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Influence of Training Time and Skills Development on University Student-athlete Success and Competition Level

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ABSTRACT

Sport participation and spectatorship in South Africa have experienced a phenomenal growth over the past two decades. University students, who are the heart and soul of any university, have consequently recognised sport as a possible career path. Success in sport is dependent on the amount of time dedicated to training, and the skills acquired and developed during training. The purpose of this study was to investigate the influence of training time and skills development on student-athlete success and level of competition. A quantitative research approach was used to collect data over a three-week period from a convenient sample of 289 university student-athletes who participated competitively under the auspices of University Sport South Africa (USSA). Data were analysed using descriptive statistics, internal-consistency reliability, correlation analysis and cross-tabulations. The findings indicate a significant positive relationship between athletic skills gained during training and success, and athletic skills gained during training and hours of training. However, no significant relationship was found between hours of training and level of competition, and hours of training and success. Most student-athletes perceived that their athletic skills improved only slightly if they trained less than five hours per week. However, great improvement was experienced if they trained more than five hours per week. Given that sport at most universities has become commercialised and receives huge sponsorships that attract high calibre student-athletes, it is important for universities to create a conducive environment for student-athletes to be able to achieve both academic as well as athletic success. Student-athlete success has serious implications for the reputation and image of universities. It influences the institution's ability to attract financial resources such as sponsorships as well as high-performing student-athletes.

Keywords: Student-athlete, training, skills development, season success, competitive level

Introduction

The athletic development of university student-athletes across their participative lifespan is only possible with various stakeholder (e.g. coaches, sport managers, sponsors, university personnel) inputs as well as exposure to sport development programmes, facilities, competitions and other factors for the progression of young athletes to elite levels (Lyle, 1997). Since sport participation and spectatorship in South Africa have experienced a phenomenal growth over the past two decades, university students, who are the heart and soul of any university, have recognised sport as a possible career path. Over the past few decades,

the competitive nature of sport has necessitated effective sport structures at various levels to ensure the progression of athletes from junior to senior and ultimately elite levels of competition (Sotiriadou & De Bosscher, 2013). In this regard, universities play an integral part in the transition and development of athletes from junior level to the elite sport stage (FISU, 2018). South African student-athletes' recent all-time best podium performances at the FISU World Student Games in Napoli, Italy indicate the important stepping stone provided by South African universities for talented junior athletes to transition to the senior and world sporting arena (FISU, 2018). Likewise, the Rio Olympic Games' 400m gold medallist from South Africa, Wayde Van Niekerk, confirmed the impact that his participation as student-athlete in the 2013 World Student Games in Kazan had on his career development and transition into elite sport (FISU, 2019). Not only has University Sports South Africa (USSA) provided important elite-level competitive inputs for student athletes' development and transition to world-class sporting levels, but commercial interest explored by various companies has also impacted SA university sports positively (Hodges, Keyter, Tarr, Serra & Surujlal, 2014). In this regard, the South African university sport context underwent massive transformation, with commercialisation impacting competitions hosted at national level involving 16 out of the 22 universities in South Africa (Del Carme, 2013). The implementation of the FNB Varsity Cup competition at university level within nine different sporting codes has provided talented student-athletes a transitional career pathway and a hope to reach the pinnacle of their sporting careers (FNB Varsity Cup, 2015). In this manner, the FNB Rugby Varsity Cup that was launched in 2007 has produced more than 948 rugby players who progressed from university to professional ranks, and the annual university-level competition has produced more than 15 Springboks (FNB Varsity Cup, 2015). Similar findings are evident within other sporting codes, and currently, student-athletes' career and talent development at university level are positively influenced by various stakeholders (Fraser-Thomas & Côté, 2009). Success in sport is dependent on the amount of time dedicated to training, and the skills acquired and developed during training. In this regard, student-athletes spend a large amount of time practising, recovering and competing with an emphasis on athletic performance and winning outcomes (Carter-Francique, Hart & Steward, 2013). The perception that student-athletes internalise their own successful performances, potentially influences their performance outcomes (Steele, Spencer & Aronson, 2002). It is therefore important that athletes view their own skills development positively, and that they perceive it as substantially contributing to a successful sport season (Carter-Francique *et al.*, 2013). Their perceived success achieved during the season is also invariably linked to the amount of time dedicated to training, as well as the level of competition they reached during the season. Student-athletes aspire to elite-level sporting goals, and the attainment of their performances is affected by their perceived athletic skills development and performance (Fuller, 2014). It is important that student-athletes are satisfied with their performances, and therefore it is important to measure this construct (Fuller, 2014). Numerous studies have investigated student-athletes' perceptions and experiences of athletic and academic participation (Carter-Francique *et al.*, 2013; Fuller, 2014; NCAA, 2016); however, there is a dearth of knowledge on South African student-athlete training, skills acquisition, season success and competition experiences and perceptions.

