Influence of teachers' ICT skills on the adoption of an e-learning management system in Sport Psychology during the COVID-19 pandemic

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Abstract

This paper analyzes the effects of technical skills, i.e., information and communications technology (ICT) skills, in adopting e-learning systems in sports psychology using the Madrasati platform (MP) during the COVID-19 pandemic in Saudi Arabia. In this regard, Web-based questionnaire survey responses on the Madrasati forum are investigated. Statistical significance was established using IBM SPSS Statistics (SPSS) software with a Cronbach's alpha value of 0.607 and a p-value of less than 0.05. The study concluded that during the COVID-19 pandemic, by a shift to e-learning and distance education in sports psychology, 62.7% of students had improved ICT skills compared to their email skills. Furthermore, using the Madrasati platform for e-learning did not require a detailed course explanation, with 48.4% of students with high skill levels also in agreement. Finally, a demographic comparison of students' ICT skills with students' characteristics showed that with students using the Madrasati platform, the students' ICT skills were highly improved. Reliability statistics of the research hypothesis showed a Cronbach's alpha value of 0.607 and a Cronbach's alpha value based on the standardized item of 0.552, indicating quite a high level of internal consistency for our scale with this specific sample.

Keywords: E-learning, ICT skills, COVID-19, teachers' influence, sports psychology.

1. Introduction

With today's recent advancements in technology and increased communication in various fields worldwide, the use of computers and knowing their importance are considered urgent needs among educators, policymakers, and the general public. The transition to using computers in our daily lives leads to economic effects and increased national competitiveness. With computers used in almost every field of life due to their effectiveness, students also need to use them for study purposes. Both e-learning and traditional learning greatly vary, and to study the differences; a detailed study is performed in Tawafak et al. (2019). However, a lack of awareness and 'integration with computers in students' studies show that this process needs to be better determined to function at the utmost level.

The educational process that uses the internet so students can study from a distance is known as online learning. This type of learning is better for students and their family members as students can study more efficiently at home, and their parents can monitor their study activities. If students cannot attend school (their educational institution), they can easily continue their studies using an online learning system. In the current COVID-19 pandemic and lockdowns, in which restrictions on physical distancing are in place, e-learning has begun to play a more significant role in enabling students to continue their studies (Singh & Thurman, 2019). Now a day, e-learning is growing in the field of sports psychology. Sports psychology involves psychological knowledge, skills to address optimum performance, the welfare of athletes, social elements of sports involvement, and systemic issues connected with sports settings and organizations. Students' psychological knowledge and skills development become easy with the help of a well-managed e-learning management system.

Around 850 million students worldwide are affected by the COVID-19 pandemic. Their educational institutions are closed due to lockdown restrictions designed to stop the spread of COVID-19. This has destroyed the general routine of studying and teaching for students and teachers of sports psychology worldwide. A country's education system cannot be stalled for a long time; therefore, educational institutions have sought help through online learning with its different learning platforms for teacher-student interaction and student studies. Some well-known platforms and interfaces used for online learning are Microsoft Teams, Zoom, FaceTime, Google Meet, etc. To improve study methodology, the online learning system, and to move towards restoring education, on 8 March 2020, the Saudi Arabia Ministry of Education announced the rapid adoption of an online learning system and the increased capacity of different software. It was to help teachers and students to continue with their general study plans. Online classrooms and study have been significant globally in continuing normal educational system methodology throughout this pandemic (Agung, Surtikanti, & Quinones, 2020).

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Software programs for online learning and teaching were developed some years ago: even before the COVID-19 pandemic, these software programs and platforms were functional. However, educational institutions only used them as a spare or supplemental study methodology. Online software programs were not used very often before the pandemic among institutions related to sports psychology. For this reason, students and teachers were not appropriately technologically aware of their utilization. However, the pandemic has forced teachers and students to employ online learning as no other solution was available for continuing students' studies, hence the switch to online e-learning (Abidah et al., 2020).

In today's pandemic situation, delivering online e-learning software is a high priority, with its perceived utilization solely for educational purposes in sports psychology but from both students' and teachers' perspectives. It is critically important to have easy usability of the software interface for teachers and students. A good and easy interface guarantees a user-friendly environment that, in turn, leads to an efficient education system. Considering male and female students' online learning system needs, the Madrasati platform (MP) was chosen as a reference benchmark.

The internet-based web technology currently used by educational institutions globally and involving an electronic learning methodology is termed "a learning management system." Depending on the different levels of students' skills in information and communications technology (ICT), online learning has different levels of effectiveness for different students. For instance, a student with a good knowledge of computers can obtain much more help from an online education system than a student who is not very aware of, or knowledgeable about, the use of computers. Sport psychologists can help athletes cope with competitive fears, improve mental skills and prepare for competitions. Research has been conducted on the effects of ICT skills on online learning system adoption: it has been found that ICT expertise and knowledge of computers play an essential role in online learning. The current study "evaluates the impact of different levels of students and teachers ICT skills in the field of sports psychology on adopting an online learning system during the COVID pandemic, utilizing Learning Management System (LMS) and Madrasati platform interfaces. Effective use of ICT skills is essential in various strategies, especially in educational systems in sports psychology, to avoid gaps between digital communications and exclusions of members of society from different services. A teacher of ICT skills must have basic computer skills, without needing to be a computer "geek," so e-learning can be easily managed.

It should be noted that nearly all computer programs share standard features and icon badges, meaning that skills learned in one program are also usually transferable to any other program. For teachers of computer and ICT skills, having these skills allows them to manage various features of the e-learning management system using the Madrasati platform and enables them to manage emails skillfully. For a teacher of ICT skills, some basic computer skills they need to master include skills in spreadsheets, word processing, electronic presentation, database management, internet navigation, networking, email management, and touch typing. A teacher of ICT skills who have skills in the use of an e-learning platform can reduce their workload by using technology in practical ways.

