Emerging Role of Information Technology for the Deaf Sportsmen during Lockdowns

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Abstract

Complete banned on sports activities during the corona days urge the need of computer based guidance for the deaf sportsmen during the lockdown period. The players of cricket, hockey and football were facing problems in the improvement of their skills without physical appearances in the ground. The study was performed to find out the use of information technology for the deaf players. The mixed method research approach was used to collect and analyze the data and significance of the results was performed using chi square test. It was observed that significant differences were found among the deaf players for communication, perfecting athletic movements and eliminating injuries except performance tracking and storing personal data for the use of computer by the players during the corona days. Significant differences were also studied for health issues, training schedules, video feedback, online registration and profile verification for the use of internet by the players during the corona days. Study showed significant differences for high cost of technology, destroy the spirit of the game, correct decision making by the referees and increase of illegal substances except for high quality training facility in the impact of technology on the players. Non significant differences in performance tracking, storing personal data and high quality training facility showed that all the players got technology benefits for these purposes during the corona days. The paper not only helps in establishing the role of computer based technology for the players but also provides the guidelines for deaf players for the improvement of their skills and fitness using technology.

Keywords: deaf**,** information technology, online, computer

Introduction

Deaf players are enthusiastic to rectify their errors in the sport grounds. But due to lockdown, all the sport activities are stopped. The main purpose of the use of technology in sports is to improve and address player's performance and health issues. This helps in players training that in turn supports them to play a longer period. Computer based system not only helps in making accurate decisions but

also increases the spectator excitement by broadcasting scoreboard in the stadium. Technology helps the sportsmen in different field like cycling (Sanderson and Cavanagh, 1990; Broker et al., 1993), rowing (Dal Monte and Komar, 1988; Gerber et al., 1985; Smith et al., 1994; Smith and Loschner, 2002), eye-movement recording (gazing) (Marr, 1982; Carpenter, 1988; Abernethy, 1990; Tenenbaum et al., 1996), cricket (Land and McLeod, 2000), volleyball (Vickers and Adolphe, 1997; Adolphe et al., 1997; Vickers, 1996)), football (Franks and Hanvey , 1997; Franks, 2000) and gymnastic (Shea and Wulf, 1999). In the recent years, technology development and used in the sports has tremendously increased. Kelly and Hubbard (2000) elaborated the driver training simulator. This advancement is projected not only to assist in training the US bobsled team, but also to offer a tourist attraction to enhance activities in the sports. Gymnasts can dress with motion sensors bearing suit that helps in recording their movements. Technology has significant impact on coaches and players. It provides training methods and techniques at relatively low cost. Qualitative information about the player's performances is provided by the technology. It can be further manipulated for individual notational analysis and game statistics in distant locations. Motor skills learning in human begins from birth (Meltzoþ and Moore, 1977) and continues throughout the life. Similar kind of learning was introduced in robots using computer based technology (Schaal, 1999). Many computer based systems are developed to check the action of athletes in competitions and attitude of coaches during training (Hughes and Franks, 1997). Sport analysis systems, many of which are computer-aided, are designed to describe in detail the movements and technical actions of the athlete. Computer aided systems not only provide digital and graphical data about the team performance to coaches or the sports analysts but also in enhancing sport specific analytical procedures (Franks and Nagelkerke,1988; Franks et al.,1989). McGarry et al. (2002) elaborated the role of computer systems in preparing expected trajectories of players and ball with the acquired data. This helps in analysis of work rate, an interactive representation and a graphical reconstruction of each player during his ground performance. Considering the need of the project, the objective of the study is to explore the role of the computer based technology for the players during the corona days.

Material and methods

The main objective of the study was to elaborate the use of computer based technology by the deaf sportsmen during corona days. To achieve the objectives, both quantitative and qualitative research was performed. Bryman (2006) described the importance of both qualitative and quantitative research methods. Qualitative research provides in depth knowledge about the participant views (Johnson & Christensen, 2004) while quantitative research explores generalization about the studied population. The blend of both research methods leads to the formation of mixed method that utilize the strength of both approaches for its findings (Johnson et al., 2007). The study utilized interview (qualitative) and questionnaire (quantitative) to overcome the limitation of singleresearch method. The participants of this study were (N=120) cricket, hockey and footballplayers who were frequently involved in physical appearances in the sports grounds. Data was collected using structured questionnaires and face to face interviews. The first part of the questionnaire contained demographic information of the individuals like gender, age and player association with the sport (cricket, hockey or football). The second part of the questionnaire explored the use of computer by the players during the

corona days (like communication, Performance tracking, Storing personal data, Perfecting athletic movements and eliminating injuries).The third section of the questionnaire explored the use of internet by the players during the corona days (like health issues,training schedules, video feedback, Online registration andOnline profile verification). The fourth section elaborated impact of technology on the players in form of advantages and disadvantages (like high cost of technology, destory the spirit of the game, high quality training facility, correct decision making by the refrees and increase of illegal substances). Qualitative data of the players was collected through confidence, communication skills, analytical skills and technical skills to probe extensively participant instance on the subject. The data collected in quantitative research was tested for independence of the data through chi square test. It was checked whether any relationship existed between the players ofcricket, hockey and football about the use of computer based technology during corona days.