Objectives

The purpose of this study was to investigate the influence of training time and skills development on university student-athlete success and competition level.

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Research questions

The study hypothesises that training time will significantly influence athletic skills development, and that skills development will influence success and competition level. Specifically, the study hypothesised that:

- H1.* An increase in training time will significantly influence skills development.
- H2.* Skills development will significantly influence success.
- H3.* Skills development will significantly influence competitive level achieved.

Methodology

A quantitative research approach using a descriptive research design following a single cross-sectional approach was adopted for the study.

Sampling method

Purposive sampling was used to recruit student-athletes from two universities within the Gauteng Province, South Africa. This sampling method is appropriate since the objective of the study was specifically aimed (Merriam, 1988) at investigating the influence of training time and perceived skills improvement on perceived season success and level of competition achieved of university athletes. Three hundred and twenty student-athletes (N=320) participating for their respective institutions in a variety of sports were recruited to voluntarily and anonymously complete the questionnaire. Data were collected over a three-week period in the presence of their coach.

Research instrument and data collection

A questionnaire comprising two sections was used to collect data. Section A requested demographic information of the participants and Section B comprised 50 items generated from the Talent Development Environment Questionnaire (TEDQ) (Martindale, Collins, Wang, McNeil, Lee, Sproule & Westbury, 2010). For the purpose of this study, the focus remains on the demographic questions posed, which were directed towards the following aspects: the number of hours student athletes were training per week (1 to 6 hours or more), perception about their season success (unsuccessful, somewhat successful or successful), the improvement of their athletic skills (1= declined greatly to 5 = improved greatly), and the level of competition they achieved during the current year (1= University team, 2 = USSA team/level, 3 = World student games, 4 = Provincial team/level, 5 = National team/level and 6 = Professional team/level).

Permission from the university authorities was obtained, after which the university sport coaches were contacted by the researcher. Coaches were requested permission to administer the questionnaire before or after official training sessions at the different universities' sports grounds. The questionnaires were completed in the presence of the researcher and coach. Participants were informed about the purpose of the study and that participation was voluntary and that they would remain anonymous. Participants were advised that they could terminate their participation at any time and were assured of confidentiality. Although permission was granted to conduct the study, the institutions requested to remain anonymous to ensure the anonymity of the student-athletes.

Data analysis

The captured data were analysed using the IBM Statistical Package for Social Sciences (SPSS), Version 25.0 for Windows. Data analysis comprised descriptive statistics, non-parametric correlation analysis and cross-tabulations.

