports.
- National results: 7,617 in individual sports and 767 in team sports.

The categorization and evaluation of provincial branch sports associations are based on data and documentation entered into eSavezi. The financial resources allocated to associations also depend on the points they collect. To reduce paper documentation and administrative workload and improve efficiency and oversight, an application was developed to automate the submission of annual and special programmes. Its principal functions are:

- Multiple user profiles with different roles: provincial branch sports associations, the Provincial Secretariat for Sport and Youth, and the system administrator.
- Electronic submission of programmes for the following year by provincial branch sports associations:

- Submission and revision of regular annual programmes.
- Submission and revision of special programmes.
- Generation of summary reports for the Secretariat and data export in Word, Excel, PDF and XML formats.

Decisions on financing provincial branch sports associations are based on data and documentation entered into the eSavezi budget implementation application. The quality of submitted annual and special programmes also affects the financial resources approved.

Specialized Information Systems in the Autonomous Province of Vojvodina

Specialized information systems used in individual sports can provide examples of good practice and models for further development of eSavezi (Table 1).

Table 1. Specifications of specialized sports information systems

Information system	Sports branch	Services
Information system of Association Sport for all Vojvodina	Sport for all	Full competition management, making bulletin
Application for complete competition management system in the Volleyball Association of Vojvodina	Volleyball	Full competition management, live results
CARE System of Judo Federation of Serbia/Vojvodina	Judo	Full competition management, challenge system
Sports Map of the Autonomous Province of Vojvodina	Sport Association	Drones, 360 degree cameras
Mobile application of the Serbian Handball Federation	Handball	Mobile technologies (Android and iOS)

Several specialized digital solutions are already used in Serbian sport, including competition-management platforms, video-analysis systems, sports-facility databases and mobile applications. These examples illustrate opportunities for integrating specialized digital services with eSavezi.

The research gap concerns the self-reported ICT competence profile of eSavezi users and its associations with demographic, sport-related and system-use characteristics. These findings may inform future development of an online learning module intended to support users' competences and the quality of data and documents entered into the system.

Methods

Research problem

The research problem concerns self-reported ICT competences among sports club representatives using eSavezi and their associations with selected demographic, sport-related and system-use characteristics.

Research hypotheses

The research hypotheses are:

H1: Representatives of sports clubs using the eSavezi system will report generally moderate-to-high levels of self-reported ICT competences.

H2: Self-reported ICT competences will be significantly associated with selected demographic, sport-related, and system-use characteristics of the respondents.

Description of the research sample

In 2026, the target population consisted of 2,090 sports clubs registered within the provincial branch sports federations of AP Vojvodina. An invitation to participate in the online survey was distributed to all eligible clubs, with one representative per club invited to complete the questionnaire. The cross-sectional survey was conducted from May 4 to July 17, 2026. A total of 413 valid responses were obtained, corresponding to a response rate of 19.76%.

Research methods, techniques and instruments

The study combined theoretical content analysis, descriptive statistics and correlation analysis. Data were collected using an online questionnaire administered through Google Forms. The questionnaire contained five general questions (gender, type of sport, sport tradition, use of the basic system, and experience with specialized systems) and 20 self-reported ICT competence items. The study-specific items underwent independent expert evaluation.

Statistical analysis

Data were analysed using IBM SPSS Statistics. Frequencies, percentages, means (M) and standard deviations (SD) were used to describe the sample and responses. Cronbach's alpha was used to assess internal consistency. Associations between the

selected respondent characteristics and ICT competence items were examined using Spearman's rank correlation coefficient (ρ). Statistical significance was assessed at $p < .05$.

Given the relatively large number of item-level correlation tests, these analyses were considered exploratory, and statistically significant associations were interpreted cautiously, with particular attention to the magnitude of the correlation coefficients.

Questionnaire content

The general questions were coded as follows: gender (1 = male; 2 = female), type of sport (1 = individual; 2 = team), sport tradition (1 = up to 30 years; 2 = up to 50 years; 3 = over 50 years), use of the basic system (1 = not at all; 2 = mostly not; 3 = partially; 4 = mostly; 5 = completely), and experience with specialized systems (1 = yes; 2 = no).

The 20 ICT competence items were developed for this study by the author of the eSavezi system, based on its principal functions and associated digital tasks. Items P1–P10 address the basic system, whereas P11–P20 address specialized sports information systems and related technologies (Table 2). This distinction reflects the study's focus on potential improvements to eSavezi.

Table 2. Self-reported ICT competence items

Item	Self-reported ICT competence
Use of the basic system	
P1	I can search the database and filter data for my branch association within the eSavezi system.
P2	I can export data from a database into specific formats (Word, Excel, XML, PDF) for my branch association within the eSavezi system.
P3	I can search the database and filter data for my club within the eSavezi system.
P4	I can export data from a database into specific formats (Word, Excel, XML, PDF) for my club within the eSavezi system.
P5	I can update the database and submit data for my club within the eSavezi system in the tables for clubs, competition calendars, athletes and sports experts.
P6	I can update the database and submit data for my club within the eSavezi system in the international results table.
P7	I can update the database and submit data for my club within the eSavezi system in the national results table.
P8	I can update the database and submit data for my club within the eSavezi system in the provincial results table.
P9	I can apply for financial support and submit data for my club within the eSavezi system - an application for budget implementation.
P10	I can submit a financial report and provide data for my club within the eSavezi system - an application for budget implementation.

