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Managerial activity of future physical education teachers aimed at building a positive image using visual technologies

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With the integration of technology and social media in education, there is increasing interest in innovative approaches to enhance managerial skills among prospective physical education and sports teachers. The integration of technology and social media into education has prompted interest in exploring innovative methods to enhance the managerial skills of prospective physical education and sports teachers. This study investigates the impact of an intervention on the managerial skills of fourth-year students majoring in Physical Culture and Sports across three educational institutions in Kazakhstan. Out of 564 participants, 355 were eligible for analysis: 167 used chatbots and 188 followed conventional classroom methods. The intervention included a 4-week team management course starting in January 2022. Chatbot users accessed various materials such as short lecture videos, stories, assignments, infographics, and audio sequences, while conventional learners attended standard lectures and practical sessions. Following the course, participants undertook a 12-week teaching practice, with chatbot users also maintaining an active Twitter presence to build a positive image as future physical education teachers. Managerial skills were assessed using a 44-item questionnaire, covering Conceptual, Human, and Technical skills. Additionally, social media popularity was measured based on Twitter activity. Results showed that both groups significantly improved their Conceptual, Human, and Technical skills after the course. Chatbot users demonstrated greater improvement in Technical skills ($p = 0.003$, $d = 1.139$), while conventional learners showed stronger Human skills ($p = 0.021$, $d = 1.32$). Specifically, the mean score for Technical skills increased from 2.71 to 3.76 for chatbot users and from 2.65 to 3.20 for conventional learners. Moreover, chatbot-aided learners further enhanced their Conceptual and Human skills through social media engagement. Correlation analysis indicated a close relationship between managerial skills and social media popularity. These findings have significant practical implications for the education and development of prospective physical education and sports

teachers. Integrating chatbots and social media into educational settings offers innovative approaches to enhancing managerial skills.

KEYWORDS

chatbot, managerial skills, PE teacher, social cognitive theory, social networks

1 Introduction

The education system is intended to adapt to the challenges and needs of its time, offering new approaches and learning requirements (Aliyu and Talib, 2020; Sánchez and Bernal, 2022). The generation born in the 21st century, also known as “digital natives”, is spending more and more time in the virtual world. This generation views social media as an essential element of their daily lives (Carril et al., 2019; Muciño et al., 2021).

Social media has changed how companies and communities create, receive, consume and share information (Baccarella et al., 2018). The success of social media platforms such as Facebook, YouTube, TikTok, Instagram, Pinterest, Twitter and even WhatsApp stems from their ability to adapt to the dynamic social context of users and evolve as technology becomes more complex (Stellefson et al., 2020). Athletes, clubs, federations, and sports companies use social media to develop and sell their personal brand (Geurin and Burch, 2017). It is an increasingly important tool for coaches and college administrators to connect with fans, alumni, and recruits (Jensen et al., 2014).

The use of social media for educational purposes, including in the field of sports, has attracted considerable attention from investigators (Carril et al., 2019). Some researchers entertained the possibility of using information and communication technologies (ICTs) in physical education (Escola, 2018; González et al., 2018; Díaz Barahona et al., 2019). Despite the benefits that these technologies bring to the industry, there are some drawbacks that come with social media engagement, such as cyberbullying, trolling, invasion of privacy, misinformation, and gadget addiction (Baccarella et al., 2018). Therefore, it is vital to understand the potential risks associated with poor social media management (Carril et al., 2019).

A few decades ago a teacher was required to be an expert and provide a full range of knowledge; however, the current age shifted this requirement with diverse pathways to knowledge (Moraes et al., 2023). As the technology advanced, it became possible to employ artificial intelligence to solve a wide range of problems. The clearest example of the change that has taken place in the education system is the integration of digital assistants, or chatbots. These computer programs are designed to simulate conversation with human users (Adamopoulou and Moussiades, 2020).

Education chatbots promote learning by providing various types of information through an easy-to-use interface (Hwang and Chang, 2021). They can help learners improve their academic performance (Wu et al., 2020) and provide them with enjoyable learning experience via real-time conversations (Hill et al., 2015; Kim et al., 2019).

Another distinctive feature of contemporary education is personalized-learning: the belief is that students cannot and should

not learn in the same way, and that new technologies can bring flexibility into the teaching and learning process (Rose, 2022). In other words, a transition from an expert teacher to a manager-teacher has occurred.