Literature review

The national and international successful performances and results of South African university student-athletes indicate the positive talent development environment supported by commercial, private and government stakeholders at university level. The transition from junior to senior level is already a massive feat, and student-athletes' success is dependent on various factors such as the university coaches, training, support services and the environment they practise and compete in (Denton & Hasbrouck, 2009; Henriksen, Alfermann, Hvid Larsen & Christensen, 2013). In order to prepare university athletes for the international stage, top-level university coaches focus on the holistic development of athletes and aim to develop physical, psychological cognitive and emotional skills as part of the inter-related process of athletic career development (Segers, Vloeberghs, Hendrickx & Inceoglu, 2011; Sotiriadou & De Bosscher, 2013). The theoretical foundation of this study was underpinned by the lifespan developmental and holistic perspective on athletic career model by Wylleman and Lavallee (2004). In this regard, coaches invest many hours of deliberate practice and focus on mastering and developing skills of one particular sport for student-athletes, aiming at elite and world-class performances (Wylleman & Lavallee, 2004; Ford, Coughlan, Hodges & Williams, 2015). It is during this university participation stage that student-athletes spend more hours training compared to their junior participation phase, and subsequently experience large gains in skills development (Balyi, Way & Higgs, 2013). Even though increased practice hours, as advocated by Ericsson, Krampe and Tesch-Romer (1993), increase skills development, play-type activities also provided skills development as a result of interaction between related factors (Ward, Hodges, Starkes & Williams, 2007). Student-athletes who engage in deliberately designed activities to improve their performance as well as dedicate more time in decision-making activities during team practice, progress to elite levels of competition (Ward *et al.*, 2007). University coaches not only need to create enjoyable and motivating training climates, but also need to ensure increased hours of training for fitness optimisation, position specific skills training, technical and tactical preparation, as well as mental, cognitive and emotional skills development (Camiré, Trudel & Bernard, 2013; Ford *et al.*, 2015). In this regard, the Long-term Participant Development Model (LTPD) describes the following athletic aspects to be developed over a period of time: strength, stamina, speed, skill and suppleness (flexibility), and emphasis is placed on these aspects by coaches to improve these skills until athletes reach the highest level (SASCOC, 2012; Balyi *et al.*, 2013).

For athletes to develop sport-specific skills and the physiological level needed for elite participation, they need to train for an average of three hours per day over a ten-year period (Balyi *et al.*, 2013). It is during the university sport competition phase that the athletes' physical, technical, tactical and mental abilities are fully established, and the higher training load is directed to optimise performance (Balyi *et al.*, 2013). Training is characterised by high intensity training with relatively high volume (Balyi *et al.*, 2013). Instances within the United States of America have been reported where the training volume is so high that athletes spend between 27 and 40 hours training (NCAA, 2016). The study by the NCCA highlights the increased training hours experienced by athletes while studying and in addition it also indicates the intended transition athletes endeavour to make towards elite levels of performance and the training time they are willing to put in in order to achieve their goals (NCAA, 2016). The NCAA's measurement of the student athletes' training experience, improved the management of the talent environment, training and skills improvement, and therefore it is important to measure student athletes' perception about their training, season

success and skills improvement, which could lead to higher levels of competitions reached (NCAA, 2016).

Among the numerous factors previously mentioned that influence student athletes' progression through university sport, is the role of the coach (Erickson & Gilbert, 2013). Coaches are instrumental in helping student athletes to transition from junior to senior and elite levels of sport participation (Vallée & Bloom, 2005; Balyi *et al.*, 2013). Coaches guide student-athletes to achieve their potential and, over a period of time, to improve fitness, enhance physical performance, reduce injury risks, and develop confidence (Lloyd, Cronin, Faigenbaum, Haff, Howard, Kraemer & Oliver, 2016). Coaches provide the structure, training and guidance during the training hours (Van Den Berg & Surujlal, 2013), and play an important role in providing continuous, sport-focused and individualised professional development of student-athletes to compete at competitive and elite levels (Denton & Hasbrouck, 2009). Within a sporting context, coaches need to improve the performance of athletes so that they can compete at higher levels, and the manner in which the coaches develop the talent of the athletes will ultimately determine the level at which the athletes will be able to compete. Coaches guide the training hours and focus on skill improvement and through goal setting help student athletes to perceive their season success and contribute to the higher competitive levels reached (Martindale *et al.*, 2010).