As previously mentioned, new platforms, such as Google Meet, Microsoft Teams, etc., have been introduced for teachers and students during the COVID-19 pandemic. In contrast, a detailed study on TAM, MOOC, and UCOM is investigated in Tawafak, Malik, and Alfarsi (2020); Tawafak, Romli, and Arshah (2018). For the smooth operation and proper utilization of LMS, which enables teachers to convey information and knowledge to students, appropriate guidelines have been provided to students and their parents. Research has shown the effectiveness of using an online learning system, but it has been chiefly higher education students who have used it (Tandon, 2021). To date, few studies have been conducted with a specific focus on adopting online learning by students and teachers.

To the author's knowledge, this may be the first study conducted in Saudi Arabia on the influence of teachers' ICT skills on online education using the Madrasati platform in sports psychology. Many previous studies examined sports psychology; however, the e-learning system is rarely introduced. Similarly, previous studies addressed online learning systems to cope COVID-19 pandemic situation. However, the online education system in sports psychology is not well-developed in the literature. These ICT skills also include knowledge about and use of the basic features of the computer. An ICT teacher must have at least basic computer skills for managing emails and skills in using an e-learning platform.

Furthermore, computers are the filing cabinets of the 21st century, and most lesson plans, resources, and reports are now created, shared, and saved on computers. To ensure their work is not lost, a teacher of ICT skills must know how to back up files, which will give them experience in online project work. As most teachers are also students, teachers must take part in group projects. Thus, to fully benefit students, teachers themselves must become involved in some online projects. This builds good social networking skills among students, among teachers, and between students and teachers.

Today, an educational learning platform provides services through an online classroom for students at primary and secondary levels in Saudi Arabia. However, proper management of the website and software is required. Many students are connected simultaneously while using a single platform for submitting their work; therefore, the website may undergo excessive traffic. However, educational e-learning platform is also needed to introduce to facilitate athletes.

From a worldwide perspective, the transition from a traditional classroom environment to online learning in all fields, including sports psychology, is rapidly evolving daily. Different software and devices, such as laptops, and smartphones equipped with software such as WhatsApp and Facebook, help people communicate with each other easily (Tiyar & Khoshsima, 2015). Online learning cannot be said to be a very new concept as popular online learning interfaces, like EdX, Coursera®, etc., have been used by people worldwide for a long time. However, they have still not been adequately integrated into schools and other educational institutions (Al-Rahmi et al., 2019; Palacios Hidalgo, Huertas Abril, & Gómez Parra, 2020). The pandemic has affected all types of educational institutions, ranging from kindergarten to higher levels of education. This has also affected countries' economic and growth curves globally, as education plays a vital role in a country's development. Therefore, the shift to online learning tends to occur in educational institutions so they can continue with their teaching schedule (Pal & Vanijja, 2020).

Software programs and platforms for online learning and teaching were developed some years ago and were functional even before the commencement of the COVID-19 pandemic. However, as previously stated, educational institutions only used them as a spare study methodology, treating them as supplemental. However, the COVID-19 pandemic has forced educators and teachers to use only online educational methods (Abidah et al., 2020). Due to the current pandemic, the transition from conventional teaching methodologies to online learning has been abrupt, also occurring in the middle of the ICT skills process in various educational institutions. Online learning and the digitization of knowledge require time to reach maturity, as no proper planning was done before the pandemic to address the issues of teachers and students in adopting e-learning (Tawafak et al., 2020).

Generally, online learning systems are internet-based teaching methodologies for tracking, distributing, and managing educational courses worldwide. They help to provide bidirectional communication between teachers and students. Teachers can also arrange polls, chat rooms, and quizzes to share, check and review data by students and teachers. Different types of online platforms are being used by educational institutions, such as Google Meet, Microsoft Teams, Moodle, and LMS, followed by video conferencing applications, such as Skype for Business, Skype, WebEx, Adobe Connect, etc.

With the recently increased employment of online learning tools due to the COVID-19 pandemic, their effectiveness regarding learning and teaching needs to be assessed and checked from the perspectives of different stakeholders. For these reasons, the current study explores the advantages and limitations of e-learning in Saudi Arabia in the context of sports psychology, as highlighted by the perceptions of faculty members and students. This study is crucial as the Ministry of Education of Saudi Arabia is currently implementing and developing a robust online learning environment for educational institutions across the country (Mukhtar et al., 2020). Research in this field could identify critical changes needed as e-learning matures with time. This study can help practitioners enhance athletes' skills and their psychological condition. The results of this study are helpful for policymakers to develop essential strategies in the education system of sports psychology.

This study evaluates teachers' perspectives on the online Madrasati platform system established in Saudi Arabia. Analysis of users' perspectives was also conducted to discover the factors involved in users' satisfaction, based on which the evaluation of their satisfaction was established.

This paper is organized as follows: Section 2 presents the literature review, whereas Section 3 discusses the online learning system. This is followed in Section 4 by discussing ICT and online teaching and learning. Section 5 presents the research methodology, results, and 'user satisfaction discussion, while Section 6 summarizes the study and concludes the paper.

2. Literature review

Different ICT tools are available in the current era for sharing and creating knowledge. These include the internet, mobile phones, radio, laptops, computers, tablets, and other accessories. Some of these ICT tools, such as computers, laptops, and mobile phones, are currently being utilized for educational purposes in e-learning and m-learning in game-based program learning (Malik et al., 2020).

A person's abilities can be enhanced by providing education using ICT programs. The current era has prompted people worldwide to use online learning, employing new technologies to educate students from kindergarten to higher levels. In 2020, researchers (Qaddumi, Bartram, & Qashmar, 2021) identified the wide range of benefits of using ICT in education services and

found the new online ways more efficient. These benefits include the increased potential to consider individual differences, providing support to acquire computer literacy and computer skills, acquiring good digital habits, and increasing the speed and efficiency of the learning process by developing new problem-solving skills for people involved in education.