In the West, researchers show interest in the professional training of either sports managers (Jones et al., 2020; Lis and Tomanek, 2020) or physical education (PE) teachers (Hill et al., 2018; O’Sullivan, 2021). In developing countries, hiring a sports management professional to host a school-level sports event may not be possible due to financial limitations, so the responsibility usually falls on the shoulders of the PE teacher.

Some researchers in developing countries pointed out that a teacher needs to handle managerial activities (Sabokro et al., 2018; Ibay and Pa-alisbo, 2020; Opstoel et al., 2020; Fatullaeva, 2022), but have not yet considered it through the potential of building a certain image on social media. Therefore, these countries should redefine teacher education with management training that involves the use of social media. Today’s education needs a teacher-manager that is experienced in management and is able to create conditions conducive to student development and predict students’ behavior in new contexts. The lack of high-quality research on the managerial activity of PE teachers in the social media context seems to be a gap to close.

By examining the administrative behaviors of PE teachers in the context of social media consumption, this research aims to solve these issues. This study aims to add to the larger conversation on teacher education and professional development in the digital era by investigating how PE instructors use social media platforms to improve student engagement, build community ties, and manage possible hazards.

This research study has two aims: first, it will evaluate how physical education instructors currently manage social media platforms and the difficulties they encounter; second, it will investigate practical ways to use social media to improve teaching and learning outcomes in physical education and sports.

This study will use a mixed-methods approach, combining quantitative analysis of social media usage trends with qualitative interviews with PE teachers, to achieve these objectives. With the help of this thorough methodology, methods for successfully integrating social media into educational practices will be informed, leading to a nuanced knowledge of the challenges surrounding social media management in sports and physical education.

The relationship between social media and education, as well as its effects on sports and physical education, has been thoroughly studied over the years. Within these categories, researchers have examined a variety of topics, including community building, professional development, and student involvement. Even while previous research has put a spotlight on the function of social media in educational experiences, limited information is known

about the particular administrative tasks that physical education (PE) instructors must complete to make successful use of social media platforms.

To optimize teaching and learning results, physical education (PE) teachers have to understand how to use social media platforms. This study attempts to fill that knowledge gap. Through an examination of the management practices employed by physical education teachers while employing social media, this research offers useful perspectives and suggestions that support teacher preparation and professional growth in the digital era.

1.1 Theoretical background

According to the social cognitive theory (SCT), human behavior is regulated by forethought. A person's motivation and action depend upon two factors (Luszczynska and Schwarzer, 2015): (1) perceived self-efficacy (an ability to perform a specific action to achieve a desired outcome); (2) outcome expectation (a belief about the consequences of an action). The expected outcome can be physical (pleasure/discomfort), social (public recognition), and self-evaluative (Lin and Chang, 2018). Sharing information on social media generates both social recognition and self-satisfaction (Linton, 2017). It provides incentives and personalized guidance for the pursuit of desired change (Bandura, 2002).

Modern realities are such that a person receives a large amount of information through the Internet daily. Visual images help to interpret the world and form certain beliefs, mental representations and worldview (Rose, 2022). Meantime, the visual culture influences one's understanding of the world around them and their self-concept (Han, 2017). Social media users receive symbolic messages regarding their body aesthetics, physical activity, and health through visual images (González-Calvo et al., 2022). These images can be powerful enough to inform subsequent behavior (Walton-Fisette et al., 2017).

Researchers have already raised questions about how PE teachers' understanding of their bodies affects their teaching (Wrench and Garrett, 2015; González-Calvo et al., 2019). PE teachers are commonly seen as (bodily) role models for students (Cale et al., 2014; Varea, 2018). At the same time, the authors of the present study failed to find any works devoted to the influence of visual images in social media on the managerial activities of future PE teachers.

1.2 Managerial skills in physical culture and sports

Management training in physical culture and sports has been in place since the 1970s (Takayama et al., 2017). In Western Europe, former athletes began to study the general theory of management at universities and receive degrees in organizational management or economics. This practice partially helped to adapt to market demands (Cini and Borragán, 2022). In the 1980s, higher education institutions in the United States and Canada began to regularly train highly specialized managers in areas such as baseball, boxing, and golf (Kryshtanovych et al., 2021). In Western Europe, on the contrary, the education system produced general

managers who could work in a diverse range of sports organizations (Kryshtanovych et al., 2021).