Results

The objective of the study was to find out the use of computer based technology among the players of cricket, hockey and football. The study was performed on the population having the size of 120. Players of each game had equal (N=40) representation in the population. It has been observed that players of cricket used computer, 95% for communication, 97.5% for performance tracking, 77.5% for storing personal data, 70% for perfecting athletic movements and 57.5% for eliminating injuries. Players of hockey used 62.5% for communication, 90% for performance tracking, 87.5% for storing personal data, 52.5% for perfecting athletic movements and 50% for eliminating injuries. Similarly, playes of football used 45% for communication, 92.5% for performance tracking, 75% for storing personal data, 12.5% for perfecting athletic movements and 37.5% for eliminating injuries (table 1).It was further studied that players of cricket, hockey and football used internet, 62.5%, 25% and 12.5% for health issues, 55%, 50%, and 25% for training schedules, 97.5%, 92.5% and 82.5% for video feedback, 82.5%, 42.5% and 25% for online registration and 50%, 34% and 92.5% for online profile verification respectively (table 2). It has been observed that 75% of cricketers, 62.5% of hockey players and 82.5% of footballers elaborated the high cost of technology. 80% of cricketers, 90% of hockey players and 62.5% of footballers described that technology had destroied the spirit of the game. 97.5% of cricketers, hockey players and footballers elaborated that technology had provided high quality training facilities. 92.5% of cricketers, 87.5% of hockey players and 72.5% of footballers showed that technology helped in correct decision making by the refrees. 85% of cricketers, 80% of hockey players and 77.5% of footballers elaborated the increase of illegal substances by the use of technology(table 3).It was observed that 25, 27 and 26 of the cricketers, hockey players and footballers were excellent in confidence in qualitative analysis. 28, 29 and 20 of the cricketers, hockey players and footballers were excellent in communication. 23, 19 and 15 of the cricketers, hockey players and footballers were excellent in analytical skills. 20,32 and 9 of the cricketers, hockey players and footballerswere excellent in technical skills. Majority of the players had excellent qualitative characteristics that enhanced the accuracy of our quantitative results (table 4). Comparison of the confidence, communication, analytical skills and technical skills among the players in fig. 1,2,3,4 showed that hockey players were outclass in the most of qualitative analysis. Significance of the results was elaborated in table 5 that showed communication with 58.6258 and 0.00001, performance tracking with

03.9643 and 0.13770, storing personal data with 05.8654 and 0.5325, perfecting athletic movements with 76.3181 and 0.00001, eliminating injuries with 08.1124 and 0.17314, health issues with 61.0180 and 0.00001, training schedules with 21.0407 and 0.00027, video feedback with 13.9194 and 0.00094, online registration with 68.5097 and 0.00001, online profile verification with 80.0147 and 0.00001, high cost of technology with10.4473 and 0.0053, destroy the spirit of the game   with 21.4849 and 0.00002, high quality training facility with 0.29250 and 0.86390, correct decision making by the refrees with 15.1880 and 0.00005 and increase of illegal substances with 02.0946 and 0.35080 chi squre and P value respectively at $P \leq 0.05$.