2.1. Online learning or e-learning

The two main types of online distance learning are synchronous and asynchronous learning. Synchronous learning is an old teaching methodology in which interaction co-occurs between student and teacher via a video call. All questions and answers are dealt with simultaneously (Singh & Thurman, 2019). In summary, synchronous learning is a form of active learning. The reason is that both teacher and student communicate face to face, and the real-time exchange of ideas occurs. In an asynchronous learning methodology, students and teachers rarely meet face to face; teachers upload educational material with students working following their schedules (Littlefield, 2018). An online platform must be of sufficient quality so that at least 40–50 students can collaborate in a conference, uploading or downloading data without hanging up or having connection breakdown. The platform must be accessible from mobile phones as some students may not have access to, or availability of, personal computers or laptops. Students must also be able to record lectures (Basilaia et al., 2020).

The various advantages of online learning are discussed next. Using an online system reduces the learning time and makes education more affordable. Students can quickly investigate study material whenever they want, regardless of time. Data can easily be shared between students and teachers at any time. Furthermore, online learning is not limited to the classroom: instead, students can obtain a large amount of study time and become more involved in the learning process (Rohmah, 2011; Verawardina et al., 2020).

3. Online Learning System

3.1. Benefits of online learning for students

The development and enhancement of new technology in our current technological world have accelerated in all countries worldwide. Thus, technical skills are now a key area of competence in personal and professional settings. Educational institutions and schools are now responsible for implementing strategies for students so they can obtain new knowledge and become future professionals. Teachers have a vital role in implementing these strategies, guiding students in using new technologies, which is considered a prerequisite for enhancing skills. In models of school effectiveness and development, it has been found that the professionalism of teachers is a critical element in students' achievements in the class use of the latest technology (Drossel & Eickelmann, 2017). ICT platform provides valuable opportunities for sports psychology students to gain valuable knowledge all over the globe. ICT advances convenience and enlarges the digital environment in sports and physical education. It not only helps a student earn knowledge, but it also assists the student in connecting and communicating with the world.

For students, learning is very flexible as they can study regardless of distance, space, time, or the COVID-19 pandemic. An easy interface is provided for teachers and students to conduct and participate in question-and-answer sessions, discussions, assignments, and activities through chat (Verawardina et al., 2020). Teachers also find the online teaching method to be good as they can create effective teaching methods. They also have flexibility in teaching and learning activities, especially in situations like the COVID-19 pandemic. It is easy for teachers to upload new course materials and update other course materials according to the syllabus. With teachers playing the role of mentors in students' lives, online teaching provides a more convenient way to keep a good track record of students and whether they have been working according to the syllabus. The teacher can quickly rectify any error in a student's work from home, thus making e-learning very efficient and effective (Verawardina et al., 2020).

3.2. Benefits of online learning for teachers

From teachers' perspectives, many challenges arise in transitioning from conventional teaching methods to online learning. It is difficult to involve students in their studies and to assure them that the link between student and teacher from an educational perspective is the key to progression. Furthermore, it is difficult for teachers to write and develop content that helps students with their studies and encourages them to be engaged in their studies. An educational sports psychologist prefers to use psychological approaches to assist athletes in advancing sports performance. Although the online learning methods used during the COVID-19 pandemic are appreciated, work is still required to significantly improve the learning and teaching standard (Tandon, 2021). Even though technology could be optimized, not every technology is easy to access. Issues include errors when downloading data and materials, problems with audio and video visuals and communication problems, and difficulties during registration and logging in. These issues lead to some students finding online teaching boring. A frequent distraction in online learning is that students like to see what they are shown rather than solely the documentation of what they are being taught (Nuraini et al., 2020).

It is more efficient and desirable for students to have two-way communication in online learning, but this is sometimes difficult to achieve in the modern asynchronous learning mode. The learning process is incomplete if students cannot practice what they have learned. Students sometimes find these courses boring if they receive solely theoretical lessons in their studies. Due to the lack of practical experience, students do not obtain comprehensive knowledge. Students also cannot accept the desired output from their assessed learning content, which is a significant issue. Students experience technical problems and difficulties understanding the content provided by teachers, with these also some of the online learning problems (Nuraini et al., 2020).

Students using online learning do not always have a stable schedule for their work due to their surrounding environment and family. They require a separate space where they will not be disturbed. Students face some restrictions enforced by their families; therefore, it is difficult for them to create a suitable timetable for themselves. With online learning, students are often less prepared due to familial interactions. This low level of student readiness does not guarantee maximum output from the online learning system (Parkes, Stein, & Reading, 2015). 'Students parent parents must understand these difficulties; however, in many cases, parents of students are not well educated and may find it hard to know the importance of e-learning in sports psychology.

Other issues for students and teachers when using an online learning system are the lack of computer knowledge and experience. Similarly, the education system faces several challenges in sports psychology (Asken, 1991; McDougall, Nesti, & Richardson, 2015). These challenges increase the level of resistance of teachers and students to the use of online learning software as they find it hard to adopt. Research indicates that a vast and thorough knowledge of ICT skills and computers can make online learning fruitful for students and society (Almaiah & Alyoussef, 2019).

3.3. Online teaching during COVID-19 school closures

Various fields, such as tourism and health sectors and different countries' economies, are being affected by the current COVID pandemic worldwide. After the health sector, the most affected sector is the education sector. During the pandemic, it is evident that the education system worldwide is badly affected to a great extent. The number of affected students from March 2020 to April 2020 has increased from 300 million to 1.6 billion, drastic and alarming figures. Due to the rapid spread of the pandemic, countries worldwide have had to find other ways to keep their educational systems uninterrupted for a long time. Data from the United Nations Educational, Scientific, and Cultural Organization (UNESCO) in 2020 show that approximately 92% of students worldwide have had their education affected by the current pandemic. In March 2020, only six countries had closed their schools; however, a month later, 195 countries implemented school closures (Tandon, 2021).