In developed Western countries, sports are the core component of the media-involved entertainment business; this rings true for both amateur teams and professional sports clubs (Kryshtanovych et al., 2021). There are separate areas of development and specialties in sports management education. In Spain, for instance, Master's students have the opportunity to master the innovative approaches for professional team management and learn how to create new market opportunities, do branding, and select sponsors (Kryshtanovych et al., 2021). They also acquire finance skills, such as financial reporting project/event finance. For comparison, in Italy, there is a Lifestyle Management program in action that provides competencies needed to start a career in a sports-related setting (Kryshtanovych et al., 2021).

In Asia and Eastern Europe, PE teachers are expected to possess management skills. Fatullaeva (Fatullaeva, 2022), for example, mentions organizational, didactic, perceptual, communicative, and suggestive, and research abilities, as well as speech skills. The organizational skill refers to the ability to manage the class, set tasks, share responsibilities, and perform common tasks. Didactic abilities revolve around the preparation of educational materials. The perceptual capability refers to an ability to determine and objectively assess the mental and emotional state of students. The communicative ability is the ability to communicate with students and colleagues in accordance with pedagogical goals. The suggestive ability is the ability to convince students of their capabilities. The research skill refers to an ability to study and evaluate pedagogical situations. Finally, speech capability is the ability to make a clear and persuasive speech.

Higher education institutions tend to prioritize human skills, as indicated in (Ibay and Pa-alisbo, 2020; Opstoel et al., 2020). These include, but are not limited to, good-temper, communicational skill, conducting a meeting, intra-organization relations, and team inspiration.

1.3 Effects of social media on PE teachers' professional activity

Social media platforms provide PE teachers with a place to build a professional learning community with their colleagues and students (Goodyear et al., 2019; Luo et al., 2020). According to some researchers, online discussions within such communities result in the development of new practices that teachers can integrate into the classroom (Goodyear et al., 2019). The use of social media can help PE teachers gain, among other things, enhanced knowledge and skills, as well as facilitate collaboration (Carpenter and Harvey, 2020), but it also comes with challenges (Hyndman and Harvey, 2019). The primary concerns are that social media provides access to unverified content (Carpenter and Harvey, 2020), fails at providing adequate training privacy, and stimulates the excessive technology use (Hyndman and Harvey, 2019). Regarding inclusiveness, some researchers present social media as an alternative source of professional knowledge for teachers who provide PE services to students with disabilities (McNamara et al., 2021).

The primary question that this study seeks to answer is as follows: Is visual technology effective in fostering PE teachers with excellent management skills? The present study aims to assess the effect an image-building intervention on the managerial skills of students majoring in Physical Culture and Sports. Hypothetically, the use of a chatbot (H1) and social media engagement (H2) can effectively instill managerial skills in PE teacher-students. The combination thereof is expected to be more effective than traditional learning. Another hypothesis holds that the level of management skills is directly dependent upon the popularity of the social media account used (H3).

2 Methods

2.1 Participants and procedures

The study initially involved 564 students from the following three educational institutions in Kazakhstan: the Kazakh Academy of Sports and Tourism (Almaty), the M. Utemisov West Kazakhstan State University (Uralsk), and the Pavlodar State Pedagogical University (Pavlodar). Of those, only 355 were considered eligible to participate in further analysis (Figure 1): 167 were chatbot users, and 188 were conventional learners. The selection criteria were fourth-year students majoring in Physical Culture and Sports, with basic teaching experience, who completed at least 70% of the Team Management course (this includes both lectures and practical assignments). All subjects were practising teaching at the time of study.

Participants started a 4-week learning course aimed at fostering team management skills at the beginning of January 2022 (Figure 1). Throughout this course, some students were using a chatbot, while others took classes within classroom walls.

The chatbot implementations took various forms, including watching short lecture videos and YouTube clips, crafting and absorbing stories, taking thematic assignments, using checklists, viewing infographics, and listening to audio materials. The conventional program comprised 1 h per week of lecture time and 2 to 3 h per week of practical work. The theoretical and practical materials provided to chatbot users were comparable with those of the conventional learners. Students using a chatbot spent no more than 10 min a week watching video content and received a great deal of infographics, sometimes accompanied by an explanatory audio sequence. Conventional learners got no additional materials and had to take lecture notes.

Upon completion of the training course, the 12-week teaching practice began. The trainees were sent to different schools to teach students in grades 6–9. In addition, the chatbot users were asked to be active on Twitter where they had to build a positive visual reference, or image, for their future assignments (see Experiment 2; Figure 1). In this study, to be considered “active”, students had to post at least 4 tweets per week.