Item	Self-reported ICT competence
Use of specialized systems and technologies	
P11	I can use a competition management application within my branch association to register competitors and teams, enter and process results, and create competition bulletins.
P12	I can use a data analysis application within my branch association.
P13	I can use a performance tracking application within my branch association.
P14	I can use a distance learning application within my branch association.
P15	I can use portable devices within my branch association.
P16	I can use computer simulations within my branch association.
P17	I can use sensors within my branch association.
P18	I can use software applications within my branch association.
P19	I can use mobile applications within my branch association.
P20	I can use cameras within my branch association.

Note. Response options: 1 = strongly disagree; 2 = mostly disagree; 3 = partly agree; 4 = mostly agree; 5 = completely agree.

Questionnaire reliability

Internal consistency of the 20 ICT competence items was assessed using Cronbach's alpha.

The questionnaire showed high internal consistency in this sample (Cronbach's $\alpha = .948$; standardized $\alpha = .949$; Table 3).

Table 3. Internal consistency of the ICT competence questionnaire

Cronbach's α	Standardized α	Items
.948	.949	20

Results

Descriptive statistics

The item means in Table 4 indicate relatively high self-reported competence in submitting international and national results (P6, P7), submitting financial reports (P10), using performance-monitoring applications (P13), computer simulations (P16) and mobile applications (P19). Lower scores were observed for searching and filtering club data (P3) and using competition-management applications (P11).

Table 4. Descriptive statistics for system use and ICT competence items

Variable / item	<i>M</i>	<i>SD</i>
Use of basic system	3.76	0.91
P1	3.97	0.86
P2	4.00	0.91

Variable / item	<i>M</i>	<i>SD</i>
P3	3.31	1.15
P4	3.97	1.09
P5	3.80	1.09
P6	4.32	0.89
P7	4.10	1.11
P8	3.85	0.99
P9	3.41	1.08
P10	4.16	1.01
P11	3.25	1.11
P12	3.62	1.07
P13	4.08	1.05
P14	3.73	1.07
P15	3.72	1.08
P16	4.43	0.84
P17	3.82	1.16
P18	3.89	1.03
P19	4.19	0.93
P20	3.61	1.25

Note. $N = 413$ for every item. M = mean; SD = standard deviation. Competence items were rated from 1 to 5; see Table 2 for item wording.

Correlation analysis

Spearman's correlations were used to examine associations between the five selected respondent characteristics and the 20 ICT competence items. The coefficients are presented in Table 5.

Table 5. Spearman correlations between respondent characteristics and ICT competence items

Item	Gender	Type of sport	Sport tradition	Use of basic system	Experience with specialized systems
P1	.070	.196**	.096	.377**	-.118*
P2	.074	.133**	.044	.431**	.001
P3	.075	.236**	.020	.309**	-.034
P4	.156**	.189**	.064	.303**	-.192**
P5	.192**	.095	-.096	.387**	-.274**
P6	.071	.205**	.051	.259**	-.025
P7	.104*	.238**	.060	.368**	-.092
P8	.062	.173**	.074	.348**	-.218**
P9	-.018	.089	.176**	.269**	-.142**
P10	.210**	.040	-.064	.294**	-.050
P11	-.014	.047	.082	.249**	-.248**
P12	.050	.118*	.119*	.288**	-.264**
P13	-.011	.286**	.055	.210**	-.194**
P14	.076	.155**	.038	.168**	-.116*
P15	.146**	.303**	.068	.302**	-.179**
P16	.197**	.137**	-.065	.257**	-.137**
P17	.037	.149**	.006	.232**	-.095
P18	.041	.224**	.085	.248**	-.080
P19	.200**	.110*	.011	.169**	-.134**
P20	-.009	.224**	.181**	.155**	-.076

Note. $N = 413$. Gender: 1 = male, 2 = female; type of sport: 1 = individual, 2 = team; experience with specialized systems: 1 = yes, 2 = no. * $p < .05$. ** $p < .01$. Associations are exploratory; no correction for multiple comparisons was applied.

The response distributions are presented in Table 6. For P1, concerning database searching and filtering, responses 4 and 5 predominated. For data export (P4), 41.65% selected the highest response option. High scores were also observed for submitting international and national results (P6 and P7). For financial report submission (P10), 51.33% selected

the highest option. Relatively high scores were observed for performance-monitoring applications (P13), mobile applications (P19) and computer simulations (P16). Lower scores were observed for applying for financial support (P9) and competition-management applications (P11), suggesting potential areas for user support.