The ongoing pandemic has posed some serious challenges to teachers regarding adopting online education. Until March 2020, the typical teaching methodology was conventional, even in sports psychology. Students went to schools and attended their classes, whereas teachers delivered lectures according to their assigned class schedules. Formal lectures were conducted by teachers, with bidirectional communication between students and teachers. Students worked in their classes simultaneously as their peers, either in groups or individually (König, Jäger-Biela, & Glutsch, 2020).

Conversely, the use of ICT was minimal (Fraillon et al., 2020; Gewerkschaft Erziehung und Wissenschaft (GEW), 2020) in education related to sports psychology because athletes require more physical training and exercise. Lockdowns applied to schools and educational institutions during the pandemic situation, thus prompting educators to seek alternative schooling methods (König et al., 2020). Teachers had to shift to online methodologies, new tools, and new interfaces to teach students and continued to seek the latest approaches for effective schooling (Eickelmann & Gerick, 2020). The teacher's role was to share academic content with students, thus continuing their teaching and education, and contact students to account for their social integration with their learning groups.

Due to the pandemic, a rapid transition occurred from conventional teaching methods to online learning systems. This happened at a time when ICT processes were being developed by educational institutions (McFarlane, 2019). Digitization in schools also gained significant prominence. The gap needs to be closed and removed between conventional learning and student development at schools and the new digital skills that are a primary need for youth entering our world today. This gap can be closed using ICT skills that provide students with opportunities to be creative, use advanced technology, and be innovative in problem-solving techniques. To respond to the rapidly developing ICT processes in educational institutions, the categories of teachers' knowledge must be extended to incorporate the new challenges associated with ICT processes and online learning methodology (König et al., 2020).

4. ICT and Online Teaching and Learning in Sports Psychology

Sport psychologists can help athletes cope with low performance, return after injury, and develop pregame routines or routines before a shot. It can advance practice efficiency, cope with hardship, perform better under the pressure of competition, manage expectations, keep the confidence and handle the psychological pressure of the big event. Along with the physical practice and training, it also requires valuable knowledge to implement better strategies while playing in which ICT is essential.

Electronic or online learning (e-learning) is also called "technology-enhanced learning (TEL)" and is a solely dependent ICT process (Yamada, 2015). Information and communications technology (ICT) is a significant aspect of implementing online learning technologies in our education system. It includes the availability of a fast internet network, acquisition and installation of the latest technology; maintenance; security; administration; uninterrupted electricity supply, and technical support. At the same, it needs to be kept in mind that some developing countries lack expert personnel for ICT maintenance and implementation (Aung & Khaing, 2015).

Electronic learning barriers in sports psychology can be categorized into two classifications: non-material barriers and material barriers. Lack of ICT and lack of information are under the category of material barriers (Almanthari, Maulina, & Bruce, 2020). As shown in the literature review, a lack of ICT skills, technological issues, and financial limitations and constraints are found to be the fundamental challenges of online learning and are faced equally by teachers and students in adopting the virtual education setup in both developed and developing countries (Almaiah, Al-Khasawneh, & Althunibat, 2020). In this regard, the e-learning setup during COVID-19 in Nigeria is studied in Adeoye, Adanikin, and Adanikin (2020), whereas authors in (Dhawan, 2020; Jena, 2020; Kumar et al., 2020; Mathivanan et al., 2021; Tripathy & Devarapalli, 2021) thoroughly investigated e-learning system influences in India during COVID-19 time.

5. Research Methodology

The study's data was obtained from a web-based questionnaire containing various closed-ended questions covering geographic and socio-demographic data. Questions on other characteristics and aspects of sports psychology student life, such as social life, academic work, emotional energy, transition in habits, personal circumstances, and personal reflections on the COVID-19 pandemic, followed this.

The web-based questionnaire is comprised of seven sections. The first section had eight questions on students' academic and socio-demographic characteristics, namely, the institution and country of study in the 2020 spring semester (northern hemisphere), the field and level of study, age, gender, and citizenship (see Table 1). The second section comprises 12 questions mainly related to student's academic lives. The questions were then asked about their experience teaching and studying during the COVID-19 pandemic and how it affected their lives, supervision, workload and assessment, administrative support and teaching, and their expectations and respective performance. The following section covered skills and infrastructure for distance learning, with two questions on students' conditions for studying from home and their ICT and computer skills.

General education in the Kingdom of Saudi Arabia comprises kindergarten, six years of primary school, and three years of intermediate and high school. This cross-sectional study was conducted with a questionnaire among general education system students of sports psychology. Students at various levels, primary, intermediate, and high school, from the Kingdom of Saudi Arabia, were invited to participate in the web-based survey. This web-based questionnaire survey analyzed responses from 290 student participants, with the number of primary students being $n_p = 83$, intermediate students being $n_i = 79$, and secondary students being $n_s = 128$ students. Responses from all completed questionnaires were statistically analyzed in detail using frequency tables and figures.

5.1 Statistical results: analysis and discussion

The survey responses were analyzed with descriptive statistics, for example, frequency tables and figures used to illustrate the results. Moreover, a chi-square test was used to identify statistically significant differences. In this study, Cronbach's alpha value for the survey/questionnaire was 0.607. In total, 290 participants completed the survey, except for the question on a big issue in using the Madrasati platform (MP), which had 11 missing values as these had been left blank. Questionnaires used in this paper were structured based on their validity in previous studies (Alkhalaf et al., 2021; Alturise, 2020, 2020; Alturise et al., 2022).

The statistical data analysis was conducted using IBM SPSS Statistics (SPSS) software. All categorical variables, such as a student's gender and school, were presented as numbers and percentages. A chi-square test was used, which helped to determine significant associations between categorical variables. If a p-value was less than 0.05, it was considered a statistical significance.