2.2 Measure

The study uses a 44-item questionnaire to assess managerial skills grouped into three categories based on the Katz’s framework

(Sabokro et al., 2018): Conceptual skills (15 items), Human skills (17 items), and Technical skills (12 items). Each item is scored on a 1 to 5 scale, where 1 is “Strongly disagree” and 5 is “Strongly agree”. The scores of Cronbach’s alpha were as follows: Conceptual skills, 0.87; Human skills, 0.76; Technical skills, 0.79.

The popularity of a PE teacher student on social media was measured based on social activity, i.e., as the total number of Tweets and the number of Retweets it receives. The formula is as follows (Tur-Viñes and González-Río, 2021):

$$\text{Popularity score} = \text{Number of Tweets} + \text{Number of Retweets}$$

2.3 Ethical issues

The study protocol was approved by the Ethics Committee of West-Kazakhstan Innovative-Technological University. Participants were informed about the nature of the study and its goals. Personal information was not saved. Participants were guaranteed anonymity.

3 Results and discussion

3.1 Testing H1 and H2

The goal of the Team Management Course was to teach student how to manage a team. The course was effective with both chatbot-aided and conventional learners (Table 1). There were differences, however. While chatbot users enhanced their Conceptual ($p = 0.041$, $d = 1.088$) and Technical skills ($p = 0.003$, $d = 1.139$), those who were learning in a classroom setting improved more in Human skills ($p = 0.021$, $d = 1.32$). Based on the intergroup comparison, chatbot users had statistically better Technical skills compared to conventional learners ($p = 0.026$, $d = 0.823$), and conventional learners had considerably better Human skills ($p = 0.018$, $d = 1.22$).

Chatbot users were then asked to build a positive image of themselves as PE teachers on Twitter. At this stage of the study process, conventional learners acted only as a control group. After 12 weeks of the image-building routine (Time 2), the control group failed to considerably enhance their Conceptual ($p = 0.651$, $d = -0.08$), Human ($p = 0.418$, $d = -0.032$), and Technical skills ($p = 0.091$, $d = 0.162$). The chatbot-aided learners, on the other hand, succeeded at improving their Conceptual ($p = 0.035$, $d = 0.809$) and Human skills ($p = 0.023$, $d = 1.218$) due to activity on social media. Yet, their level of technical skills was unchanged ($p = 0.74$, $d = 0.045$).

In the present study, the conceptual criteria behind the PE teacher student’s managerial competency are discipline, creativity, prioritization, awareness of rules and regulations, innovative methods, flexibility, and reflection. Here, both groups were able to significantly improve their results between Time 1 and Time 2. At the same time, there were no significant differences between groups after the intervention ($p = 0.712$, $d = -0.31$). With that in mind, we cannot unequivocally say that a chatbot was more effective in developing flexibility, creativity, time management and other conceptual factors compared to classroom sessions. During the second stage of the study, only chatbot users achieved a significant