Discussions

Physical activities are mostly expressed by the word sports in order to maintain the healthy life. Sports may be at professional, amateur and recreational level. The main purpose for all is to involve the body in some physical activity in order to maintain muscles in working positions (McGrath et al.; 2013). It is believed that any tactical gain in sports in the future is due to technical innovation (Balmer et al. 2011). The statement is endorsed through speed skating game, where it is claimed that half of the improvement of world records to date is due to adaptation of the technology (de Koning 2010). Haake (2009) reported that impact of adaptation of technology could be clearly seen by the improvement of results. Significant differences were found among the players for communication, perfecting athletic movements and eliminating injuries except performance tracking and storing personal data for the use of computer by the players during the corona days. Gibson (1979) and Michaels and Carello (1981) put forward the concept of self motion relative to the surroundings. This concept is utilized in computer in producing virtual environment. This relationship is implied in simulation training that is used in three dimensional displays. Some errors during the training were overlooked by the coaches and players due to human errors. These are the computer based system that provides accurate feedback through video in improving the skills of players in timely manners (McClements et al., 1996). Hubbard and Alaways (1989) elaborated the importance of technology in the javelin throw. The feed back to the player after first throw improved in performance in the next throw by providing information about release speed, release angle, attack angle and pitch rate. Salmoni et al., (1984) reported that training followed by feedback increased the dependency on the computed information. Independent player performs more confidently by correcting his errors determined on the basis of self judgments. Shea and Wulf, (1999) reported that external feedback (computer based) was more important than internal feedback like balance maintenance tasks especially in early stages of skill acquisition. Significant differences were also studied for health issues, training schedules, video feedback, online registration and profile verification for the use of internet by the players during the corona days. Feedback through technology has positive impact on the performance in all sports activities (Schmidt et al., 1990; Winstein and Schmidt, 1990). Winkler (1996) emphasized the role of computer based systems to resolve the fitness issues of the players by applying two video cameras interlinked to a computer. This helped him in analyzing the player's issue. Lundeberg et al., (1984) elaborated the importance of feedback on spindles and pain receptors that helped players in reducing pain and causing muscular relaxation. It also helps players in maintaining muscle elasticity during training (Nazarov and Spivak, 1987). The role of mechanical segmental vibrations during simple arm lifting movements was elaborated by

Liebermann and Issurin (1997). The players feel fewer loads during vibration conditions resulting in heavy load lifting. Vibration may have the negative impact as well it. It alters the position and velocity sensing (Goodwin et al., 1972; Sittig et al., 1985, 1987) resulting in limb displacements without the players awareness. Vibration has the positive role in astronaut physical training. It has positive impact in space missions for the reversal of osteoporosis (Rubin et al., 2001). Bartlett (1999) elaborated the disadvantages of the technology as computer aided training results in similar skill development in the players. Moreover, less body and joint movements result in health issues (Ay and Kubo, 1999). Sports technology is a complicated and expensive systems used for gathering and processing of large amount of data. Computer based real-time tracking of a football match and the analysis of training (von der Grün et al.; 2011) are considered expensive technology. Study showed significant differences for high cost of technology, destroy the spirit of the game, correct decision making by the referees and increase of illegal substances except for high quality training facility in the impact of technology on the players. Schmidt and Lee (1999) described the improvement of the skills, If proper feedback is provided in a suitable way. It not only improves the player skill performance but also his confidence as well. This facility is provided by the enhancement of computer based technology. Many athletes and coaches believe that use of technology in the sports is highly valuable and priceless. The concept of feedback might be started from mechanical control theory concept elaborating engineering models and close-loop systems in maintaining equilibrium which would help in main actuator working (Shannon and Weaver, 1949). Learning process is increased by getting feedback through virtual environment using technology as compare to standard coaching procedures (Todorov et al., 1997). Similarly to judge a ball where it should be landed and what its impact should be is more described by the three-dimensional virtual environment as compare to real situations (Zaal and Michaels, 1999). Qualitative study showed that the hockey players were out class in most of qualitative assessments especially in technical skills. Liebermann et al., (1988) described that timing is the main element to perform an activity in a skill performance. This can be easily learnt with a little attention. Dufour (1993) reported the use of computer algorithms in the sports. He judged the players performances in physical, technical and tactical sections. He confirmed the accurate analysis and feedback for players, coaches and team using computer-aided systems. Land and McLeod (2000) described the importance technology for the cricketers in establishing motor actions within the time constraints of the game. Franks and Hanvey (1997) and Franks (2000) described the computer based training for the goal keepers. They proved significant differences in their performances in saving penalty kick.

Conclusions

Computer based technology provides better information to the coaches and players. It facilitates in better match analysis, performance ranking, players selection, players fitness issues, playing technique improvement, sports statistics and predictions. Its introduction improves the sport performance environment. Non significant differences in performance tracking, storing personal data and high quality training facility showed that all the players got technology benefits for these purposes during the corona days.

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Table 1.Statistics for the use of computer by the players during the corona days.