Based on responses to the web-based questionnaire survey, the 290 student participants were from various cities, of both genders, of different educational levels, used other devices for e-learning, and may or may not have previously faced an e-learning platform. From the analysis shown in Figure 1(a), most student participants (227, 78.3%) were female students, while only 63 (21.7%) were male students. Furthermore, Figure 1(b) shows the educational levels of student participants, revealing that 28.6% of students were at the primary level, 27.2% were intermediate, and 44.1% were secondary students. Only 32.1% of students were previously aware of this e-learning platform, as shown in Figure 1(c), on which most students had not been trained, as shown in Figure 1(d). Finally, as shown in Table 1, during the COVID-19 pandemic, the shift to e-learning and distance education was new to 67.9% of student participants in the different cities of Saudi Arabia. Detailed investigation of the operating devices used for distance e-learning revealed that the highest percentage of students (52.4%) used a mobile phone, whereas 16.9% used a laptop, and 15.9% used a tablet. Only 3.1% preferred to use a desktop computer. Analysis in the current study concluded that a mobile device was more accessible in the distance e-learning for accessing the Madrasati platform and was preferred by students as a mobile device can be operated from anywhere. The detailed quantitative analysis, as presented in Table 1, shows that 51.7% of student participants spent more than four hours daily using the internet platform.

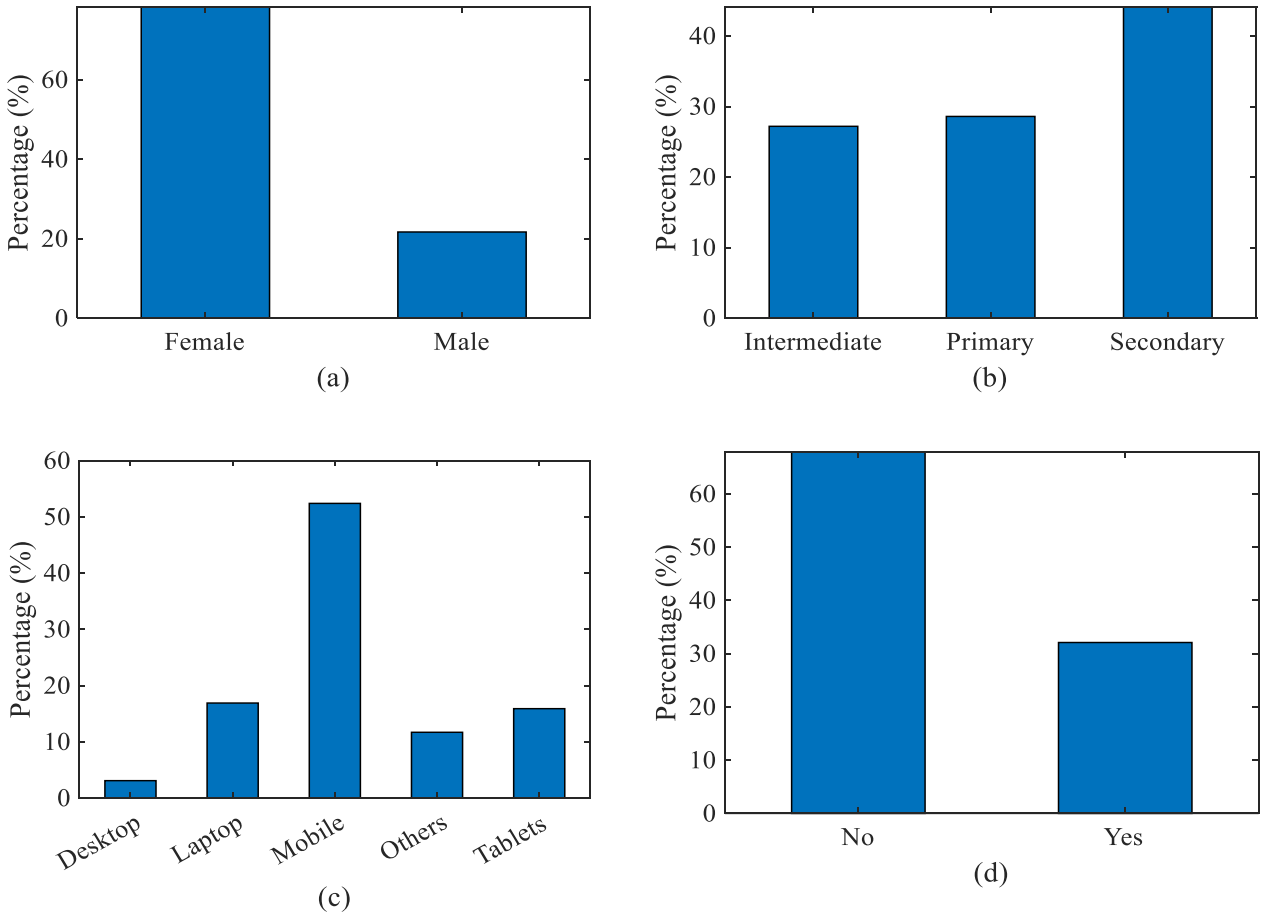

Fig. 1. Demographic characteristics of student participants based on: (a) gender; (b) educational level; (c) device used; and (d) awareness of the use of the e-learning platform

In addition, the analysis of the quantitative categorical variables, as shown in Figure 2(a), reveals that 55.6% of student participants agreed that their ICT skills had improved in using computers to access the internet, with only 13.5% not agreeing. Moreover, as shown in Figure 2(b), 56.6% of students agreed that using the Madrasati platform as their distance e-learning platform was straightforward, which also helped them improve their computer skills. As shown in Figure 1(d), 32.1% of students had used the Madrasati platform for e-learning. Therefore, from Figure 2(c), 50.3% of students agreed that their previous experience using the Madrasati platform had helped them use this platform for e-learning, as shown in Figure 2(d).

