INTRODUCTION

Twenty-first century skills (e.g., teamwork, leadership) represent the knowledge and skills that one must possess to live in the emerging global marketplace (Silva, 2009). As globalization becomes a reality, the need for youth to develop such skills has become a pressing priority. Schools and other youth development settings often have an opportunity to foster such skills. Unfortunately, few instruments specifically assess 21st century skills (Silva, 2009). A demonstrable need exists for psychometrically sound instruments to evaluate youth on critical 21st Century skills such as leadership and time management.

Several organizations offer frameworks of 21st Century skill development (e.g., Partnership for 21st Century Skills, American Association of School Librarians). Three key domains of skill are typically included: Learning and Innovation; Information, Media, and Technology; and Life and Career (Partnership for 21st Century Skills, 2009). Learning and innovation skills include creativity, critical thinking, problem solving, and collaboration. Information, Media, and Technology encompasses several types of literacies related to the growing prominence of technology in learning (e.g., information literacy, media literacy, etc.). Life and career skills include key skills necessary for youth to work in complex environments, such as time management, initiative, and self-directed learning.

In addition, recent research (Christen, 2009; Pappas, 2009) emphasizes the importance of 21st Century learning environments that provide opportunities to apply 21st Century skills across content areas. These settings enable innovative learning methods that integrate the use of technology, inquiry- and problem-based approaches and higher-order thinking skills. Research highlights the importance of these settings and notes that an emphasis on 21st Century skills in learning environments can influence both how and what young learners learn (Roschelle et al., 2000).

METHOD

Instrument Development

The 21st Century Assessment was developed using steps of scale development outlined by DeVellis (2003). Following a thorough review of literature, the researchers initially developed 29 items to measure 21st Century skills in the three domains identified in the literature. These items also included measures of 21st Century learning environments. All items utilized a 5-point Likert-type response scale (1 = Not at all true; 5 = Really true).

Participants and Data Collection

The 21st Century Assessment was administered to middle school students (N = 267) in grades 6 (34.9%), 7 (34.9%), and 8 (27.8%). Nearly half (47.9%) of respondents reported as male and 46.1% reported as female. Half of the students reported their race/ethnicity as African American (50.8%), 25.2% reported as White, and 21.1% reported as Multi-Racial.

Data Analysis

This study utilized an exploratory factor analysis (EFA) to examine the psychometric properties of the 21st Skills Assessment, comprised of items measuring both 21st Century skills and 21st Century learning environments. Principal axis factoring with varimax rotation allowed an examination of the underlying factor structure of each component of the 21st Skills Assessment. In addition, estimates of internal consistency and intercorrelations were calculated among the resulting factors.

RESULTS

Two separate EFAs were used to determine the factor structures of the two scales comprising the 21st Century Assessment. One EFA was used for the analysis of the 21st Century Skills scale and another for the analysis of the 21st Century Learning Environment scale. Factor analysis was deemed appropriate given significant (p < .01) Bartlett’s (1954) Tests of Sphericity and Kaiser-Meyer-Olkin Measure (KMO; Kaiser, 1974) values of 0.92 and 0.90.

Items were eliminated if they did not load greater than .50 (Tabachnik & Fiddell, 2007). Results of the EFA indicated that the 21st Century Skills scale resulted in a four-factor solution accounting for 62.75% of the total variance. The 21st Century Learning Environment scale resulted in a one-factor solution accounting for 49.97% of the total variance. The factor loadings are presented in Tables 1 and 2 and discussed further below.

21st Century Skills

The resulting four factors were positively related to each other and demonstrated strong internal consistency. Descriptive Statistics and Correlations for the 21st Century Skills scale are presented in Table 3. The factors are as follows:

- **Factor 1:** Accounted for 37.16% of the variance and comprised five items, labeled Self-Directed Learning.
- **Factor 2:** Accounted for 11.38% of the variance and comprised four items, labeled Working Responsibly with Others.
- **Factor 3:** Accounted for 7.34% of the variance and comprised four items, labeled Leadership.
- **Factor 4:** Accounted for 6.88% of the variance and comprised four items, labeled Time Management.

21st Century Learning Environment

The one-factor solution was comprised of eight items accounting for 49.97% of the total variance. This solution demonstrated strong internal consistency as well (α = .88). The factor loadings are presented in Table 2.