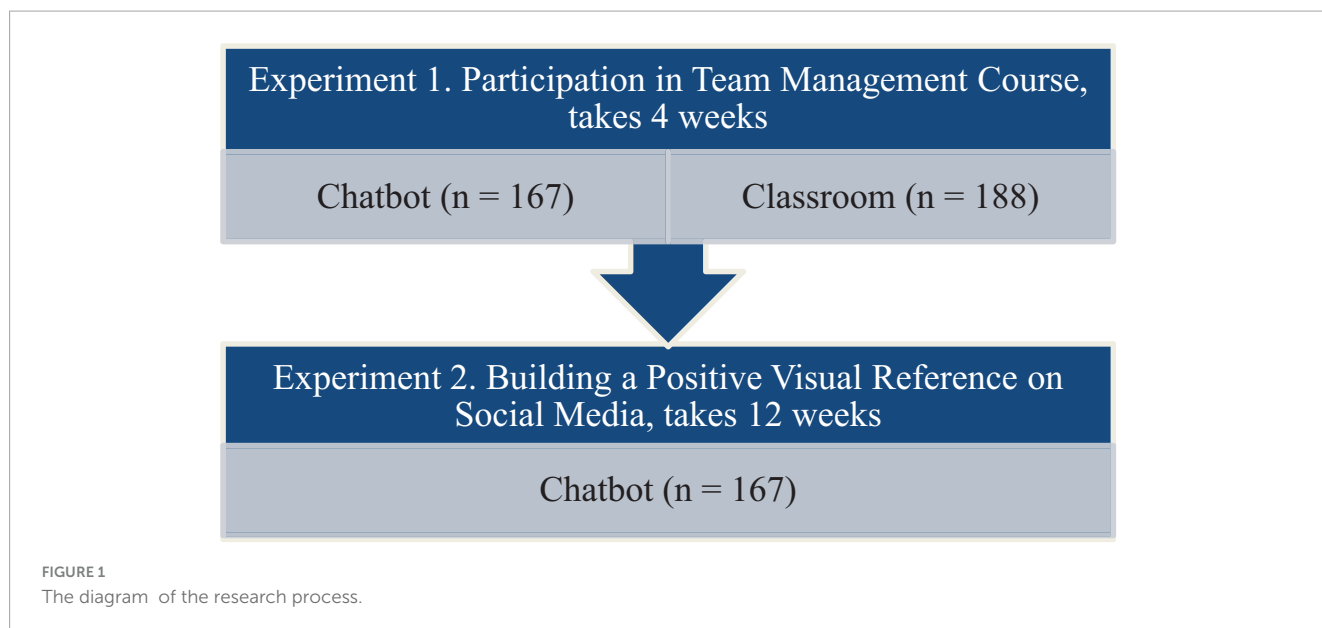


FIGURE 1 The diagram of the research process.

TABLE 1 Descriptive statistics for the central variables and t-statistic at all time points.

Managerial skills	Time 1		Time 2		p	d	Time 3		p	d
	Mean	SD	Mean	SD			Mean	SD		
Team Management Learning						Online Image Building				
Chatbot users										
Conceptual skills	2.92	0.56	3.54	0.58	0.041*	1.088	4.11	0.81	0.035*	0.809
Human skills	3.14	0.61	3.21	0.66	0.514	0.028	3.95	0.55	0.023*	1.218
Technical skills	2.71	0.59	3.76	0.72	0.003*	1.139	3.79	0.62	0.74	0.045
Conventional learners										
Conceptual skills	3.11	0.66	3.34	0.71	0.046*	0.336	3.28	0.78	0.651	-0.08
Human skills	3.18	0.62	3.96	0.56	0.021*	1.32	3.94	0.67	0.418	-0.032
Technical skills	2.65	0.54	3.2	0.6	0.038*	0.964	3.31	0.75	0.091	0.162
Intergroup differences										
Conceptual skills					0.712	-0.31			0.016*	1.13
Human skills					0.018*	1.22			0.087	0.24
Technical skills					0.026	0.823			0.034	0.66

*Significant difference ($p < 0.05$).

level of Conceptual skills, but it was as expected, for the control group did not participate in the image-building assignment. The effect of the intervention was strong ($d = 1.13$).

The Human criteria include kindness, effective communication, intra-organizational relationship, motivation, and conflict management. After the training, the level of Human skills was higher among conventional learners ($p = 0.018$, $d = 1.22$), but the chatbot-aided students managed to slightly outperform them after completing the image-building intervention; the effect of the said intervention happened to be rather strong ($d = 1.218$).

The Technical factors were the delegation of authority, allocation of resources, methods and techniques, performance monitoring tools, and the ability to implement knowledge. During the course, chatbot users were the only students to achieve a statistically significant improvement in the technical level

($p = 0.003$, $d = 1.139$). The image-building intervention was ineffective in this regard, such that the chatbot users failed to considerably improve their managerial experience and authority delegation skills ($p = 0.74$, $d = 0.045$).

3.2 Testing H3

The participants sent out an average of 75.63 Tweets over 12 weeks (Table 2). The number of Retweets per Tweet fluctuated widely between users, 64 being the minimum number and 874 the maximum. The popularity score averaged to 290.83 (SD = 140.12).

The correlation coefficient (R) is 0.672, indicating a rather close relationship between managerial skills and the teacher student's popularity on social media.

TABLE 2 Descriptive statistics for students' popularity on Twitter.

	Minimum	Maximum	M	SD
Number of Tweets	48	96	75.63	27.44
Number of Retweets	64	874	215.20	112.68
Popularity score	112	970	290.83	140.12
R	0.672			

This study suggests that visual technologies are effective in developing management skills among PE teacher students. The use of a chatbot (H1) was proven partly helpful, as chatbot-aided learners developed better Technical skills compared to conventional learners, but lagged behind in Human skills. Active participation in social media (H2) also had a substantial boosting effect. The managerial skills also seem to be closely related to the extent to which a student is active on social media (H3). These findings coincide with the latest research (González-Calvo et al., 2022; Xu et al., 2023) where scholars emphasized the importance of social media for professional development and self-presentation. Fatullaeva (2022) argues in order to effectively manage the physical culture of schoolchildren, it is important that the PE teacher not only be a good planner, organizer, communicator of the knowledge, but also have a pleasant appearance, be responsive and open to communication. In this study, the popularity of students in social media was built on creating such a positive image.