Table 1

Demographic characteristics of student participants (n=290)

Characteristics	Categories	n (%)
Gender	Female	227 (78.3%)
	Male	63 (21.7%)
School	Primary	83 (28.6%)
	Intermediate	79 (27.2%)
	Secondary	128 (44.1%)
City	Riyadh	96 (33.1%)
	Macca	60 (20.7%)
	Medina	24 (8.3%)
	Qassim	80 (27.6%)
	Other	30 (10.3%)
Type of internet connection used	DSL	126 (43.4%)
	Mobile network	103 (35.5%)
	Fiber optics	54 (18.6%)
	Other	7 (2.4%)
Type of device most often used to access the Madrasati platform	Desktop	9 (3.1%)
	Laptop	49 (16.9%)
	Tablet	46 (15.9%)
	Mobile	152 (52.4%)
	More than one device	34 (11.7%)
How many hours do you usually spend in a day on your device (using the internet)?	< 1 hour	51 (17.6%)
	1–2 hours	42 (14.5%)
	3–4 hours	47 (16.2%)
	> 4 hours	150 (51.7%)
Did you use any e-learning platforms before?	Yes	93 (32.1%)
	No	197 (67.9%)

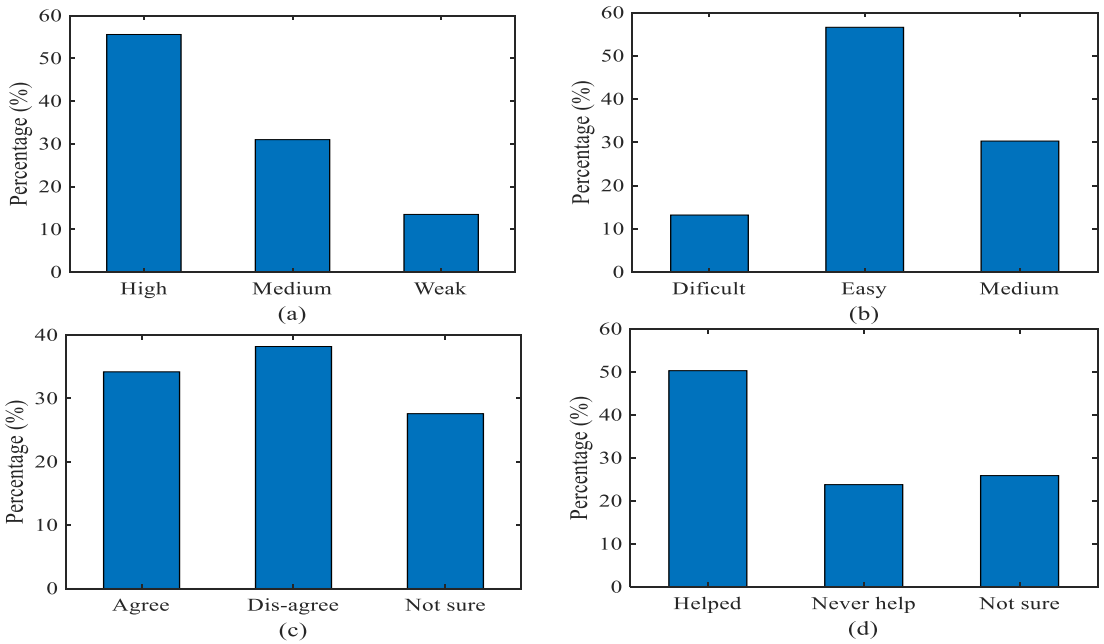

Fig. 2. Categories of student participants' characteristics: (a) ICT skills; (b) difficulties in using the Madrasati platform (MP); (c) MP helped to brush up on ICT skills; and (d) previous ICT skills helped in using MP

To analyze students' characteristics and ICT skills, a research-based hypothesis was developed based on the web-based questionnaire survey that comprised eight questions (Q1–Q8), as listed in Table 2. Based on testing Table 2's hypothesis, details of students' characteristics and their ICT skills are shown in Figure 3(a-d) and Figure 4(a-d).

Analysis and comparison of students' demographic characteristics and ICT skills revealed several aspects. As

shown in Figure 3(a), students who spent more time per day using the internet improved their skills. Responses to the web-based questionnaire survey showed that students who used the internet for more than 4 hours a day had significantly improved their ICT skills, with this agreed by 62.7% of students. This was low compared to improvement in email skills at 50.3%, with a medium amount of time spent on the internet per day, as shown in Figure 3(b). As shown in Figure 3(c), only 32.1% of students were aware of the Madrasati platform and had used the e-learning platform. Therefore, students' previous experience was not dominant, with only 6.23% agreeing that their prior experience helped them use the Madrasati platform for distance e-learning, as listed under student characteristics in Table 2.

Regarding doing a course or receiving an explanation on the Madrasati platform's uses for e-learning, as shown in Figure 3(d), 61.2% of students rated this as weak, clearly indicating that students did not require a detailed explanation when using the Madrasati platform. As clearly shown, 48.4% of students with a high level of skills agreed that they did not require a course or an explanation to use the Madrasati platform. This was further justified by students' skill levels, which increased with the Madrasati platform, as shown in Figure 4(a). As can be seen, 43.3% of students agreed that using the Madrasati platform increased their ICT skills. In contrast, students with weak skills disagreed that the increase in ICT skills was mainly due to their rare previous experience using the Madrasati platform. However, both new and old students who had used the Madrasati platform thought that using the Madrasati platform for e-learning was very easy, with this agreed by 57.7% of students, as shown in Figure 4(b). The overall analysis of students' characteristics and their ICT skills was also performed at different school levels (as shown in Figure 4[c]) and with different genders (as shown in Figure 4[d]), where most participants were female. The analysis concluded that at all school levels, namely, primary, intermediate, and secondary, most students indicated that using the Madrasati platform was accessible at all school levels. Details of the comparison of student levels with student characteristics are listed in Table 2.