Table 6. Distribution of responses to ICT competence items (%)

Response	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
1	0.00	0.00	7.02	2.91	3.15	0.00	0.97	0.97	2.18	0.97
2	5.08	5.08	16.95	7.02	6.05	4.36	11.62	7.26	17.92	5.57
3	23.49	26.63	30.99	21.79	33.90	15.25	16.46	30.51	38.26	21.31
4	40.92	31.96	27.85	26.63	21.31	23.97	18.64	28.81	20.10	20.82
5	30.51	36.32	17.19	41.65	35.59	56.42	52.30	32.45	21.55	51.33
Response	P11	P12	P13	P14	P15	P16	P17	P18	P19	P20
1	5.33	1.94	1.94	1.94	3.15	0.00	4.12	0.00	0.00	5.08
2	20.34	12.35	5.33	9.44	8.23	2.42	9.20	10.41	5.08	16.22
3	33.66	34.62	23.49	34.14	31.96	15.25	25.67	27.36	20.34	26.15
4	25.42	24.21	21.07	22.28	26.63	18.89	22.76	25.18	24.70	17.43
5	15.25	26.88	48.18	32.20	30.02	63.44	38.26	37.05	49.88	35.11

Note. $N = 413$. Responses: 1 = strongly disagree; 2 = mostly disagree; 3 = partly agree; 4 = mostly agree; 5 = completely agree. Percentages may not total 100 because of rounding.

Discussion

Practical implications include the need for continuous technical updates, regular training for administrators and users, and integration with other specialized systems to further enhance operational efficiency. Future research should explore longitudinal impacts of upgrades, cross-regional comparisons, and potential links between user satisfaction and broader ICT competences development.

The sample comprised 62.23% male and 37.77% female respondents. Representatives of individual sports accounted for 82.81% and representatives of team sports for 17.19%. Clubs established up to 30 years previously accounted for 60.53% of the sample; those in the second sport-tradition category accounted for 8.72%, and those established more than 50 years previously accounted for 30.75%.

The mean rating for use of the basic eSavezi system was 3.76. Experience with specialized systems was reported by 47.21% of respondents, indicating that such experience was not universal within the sample.

Respondents generally rated their ICT competences as moderate to high, with an overall item mean of 3.86. The highest scores concerned international and national results submission (P6, P7), financial report submission (P10), performance-monitoring applications (P13), computer simulations (P16) and mobile applications (P19). Searching and filtering club data (P3) and competition-management applications (P11) had the lowest scores and may therefore warrant particular attention in user training.

The standard deviations for most items are around 1, which indicates moderate variability in responses, i.e. the existence of differences among respondents in their assessment of their own ICT competences. The descriptive findings generally supported H1.

Table 5 shows exploratory associations between self-reported ICT competences and selected respondent characteristics. Ratings of basic-system use were positively associated with all 20 competence items ($r = .155-.431$). The strongest associations involved database searching and filtering (P1) and data export (P2). Positive associations were also observed for updating and submitting data (P5, P7 and P8). These findings concern self-reported competences and should not be interpreted as evidence of objectively measured performance.

Gender showed small statistically significant associations with selected competences, including data export, database updating, financial report submission, portable devices, computer simulations and mobile applications (P4, P5, P10, P15, P16 and P19). Positive coefficients indicate higher scores among female respondents. Positive associations with type of sport indicate higher scores among representatives of team sports. Sport tradition showed small associations with applying for financial support and using cameras (P9 and P20). Experience with specialized systems showed negative associations with several items (P4, P5, P8, P9, P11, P12, P13, P15, P16 and P19).

Therefore, a negative correlation between this variable and an ICT competence item generally indicates that respondents who have experience with specific systems tend to report higher competence scores. The correlation analysis identified statistically significant associations between selected respondent characteristics and individual ICT competence items, providing partial support for H2.

Limitations of this study include its regional scope and reliance on self-reported measures. The relatively large number of item-level correlation tests represents an additional limitation of the study. As no formal correction for multiple comparisons was applied, individual statistically significant associations should be interpreted cautiously and considered primarily exploratory.

Possible future development directions include creating new functions and services or integrating existing solutions for competition management, data analysis, computer simulations, performance analysis and video use. Portable devices, sensors and mobile applications could also be considered. Distance-learning resources may support users' ICT competences, including digital content production, computer simulations and the use of artificial intelligence in administrative work. These are potential development directions rather than needs directly established by the present survey.

The development of professional ICT competences among future sports specialists also warrants attention, particularly in distance-learning and practical training settings (Kulyk et al., 2023).

One of the recommendations for future research is that similar research should be conducted on a sample representing representatives of branch sports associations in the Republic of Serbia.

Conclusion

This study described self-reported ICT competences among eSavezi users and their exploratory associations with selected demographic, sport-related and system-use characteristics. Respondents generally reported moderate-to-high competences. Positive correlations with gender indicated higher scores among female respondents, while positive correlations with type of sport indicated higher scores among representatives of team sports. Most associations were small in magnitude, despite being statistically significant. The results may help identify priorities for user support and training. Possible future activities include online support resources, qualitative interviews about ICT integration into routine work, opportunities for exchanging international practice, and workshops on video analysis, mobile applications and distance learning.

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