Players	Total	Communication				Performance tracking				Storing personal data				Perfecting athletic movements				Eliminating injuries			
		User		Nonuser		User		Nonuser		User		Nonuser		User		Nonuser		User		Nonuser	
		F	P	F	P	F	P	F	P	F	P	F	P	F	P	FF	P	F	P	F	P
Cricket	40	38	95	2	5	39	97.5	1	2.5	31	77.5	9	22.5	28	70	12	30	23	57.5	17	42.5
Hockey	40	25	62.5	15	37.5	36	90	4	10	35	87.5	5	12.5	21	52.5	19	47.5	20	50	20	50
Football	40	18	45	22	55	37	92.5	3	7.5	30	75	10	25	5	12.5	35	87.5	15	37.5	25	62.5

F = frequency, P = percentage

Table 2.Statistics for the use of internet by the players during the corona days.

Players	Total	Health issues				Training schedules				Video feedback				Online registration				Online profile verification			
		User		Nonuser		User		Nonuser		User		Nonuser		User		Nonuser		User		Nonuser	
		F	P	F	P	F	P	F	P	F	P	F	P	F	P	FF	P	F	P	F	P
Cricket	40	25	62.5	15	37.5	22	55	18	45	39	97.5	1	2.5	33	82.5	7	22.5	20	50	20	50
Hockey	40	10	25	30	75	20	50	20	50	37	92.5	3	7.5	17	42.5	23	12.5	17	34	23	66
Football	40	5	12.5	35	87.5	10	25	30	75	33	82.5	7	17.5	10	25	30	25	37	92.5	3	7.5

F = frequency, P = percentage

Table 3.Statistics of impact of technology on the players.

Advantange/disadvantages of technology	Cricket				Hockey				Football			
	Y		N		Y		N		Y		N	
	F	P	F	P	F	P	F	P	F	P	F	P
High cost of technology	30	75	10	25	25	62.5	15	37.5	33	82.5	7	17.5
Destory the spirit of the game	32	80	8	20	36	90	4	10	25	62.5	15	37.5
High quality training facility	39	97.5	1	2.5	39	97.5	1	2.5	39	97.5	1	2.5
Correct decision making by the refrees	37	92.5	3	7.5	35	87.5	5	12.5	29	72.5	11	27.5
Increase of illegal substances	34	85	6	15	32	80	8	20	31	77.5	9	22.5

F = frequency, P = percentage

Table. 4. Qualitative assessment of the players.

| Players	Total	Confidence				Communication skills				Analytical skills				Technical skills			
		E	VG	G	S	E	VG	G	S	E	VG	G	S	E	VG	G	S
Cricket	40	25	10	3	2	28	7	4	1	23	10	4	3	20	10	7	3
Hockey	40	27	6	5	2	29	6	4	1	19	8	2	11	32	6	1	1
Football	40	26	6	2	6	20	9	2	9	15	7	7	11	9	8	6	17

E= Excellent, VG= very good, G= good, S= satisfactory

Table.5. Chi square values of different variables for cricket, hockey and football players.

| Players	Chi-square value	P-value
Communication	58.6258	0.00001*
Performance tracking	03.9643	0.13770^{NS}
Storing personal data	05.8654	0.5325^{NS}
Perfecting athletic movements	76.3181	0.00001*
Eliminating injuries	08.1124	0.17314*
Health issues	61.0180	0.00001*
Training schedules	21.0407	0.00027*
Video feedback	13.9194	0.00094*
Online registration	68.5097	0.00001*
Online profile verification	80.0147	0.00001*
High cost of technology	10.4473	0.0053*
Destory the spirit of the game	21.4849	0.00002*
High quality training facility	0.29250	0.86390^{NS}
Correct decision making by the refrees	15.1880	0.00005*
Increase of illegal substances	02.0946	0.35080*