Table 2

Comparison of student participants' level of ICT skills with student participants' characteristics

S.No	Students' characteristics		Students' level of ICT skills		
			Very weak skills/Weak skills	Medium skills	High skills/Very high skills
Q1	Hours a day using the internet	< 1 hour	13 (33.3%)	18 (20%)	20 (12.4%)
		1–2 hours	8 (20.5%)	15 (16.6%)	19 (11.8)
		3–4 hours	8 (20.5%)	18 (20%)	21 (13%)
		> 4 hours	10 (25.6%)	39 (43.3)	101 (62.7%)
Q2	Skills in using email	Not used	23 (58.9%)	31 (34.4%)	27 (16.7%)
		Very high	1 (2.5%)	10 (11.1%)	45 (27.9%)
		Medium	9 (23%)	39 (43.3%)	81 (50.3%)
		Low	6 (15.3%)	10 (11.1%)	8 (4.9%)
Q3	Previous ICT skills helped you in using MP	Never helped/did not help	22 (56.4%)	28 (31.1%)	19 (11.8%)
		Not sure	8 (20.5%)	38 (42.2%)	29 (18%)
		Helped/ helped me	9 (23%)	24 (26.6%)	113 (70.1%)
Q4	Did you do a course or receive an explanation on using the MP?	I did not do a course or receive an explanation	24 (61.5%)	32 (35.5%)	59 (36.6%)
		I did a short/intensive course or received a short explanation	9 (23%)	32 (35.5%)	24 (14.9%)
		I did not need courses or explanations	6 (15.3%)	26 (28.8%)	78 (48.4%)
Q5	Do you think using the MP helped increase your ICT skills?	Strongly disagree/not agree	29 (74.3%)	32 (35.5%)	50 (31%)
		Not sure	6 (15.3%)	33 (36.6%)	41 (25.4%)
		Agree/ agree	4 (10.2%)	25 (27.7%)	70 (43.4%)
Q6	What do you think of using the MP?	Very difficult/ Difficult	17 (43.5%)	10 (11.1%)	11 (6.8%)
		Not that difficult	13 (33.3%)	36 (40%)	39 (24.2%)
		Easy/Very easy	9 (23%)	44 (48.8%)	93 (57.7%)
Q7	School level	Primary	18 (46.1%)	26 (28.8%)	39 (24.2%)
		Intermediate	10 (25.6%)	23 (25.5%)	46 (28.5%)
		Secondary	11 (28.2%)	41 (45.5%)	76 (47.2%)
Q8	Gender	Male	15 (38.4%)	23 (25.5%)	25 (15.5%)
		Female	24 (61.6%)	67 (74.5%)	136 (84.5%)

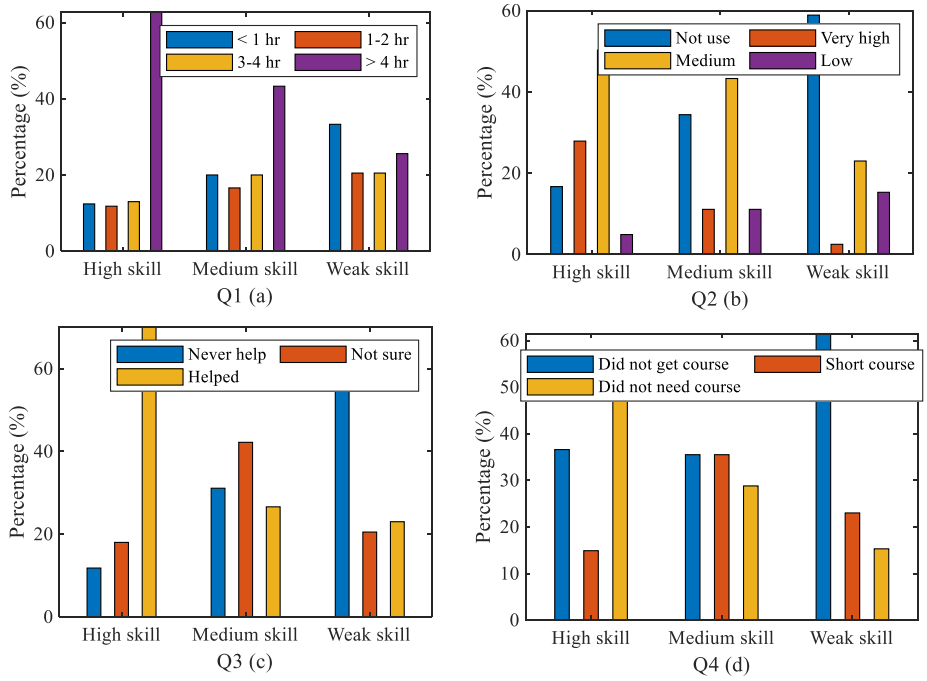

Fig. 3. Variations of student participants' level of ICT skills with student participants' characteristics: (a) Q1; (b) Q2; (c) Q3; and (d) Q4

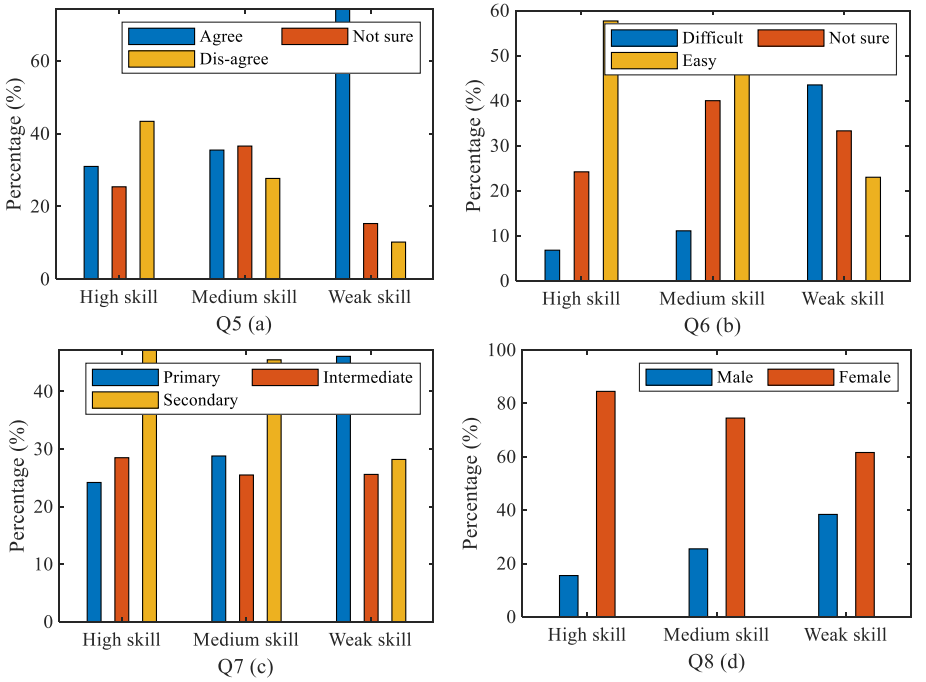

Fig. 4. Variations of student participants' level of ICT skills with student participants' characteristics: (a) Q5; (b) Q6; (c) Q7; and (d) Q8