Findings

Demographics

Two hundred and sixty-seven completed questionnaires (n=267) were received from the 320 (N=320) that were administered to student-athletes at the different universities. Almost the same number of male (n=135, 50.6%) and female (n=132, 49.1%) participants comprised the sample of the study. The majority of participants were younger than 25 years of age (90.4%) and were either in their first or second year of study (59.5%). The main sports that participants participated in were rugby (19.4%), hockey (15.0%), netball (11.2%), basketball (16.5%) and soccer (16.6%).

Table 1
Sample description

Variable	Categories	%
Gender	Male	50.5
	Female	49.1
Age group	18 to 25 years	90.4
	26 to 33 years	8.9
Year of study	1 st year	29.9
	2 nd year	29.6
	3 rd year	18.1
	Postgraduate	15.5
	Other	6.3
Sport participation	Rugby	19.4
	Cricket	2.6
	Hockey	15
	Netball	11.2
	Athletics	1.9
	Body building	2.2
	Basketball	16.5

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Variable	Categories	%
	Volleyball	6.8
	Soccer	16.6
	Other	2.6

Cross-tabulations

Cross-tabulations were computed to ascertain the influence of the training time on skills improvement as well as to evaluate the perception of season success on competitive level achieved, as presented in Tables 2 and 3.

Table 2 indicates that approximately half of the student-athletes (n=131; 50.6%) reported to train at least six hours per week. Within the 50.6% student-athletes who trained six hours per week, only one student (n=1) perceived skills development to have greatly improved, while 116 students (55.2%) indicated a slight improvement of their skills. A further six students (27.3%) indicated that their skills remained the same, with seven student-athletes' (35.5%) skills declining slightly and one declined greatly (14.3%). In contrast, 47 (18.1%) and 41 (15.5%) student-athletes trained for five hours and four hours per week, respectively. A total of 41 (sum of n=17, n=21 and n=3; 25.1%) student-athletes trained for three hours or less per week.

Table 2: *Cross-tabulation on training hours and skills development*

		Hours per week training						Total
		1 hour	2 hours	3 hours	4 hours	5 hours	6 hours	
Skills	Declined greatly	0	0	0	1	5	1	7
	%	0.0%	0.0%	0.0%	14.3%	71.4%	14.3%	100.0%
	Declined slightly	1	5	2	2	3	7	20
	%	5.0%	25.0%	10.0%	10.0%	15.0%	35.0%	100.0%
	Remained the same	0	3	2	6	5	6	22
	%	0,0%	13,6%	9,1%	27,3%	22,7%	27,3%	100,0%
	Improved slightly	2	13	13	32	34	116	210
	%	1%	6.2%	6.2%	15.2%	16.2%	55.2%	100.0%
	Improved greatly	0	0	0	0	0	1	1
	%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	100.0%
Total	Count	3	21	17	41	47	131	260
	% within hours training	1.2%	8.1%	6.5%	15.8%	18.1%	50.4%	100.0%

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Table 3: *Cross-tabulation on success and competitive level*

Competitive level	Unsuccessful		Somewhat successful		Successful		Total	
	n	%	n	%	n	%	n	%
University	7	63.6%	35	37.5%	52	32.5%	94	35.6%
USSA team	0	0%	22	23.7%	17	10.6%	39	14.8%
World Student	0	0%	1	1.1%	3	1.9%	4	1.5%
Provincial	2	18.2%	25	26.9%	39	24.4%	66	25%
National	1	9.1%	7	7.5%	31	19.4%	39	14.8%
Professional	0	0%	2	2.2%	17	10.6%	19	7.2%
Other	1	9.1%	1	1.1%	1	0.6%	3	1.1%
Total	11	100%	93	100%	160	100%	264	100%