* Significant at P $\leq$ 0.05
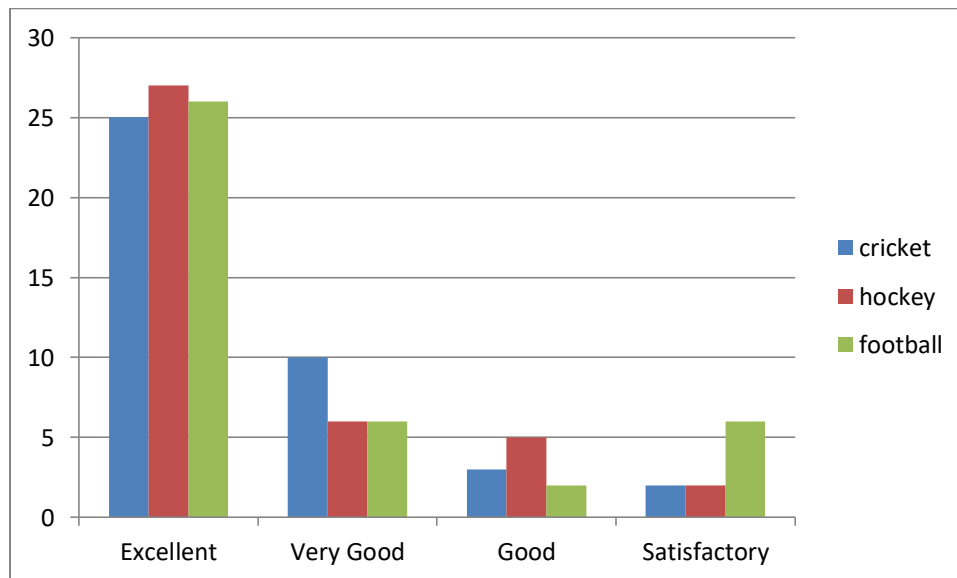
Fig 1. Confidence level of the players.
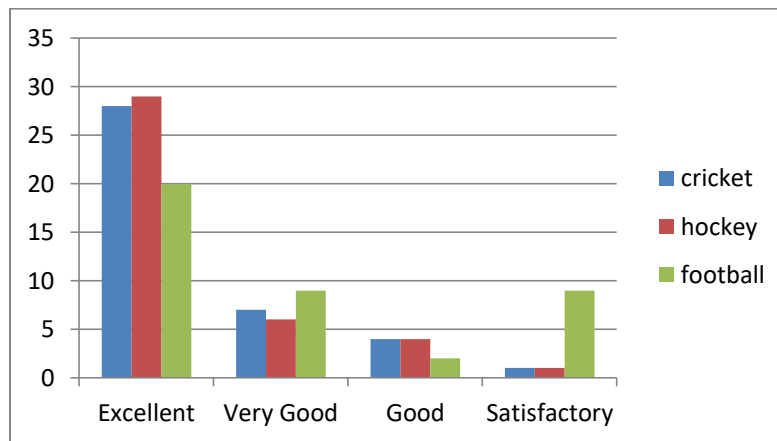
Fig 2.Communication skills of the players.
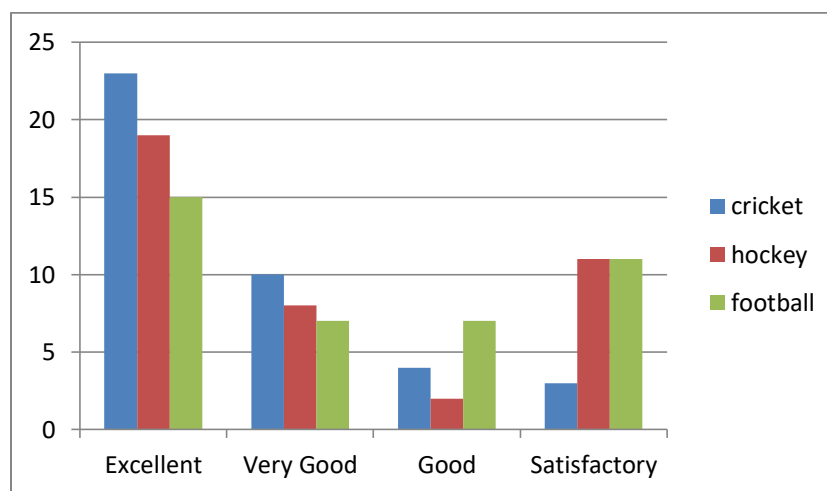
Fig 3.Analytical skills of the players.
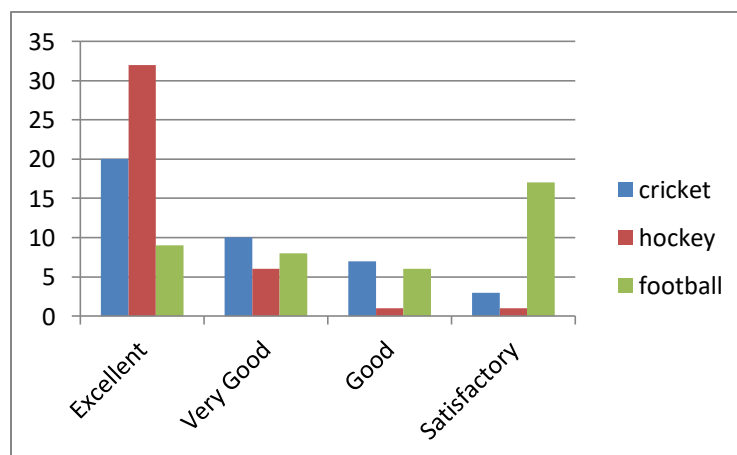
Fig 4.Technical skills of the players.