Finally, students' characteristics and ICT skills were analyzed based on their demographic characteristics, as shown in Table 3 and Figure 5. A detailed comparison of differences in students' level of ICT skills, according to students' characteristics, revealed a significant difference in students' ICT skill levels and the number of hours they spent on the internet in a day ($p =< 0.0009$); students' skills in using email ($p =< 0$); and students who indicated their previous ICT skills had helped them in using the Madrasati platform ($p =< 0.000$). Moreover, significant differences were found in students' ICT skill levels and whether students needed

courses or explanations to use the Madrasati platform (p =< 0), whether students improved their ICT skills after using the Madrasati platform (p =< 0); whether they had difficulty in using the Madrasati platform (p =< 0); and students' gender (p = 0.004). However, no significant difference was found between students' ICT skills and school levels. Furthermore, reliability statistics of the research hypothesis revealed that Cronbach's alpha value was 0.607, and Cronbach's alpha value, based on the standardized item, was 0.552, indicating quite a high level of internal consistency for our scale with this specific sample. It should be noted that the 14 items followed the questionnaire. Furthermore, comparing Cronbach's value with what is reported in the literature (Daud et al., 2018; Taber, 2018), the obtained value is in an acceptable range.

Table 3

Demographic comparison of student participants' level of ICT skills with student participants' characteristics

S.No	Students' characteristics	Level of ICT skills		
		x^2	df	p-value
1	Hours a day using the internet	22.68	6	0.0009
2	Skills in using email	47.68	6	0.000
3	Previous ICT skills helped you in using the MP	71.149	4	0.000
4	Did you obtain courses or explanations for using the MP?	28.31	4	0.000
5	Do you think using the MP helped increase your ICT skills?	32.387	4	0.000
6	What do you think of using the MP?	42.455	4	0.000
7	School-level	8.1411	4	0.08654
8	Gender	10.837	2	0.004434
School				
9	What do you think of using the MP?	3.1393	4	0.5348

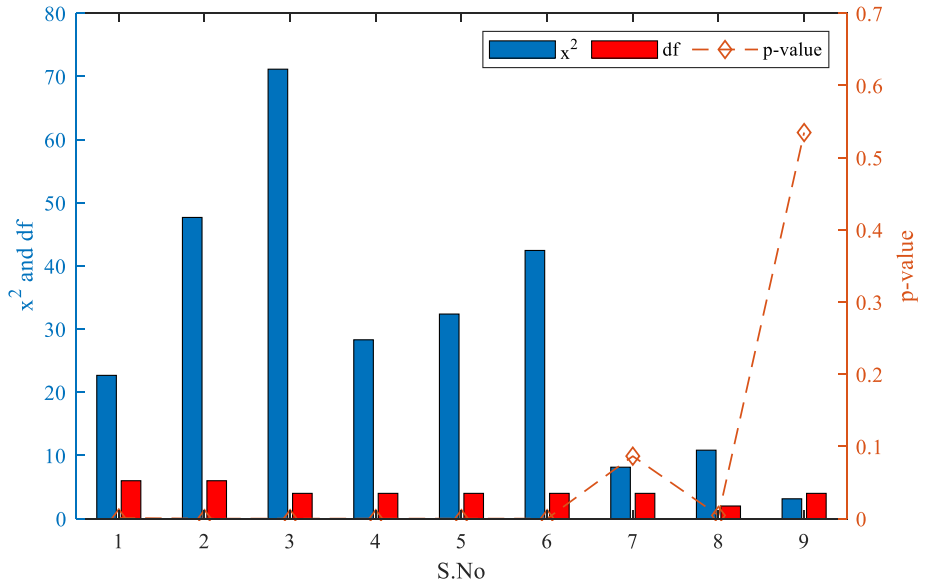

Fig. 5. Demographic comparison of student participants' level of ICT skills

6. Conclusion

This study, based on responses to a web-based questionnaire survey from students of sports psychology, investigated the influence of teachers' ICT skills, according to students' demographics, on students' characteristics and their ICT skills in adopting an e-learning system (the Madrasati platform) during the COVID-19 pandemic in Saudi Arabia. In total, 290 students of sports psychology participated in the survey. Based on their responses, analysis, and detailed discussion of the results concluded that, during the COVID-19 pandemic and the rapid shift to e-learning and distance education, students' ICT skills were highly improved in the field of sports psychology, as agreed by 62.7% of students, in comparison to their email skills. The analysis further concluded that 61.2% of student participants agreed that using the Madrasati platform as

an e-learning platform did not require a course or detailed explanation, with 48.4% of students with high skills in agreement. The study's analysis concluded that 'students' ICT skill levels were improved using the Madrasati platform as an e-learning Learning Management System (LMS). Comparing students' demographics and ICT skills with their characteristics concluded that students using the Madrasati platform and spending more time on the internet highly improved their ICT skills. Finally, reliability statistics of the investigated research hypothesis revealed a Cronbach's alpha value of 0.607 and a Cronbach's alpha value, based on the standardized item, of 0.552, thus indicating quite a high level of internal consistency for our scale with this specific sample.

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