According to Table 3, 11 (4.1%) student-athletes perceived their season as unsuccessful regardless of the level they competed in, with a large percentage of these athletes (n=7; 63.6%) who participated at university team level viewing their season as unsuccessful. Thirty-five participants (37.6%) perceived their season somewhat successful and 52 (32.5%) successful by participating for the university team. A total of 160 (60.6%) student-athletes perceived their season successful, with 93 (35.2%) who viewed their season as somewhat successful, regardless of the level they competed at. A total of 39 (14.8%) athletes were selected for the USSA team in their sport, four (1.5%) for the World Student team, 66 (25%) a provincial team, 39 (14.8%) a national squad, 19 (7.2%) a professional team and three (1.1%) reached other competitive levels. This totals 170 (64.4%) athletes who progressed to higher competitive levels other than the university team.

The correlations in Table 4 indicate a statistically significant positive relationship ($p \leq 0.01$) between training hours and athletic skills improvement ($r = 0.164$) and athletic skills gained and perceived season success ($r = 0.365$). The season success significantly correlated with competition level reached ($r = 0.184$). However, no significant relationship was found between hours of training and level of competition; and hours of training and success. The strongest correlation was between athletic skills improvement and season success and the weakest between hours training and skills improvement.

Table 4
Correlation analysis: Spearman's rho

		Season success	Athletic skills improve	Hours training	Competition level
Success of season	Correlation coefficient	1,000	.365**	-0,014	.184**
	Sig. (2-tailed)		0,000	0,820	0,003
	N	265	260	264	264
Athletic skills improvement	Correlation coefficient	.365**	1,000	.164**	0,091
	Sig. (2-tailed)	0,000		0,008	0,146
	N	260	261	260	259
Hours training	Correlation coefficient	-0,014	.164**	1,000	-0,093
	Sig. (2-tailed)	0,820	0,008		0,130

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		Season success	Athletic skills improve	Hours training	Competition level
	N	264	260	266	264
Competition level	Correlation coefficient	.184**	0,091	-0,093	1,000
	Sig. (2-tailed)	0,003	0,146	0,130	
	N	264	259	264	265

**Correlation is significant at the 0.01 level(2-tailed)

*Correlation is significant at the 0.05 level(2-tailed)

Discussion

The statistically significant correlation between training hours and athletic skills development confirms *H1* and is substantiated by Balyi, Way and Higgs (2013), who found that university athletes who engage in higher training hours experience increased skills development. These results correlate with the lifespan model by Wylleman and Lavallee (2004), whereby on the athletic level of the model, athletes experience skills development as they move from the developmental stage to the mastery stage according to their age. It is, however, concerning given the fact that only half of the student-athletes (50.4%) indicated to have trained for about six hours per week, since this is much lower than the average compared to their American counterparts who trained between 27 and 40 hours (NCAA, 2016). Although untested in this study, a plausible reason for this could be the low number of hours devoted to training because of the academic demands on them. Trail and Chelladurai (2000) investigated the goals of intercollegiate students and found that student-athletes focused on academic achievement as their most important goal. With regard to perceptions regarding the relationship between the number of hours trained and skills acquired, it is interesting that Memmert, Baker and Bertsch (2010) found, in their study on the development of creative behaviour in team ball sports, that players were more creative because they spent more time in structured training activities than their less-creative counterparts. With just over half of the student-athletes (55.2%) indicating only a slight skills improvement, the question can be asked whether the university coaches successfully engaged the athletes in deliberate practice that should have resulted in higher skills development for the training hours (Ericsson, Krampe & Tesch-Romer, 1993). Deliberate practice entails specific and specialised training aimed at mastering superior skills in a sport aimed at achieving at elite levels (Ericsson, Krampe & Tesch-Romer, 1993), and coaches should focus on not only enhancing the training hours of their athletes, but also ensuring that more deliberate practice is taking place (Balyi, Way & Higgs, 2013). Wylleman and Lavalle (2004) argue that it may not be surprising that skills development has not been at optimal levels, since numerous supportive factors influence the transition from developmental to mastery stage (Sotiriadou & De Bosscher, 2013).