Jensen et al. (2014) studied the popularity of football coaches in social networks. The team's success on the field and the personality of the coach himself were the most important factors highlighted by the authors, while the number of enrolled students and school's prestige level showed little correlation with the popularity of the coach's social media account. If so, many PE programs with smaller budgets may be more popular on social media than those with larger budgets where no effort to enhance the popularity of the coach is made. This study elaborates on this conclusion made by Jensen et al. (2014) with the idea that having a positive image on social media is important.

Opstoel et al. (2020) described the experience of integrating the skills of top management into a physical education organization. Using an analytical hierarchy approach to analyzing the role of managerial skills, the authors found a strong association between these skills (conceptual, human, and technical) with organizational learning, with conceptual skills having the most impact.

Even through using a chatbot and being active on Twitter had an impact on managerial skills, it is best to make an informed decision about whether to use of these tools and how to use them to achieve a specific goal. The PE teacher students who participated in the study were informed about the need to manage a Twitter account, and they agreed to it and completed the task with more or less enthusiasm. These were individuals who were open to new ideas and experiences in social media. Yet, a considerable percentage of teachers may not want to engage with social media, may not see the need for it, and may not be motivated to form an image. This category of educators requires a different approach to the formation of managerial competencies.

3.3 Limitations and prospects

This study touches upon issues related to chatbot-aided delivery of PE teacher education and social-media account management. The study experiment, however, was limited to instilling and enhancing managerial skills and building a positive image of PE teacher students in social media, whilst many important and extensive topics, such as the potential of chatbots and social media engagement, were ignored. Due to the current study design, no interviews were made. Future research on the effectiveness of ICT tools in education should consider presenting a content analysis of interviews. Finally, some researchers have examined the impact of cyber-bullying, misinformation and privacy risks in social media (Xu et al., 2023), which the present study overlooked. Future study should close this gap.

Given the popularity of social-media platforms among children and adolescents, more studies are needed to expand our understanding of how they perceive and emulate the visual image of their PE teacher and to find out how this can be implemented. It seems best to explore the non-academic digital sources that can be potentially used for PE improvement from different perspectives: teacher interviews, student interviews, and university reports. It is also important to deepen our knowledge about the potential of chatbots as tools to improve the professional competencies of PE teachers, for this study failed to unequivocally confirm or refute the hypothesis that they are effective in teaching. The potential of these two ICT tools (chatbot, Twitter) in PE teacher preparation is yet to be fully explored.

4 Conclusion

The present findings can serve as a platform to improve education programs for PE teachers and coaches. The study suggests that the chatbot-aided learning is effecting in instilling and enhancing technical management skills, while the classroom-based mode of learning to good for the development of human management skills. This information can be useful to PE teachers and sports organizations. Yet, if we look at the results more globally, then the given tools (chatbot, Twitter) can be helpful in promoting public health among children and adolescents.

The study suggests that a positive image in social media can promote managerial skills. A competent PE teacher of the current age can make use of chatbots to acquire some of the knowledge they miss. Having a social media account expands their pathways to interact, get ideas, and build a visual reference for their students.

The expectation this study holds is that the present findings will enhance the awareness of the importance of modern non-academic digital sources for learning. Research at the intersection of pedagogy, computer science and communications seems to be an in-demand and fresh solution for the sports industry.

Data availability statement

The original contributions presented in this study are included in this article/supplementary material, further inquiries can be directed to the corresponding author.

Ethics statement

The study protocol was approved by the Ethics Committee of West-Kazakhstan Innovative-Technological University. Participants were informed about the nature of the study and its goals. Personal information was not saved. Participants were guaranteed anonymity. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

SR: Writing – review and editing, Writing – original draft, Funding acquisition, Formal analysis, Data curation, Conceptualization. MT: Writing – original draft, Resources, Project administration, Methodology, Investigation. RK: Writing – review and editing, Visualization, Validation, Supervision, Software. GK: Writing – original draft, Visualization, Methodology, Formal analysis, Conceptualization. AG: Writing – review and editing, Supervision, Resources, Project administration, Investigation, Formal analysis. JK: Writing – original draft, Validation, Resources, Methodology, Investigation, Formal analysis, Conceptualization.

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