A Bifactor Analysis of Sport Literacy: Hands-on Knowledge and Context Knowledge

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Intro/Background/Purpose
For the last several decades, many sport teams/events-professionals, collegiate, and amateur-have strived to attain their spectators while seeking strategies to succeed in fan development. Likewise, scholarships in sport management have strived to generate theoretical foundations in understanding sport fans and have explained the mechanisms or characteristics of the fan development model. Major topics of focus have included motivation (e.g. Fink, Trail, & Anderson, 2002), identification (e.g. Wann & Branscombe, 1990, 1995) as well as models and measurement tools of sport fanship (e.g. Bahk, 2000; Trail, Anderson, & Fink, 2000; Trail & James, 2001), yet the cognitive aspect of spectators has been barely addressed in the scholarship. The current study explored the concept of sport literacy in sport and examined the factor structure of sport literacy (hands-on knowledge and context knowledge) to provide a theoretical foundation.

Sport literacy refers to the “understanding of hands-on knowledge and context knowledge as well as the ability to read, analyze, and interpret sport games and play in a form that deepens the spectating experiences” (Kim, 2016). Many scholars have argued that greater understanding in sport may facilitate people to learn and appreciate the rules and experiences of the game which is beneficial for the longevity of the sport (Dietz-Uler et al., 2000; Kim, 2016; Murrell & Dietz, 1992; Park, Mahony, Kim, 2011); however, there is insufficient empirical research in the area of characterizing spectators’ sport literacy. This study proposes two constructs through robust theoretical reviews and empirical evidence: a) hands-on knowledge (e.g., rules, skills and drills, and strategy) and b) context knowledge (e.g., team/player, history, culture, and statistics).

One interesting question that can be developed from the proposition: “Are hands-on knowledge and context knowledge two separate constructs or simply two domains to the study of sport literacy?” One way to address this issue is to examine the joint factor structure of hands-on knowledge (HK) and context knowledge (CK). If HK and CK are independent constructs and can differentially predict external variables, beyond the shared variance with the general sport literacy construct, it is likely that HK and CK are two related yet distinct constructs. On the other hand, if either HK or CK do not form an independent factor after considering the shared common variance, it calls into question the conceptual uniqueness of these two types of sport knowledge. The purpose of this study is to examine these theoretical claims by using a bifactor modeling approach.

Methods
The study first employed a multiple case study method (Eisenhardt, 1989) to identify the structure of sport literacy construct. Men’s college basketball was chosen as the context of this study. 12 content experts (players, coaches, and fans) participated in the interviews and scenario plays. Second, a bifactor analysis was performed to determine structural relationships. The bifactor model is consisted of one general factor (sport literacy) and two specific factors (hands-on knowledge and context knowledge). For comparison purposes, a second-order factor model was also tested. The model has two specific factors as the lower-order factor and sport literacy as the higher-order factor. The study further investigated whether HK and CK were associated with external variables (team identification, intention to watch the game). The bifactor and second-order factor were compared using a 40-item college basketball literacy assessment (CBLA). The CBLA was developed to assess the level of sport literacy which includes 23 hands-on knowledge items and 17 context knowledge items. A total of 382 responses (male: 224, female: 158) were collected in 2016 from three public universities in the Southwestern region of the States. All analyses were conducted using Mplus version 7.4 (Muthen and Muthen 1998-2015).

Findings/Contributions/Conclusions
As noted, the multiple case study identified two constructs (i.e., HK and CK) for sport literacy. The preliminary two-factor CFA analysis indicated that HK and CK were highly correlated (r= 0.857). This correlation provides a
foundation for bifactor model. It is expected that responses to the CLBA items could be explained by one general factor that captures the commonality shared by the two specific factors over and above the general factor. In this study, hands-on knowledge and context knowledge would form two specific factors and sport literacy is the general factor. The model fit the data adequately, $\chi^2=769.206$ (df = 700), RMSEA=0.016 (CI: 0.005, 0.023), WRMR=0.786, CFI=0.995, and TLI=0.994. However, several items had stronger loadings on the general factor than on the specific factors, suggesting that most of their variances were shared with the general factor and that their specific factors were relatively weak. The second-order factor model consisted of one second-order factor and two lower-order factors, hands-on knowledge and context knowledge. The model poorly fit the data, $\chi^2=4947.216$, RMSEA=0.122 (CI: 0.119, 0.125), WRMR=2.947, CFI=0.672, and TLI=0.655. HK and CK were both positively related to team identification and intention to watch the game.

From a theoretical perspective, the study identified the structural relationship between hands-on knowledge and context knowledge over and beyond the concept of sport literacy. The results of this study provide support for the notion that HK and CK are conceptually related to each other. On the other hand, the findings also indicate that controlling for the general factor of sport literacy, the components of HK and CK from specific factors, allows for the capture of their unique variances. This implies that HK and CK are also distinct constructs, even though they are closely related at the general construct level.

From a practical standpoint, this finding can contribute to the development of spectators’ literacy and provide additional insight in developing sports fans. “What knowledge construct is more important in becoming a sport fan?”, “Does the level of each knowledge construct affect the sport game experience?”, “What are the effective ways for educating and delivering each knowledge components to the spectators?” are potential issues for sport managers with regards to their fan development.

In conclusion, the study introduced the bifactor model as a possible tool for addressing theoretical and empirical issues in spectator research. This could be beneficial for sport managers who want to understand spectators’ sport literacy, potentially aiding them in developing strategies for recruiting and retaining sport fans.