The improvement in athletic skills – even though half viewed it as a slight increase – perceived by student-athletes influenced their season success as indicated by the statistically significant correlation between these two constructs. Therefore, *H2* can be accepted and explained according to previous studies, whereby university coaches focus on optimising various sport performance aspects such as physical conditioning, mental skills, position specific skills training and technical and tactical skills development (Camiré *et al.*, 2013; Ford

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et al., 2015). In this regard, Côté and Sedwigck (2003) opined that the planning of practice sessions by expert coaches is proactive and athletes benefit by gaining more skills. The higher level of expertise of university coaches and the focus to improve a wider variety of performance-related aspects compared to high school sport coaches could have led to student-athletes experiencing a slight skills increase and therefore also influenced their success achieved (Bloom, 2002; Vallée & Bloom, 2005).

The statistically significant correlation between season success and competitive level reached confirms *H3*. In this regard, 19 students (7.2%) reached professional team squads, which correlates with literature, which suggests that on average, only one junior athlete in three successfully transition into the senior elite ranks (Australian Sports Commission, 2003). However, thirty-nine (14.8%) students progressed to national competitive levels, sixty-six (25%) provincial, four (1.5%) world student games and thirty-nine (14.8%) USSA team levels, which indicate that student-athletes progressed from university team level participation to higher competitive levels. Even though the majority of students did not progress to elite professional level, Hollings, Mallett and Hume (2014) posit that student-athletes who perceived their skills improvement as being successful had a higher sense of accomplishment and therefore reached higher competitive levels. In this regard, the findings indicate that a total of 64 percent athletes progressed in competitive level, which indicates that university coaches are developing athletes to higher levels. However, these athletes had various perceptions about the success of their season, regardless of the competitive level they reached. From the 94 student-athletes who only participated at university level, 7% viewed their season as unsuccessful, 35% as somewhat successful, and 52% as successful. In addition, two athletes who reached professional levels viewed their season as somewhat successful, while the other 17 reaching professional teams viewed it as successful. In this regard, the perception of student-athletes and their abilities and the intended competitive goals they strive to attain, differs from athlete to athlete, and could therefore influence their perceived success (Hollings *et al.*, 2014).

Limitation

An important limitation of the study is that data was collected from student-athletes from two universities in only one province in South Africa. Hence, the findings cannot be generalized to the greater population of students in South Africa. A positive contribution, however, is that the results of the study adds to the existing literature on the influence of time spent on focused training for the acquisition of skills in sport and the talent development environment as a whole.

Recommendation

The significant influence of training time on skills development and skills increase on success and competitive levels within the study indicates that student-athletes are exposed to an enhanced talent development environment with better coaching and training compared to their previous exposure. However, taken into account the low number of hours spent on training per week compared to universities from various countries, South African university management could look into the possibility of increasing the training hours of student-athletes. In this regard, support services should also be available to students to help balance the increased training demand against their time spent on academics.

The indication of a slight increase in skills by half of the students could also become a focus area of improvement, where management need to ensure deliberate practice from highly trained and skilled coaches. This could lead to higher skills development and competitive levels achieved by more student-athletes.

Conclusion

The findings of this study provide evidence that improved performance and competing at higher levels of competition are dependent on the skills acquired by student-athletes during training. It is evident that athletes who spend less time training do not acquire the skills required to compete at the highest level. Therefore, coaches should assist student-athletes to plan their training sessions in such a way that a balance between their academic and sporting life is developed.

This study is significant as it provides High Performance (HP) university managers with a better understanding of athletic developmental perspectives to establish continuous systems of support, training and coaching. Likewise, for the HP manager, the findings could raise awareness of factors relevant to athletic skills development needed within the current university talent development environment.

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